



Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

■ May 2018

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 May 2018 included the following:

- Bitumen sealing work
- Earthworks
- Continuing bridge works including deck pours, stitch pours and parapet installation
- 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
- Installation and maintenance of Erosion and Sediment Controls
- Pavement (Asphalt and Concrete)
- Decommissioning of the Precast Facility
- Verge / Median Placement including median Topsoil Placement
- Operation of asphalt batch plant
- Landscape Planting Works including Upper Warrell Creek
- Installation of Flood Alleviation Channel – Upper Warrell Creek
- Removal of temporary crossing at Upper Warrell Creek
- Fauna fencing

Works scheduled for next month include the following:

Note: The WC2NH project stage 2b (Scott Head Road to Browns crossing) is planned to open to traffic from 29th June 2018.

- Fauna fencing
- Landscape Planting Works including northern bank of Upper Warrell Creek
- Bitumen sealing work
- Earthworks
- Continuing bridge works including deck pours, stitch pours and parapet installation
- 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
- Verge / Median Placement including median Topsoil Placement
- Operation of asphalt batch plant

1.2 Consultation Activities

The project’s consultation activities during May 2018 included the following:

Table 1 – Consultation Activities

Groups	Date	Key Topics
Toolboxes	Wednesday each week	Environmental and community issues communicated to the workforce.
RMS	Fortnightly	Communications look ahead, stakeholder issues.

Other Consultation Activities:

The following notifications were made to the community during May 2018.

- Appropriate notification about out of hours work at the southern interchange
- Appropriate notification about out of hours work at Williamson Creek

On-site meetings:

- 40 onsite meetings were held with community members in April 2018 regarding proposed property adjustments, boundary fencing, out of hours work, construction impacts, vegetation, flooding and other various matters.

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:

- Final opening notification being finalised for submission in June.
- Notifications concerning highway closures for maintenance work
- Meeting with emergency services concerning the highway opening
- Responding to community issues and concerns

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
1/05/2018 – 31/05/2018	12.80 mm	Northern Compound
1/05/2018 – 30/05/2018	7.20 mm	Albert Drive Compound

The site experienced a total of six (6) rain days throughout the month of May 2018.

During May 2018, rainfall received on site was lower than the May monthly average of 131mm. 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 May 2018 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**May 2018**

Date	Time	TOTAL Rain Gauge (mm)
1/05/2018	9:00 AM	0
2/05/2018	9:00 AM	0
3/05/2018	9:00 AM	0.2
4/05/2018	9:00 AM	0
5/05/2018	9:00 AM	0
6/05/2018	9:00 AM	0
7/05/2018	9:00 AM	0.4
8/05/2018	9:00 AM	0
9/05/2018	9:00 AM	0.6
10/05/2018	9:00 AM	0.2
11/05/2018	9:00 AM	0
12/05/2018	9:00 AM	0
13/05/2018	9:00 AM	0
14/05/2018	9:00 AM	0
15/05/2018	9:00 AM	0
16/05/2018	9:00 AM	0
17/05/2018	9:00 AM	0
18/05/2018	9:00 AM	0
19/05/2018	9:00 AM	0
20/05/2018	9:00 AM	0
21/05/2018	9:00 AM	0
22/05/2018	9:00 AM	0
23/05/2018	9:00 AM	0
24/05/2018	9:00 AM	0
25/05/2018	9:00 AM	0
26/05/2018	9:00 AM	3
27/05/2018	9:00 AM	0
28/05/2018	9:00 AM	2.4
29/05/2018	9:00 AM	0.4
30/05/2018	9:00 AM	0
31/05/2018	9:00 AM	0

Table 2.2 – Rainfall recorded at the Northern Compound Automated Weather Station**May 2018**

Date	Time	TOTAL Rain Gauge (mm)
1/05/2018	9:00 AM	0.2
2/05/2018	9:00 AM	0
3/05/2018	9:00 AM	0
4/05/2018	9:00 AM	0
5/05/2018	9:00 AM	0
6/05/2018	9:00 AM	0.2
7/05/2018	9:00 AM	0.2
8/05/2018	9:00 AM	0
9/05/2018	9:00 AM	2.2
10/05/2018	9:00 AM	0.2
11/05/2018	9:00 AM	0
12/05/2018	9:00 AM	0
13/05/2018	9:00 AM	0
14/05/2018	9:00 AM	0
15/05/2018	9:00 AM	0
16/05/2018	9:00 AM	0
17/05/2018	9:00 AM	0
18/05/2018	9:00 AM	0
19/05/2018	9:00 AM	0.2
20/05/2018	9:00 AM	0
21/05/2018	9:00 AM	0
22/05/2018	9:00 AM	0
23/05/2018	9:00 AM	0
24/05/2018	9:00 AM	0.2
25/05/2018	9:00 AM	0
26/05/2018	9:00 AM	7
27/05/2018	9:00 AM	0.8
28/05/2018	9:00 AM	1.4
29/05/2018	9:00 AM	0.2
30/05/2018	9:00 AM	0
31/05/2018	9:00 AM	0

Table 2.3: Weather conditions recorded in May 2018 at Smoky Cape by the Bureau of Meteorology.

May 2018			
Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/05/2017	16.8	26.1	0
2/05/2017	17.8	25.9	0
3/05/2017	17	22.6	0
4/05/2017	14.5	21.4	5.6
5/05/2017	14.5	23.2	1
6/05/2017	15.5	24.2	0
7/05/2017	15.7	25.7	0
8/05/2017	15	23.5	0
9/05/2017	14.2	23	0
10/05/2017	13.4	22	1.2
11/05/2017	14.6	23.3	0.6
12/05/2017	15	22	1.2
13/05/2017	15.5	*	1
14/05/2017	*	21.4	0
15/05/2017	14	21.8	39
16/05/2017	14.4	23	0
17/05/2017	15	23	0
18/05/2017	15	24.7	0
19/05/2017	16.5	19	19.4
20/05/2017	16.3	22.5	17.4
21/05/2017	16.2	24.1	0
22/05/2017	17	24.4	0
23/05/2017	16.2	24.5	0
24/05/2017	17	24	0
25/05/2017	13.3	22	0
26/05/2017	14.7	23.1	0
27/05/2017	14.2	23.1	0
28/05/2017	16.5	20	0
29/05/2017	14.3		2.4
30/05/2017	*	21	0
31/05/2017	10.8	19.5	0

*No data recorded on BOM Daily weather observation for Smoky Cape

3. Surface Water Monitoring

Pacifico have been provided trigger levels from 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

1. 5th May 2018

Field and laboratory testing - results are attached in Appendix A – Table 1a.

Note: the removal of the temporary crossing at Upper Warrell Creek had not commenced at the time of this surface water quality monitoring event.

pH levels noted to be outside of trigger levels at:

Lower Warrell Creek recorded elevated pH levels upstream and downstream (7.41 pH upstream, 7.31 pH downstream, 7.02pH trigger for upstream and downstream). 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 7.16 upstream, pH 7.35 downstream recorded April 2018, pH 7.33 upstream, pH 7.3 downstream recorded February 2017 and pH 7.18 upstream, pH 7.35 downstream recorded October 2017).

Nambucca River South recorded elevated pH levels (7.84pH Upstream, 7.79pH downstream, 7pH trigger upstream and downstream). It is noted that pH levels decreased from upstream to downstream and are consistent with previous results (pH 8.24 upstream, pH 8.21 downstream recorded April 2018). It should be noted that this section of the alignment is now operational with no major construction activities being undertaken at this location.

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

Upper Warrell Creek recorded elevated DO levels upstream (7.36mg/L recorded, 4.98mg/L trigger) and downstream (7.4mg/L recorded, 4.8mg/L trigger). Results decreased from upstream to downstream and therefore are unlikely to be a result of construction works.

Stony creek recorded elevated DO levels upstream (8.65mg/L recorded, 4.8mg/L trigger) and downstream (7.29mg/L recorded, 6.34mg/L trigger). Results decreased from upstream to downstream and therefore are unlikely to be a result of construction works.

Unnamed Creek Gumma north recorded elevated DO levels (7.14mg/L recorded, 6.4mg/L trigger). It should be noted that this section of the alignment is now operational with no major construction activities being undertaken at this location.

Metals noted to be above trigger levels at:

Stony Creek recorded low Manganese levels below trigger levels upstream (0.094mg/L recorded, 0.02mg/L trigger) and downstream (0.1mg/L recorded, 0.013mg/L trigger). Results increased downstream and are unlikely to be impacted by construction works.

Lower Warrell Creek recorded Nickel outside of trigger values downstream (0.002mg/L recorded, 0.001mg/L trigger).

Unnamed Creek Gumma East recorded elevated Manganese levels upstream (0.264mg/L recorded, 0.23mg/L trigger). Downstream values were below trigger values (0.004mg/L recorded, 0.019mg/L trigger). This variance in results is unlikely to be a result of construction works. Unnamed creek Gumma North also recorded elevated Nickel levels (0.003mg/L recorded, 0.001mg/L trigger). 80th and 20th percentile trigger values are both 0.001mg/L and therefore any result outside of this will exceed trigger values.

Nambucca River recorded an elevated level of Manganese upstream and downstream (0.064mg/L upstream, 0.063mg/L downstream and 0.03mg/L trigger). It should be noted that results decreased from upstream to downstream and it is unlikely that this elevated level upstream and downstream was due to construction impacts. This is consistent with April results (0.13 mg/L upstream, 0.12mg/L downstream).

Nutrients noted to be outside trigger levels at

Upper Warrell Creek recorded elevated levels of total nitrogen downstream (0.7mg/L recorded, 0.6mg/L trigger) and elevated levels of Nitrate upstream (0.06mg/L recorded, 0.04mg/L trigger) and downstream (0.13mg/L recorded, 0.03mg/L trigger). All controls were verified to be in place for the site. A possible source of elevated results for Nitrogen and Nitrate is surrounding agricultural activities. These results are consistent with previous results for the site (elevated Nitrogen and Nitrate) recorded April and March 2018.

Stony Creek recorded elevated nitrate levels upstream (0.07mg/L recorded, 0.03mg/L trigger) and downstream (0.04mg/L recorded, 0.03mg/L trigger). Results decreased from upstream to downstream and therefore are unlikely to be due to construction works.

Lower Warrell Creek recorded elevated Nitrate levels upstream (0.11mg/L recorded, 0.04mg/L trigger) and downstream (0.1mg/L recorded, 0.04mg/L trigger). Low Ammonia results were recorded upstream (0.04mg/L recorded, 0.06mg/L trigger) and downstream (0.03mg/L recorded, 0.06mg/L trigger). Results decreased from upstream to downstream and are therefore unlikely to be due to construction works.

Unnamed Creek Gumma North recorded elevated Nitrate levels (0.06mg/L recorded, 0.04mg/L trigger). No major construction works occurred at this location during May 2018 and that this section of the roadway was opened to traffic in December 2017.

Nambucca River recorded elevated levels of Nitrate downstream (0.03mg/L recorded, 0.02mg/L trigger) this is consistent with April results where nitrate downstream was recorded to be 0.08 mg/L. It should also be noted that construction works at this location have been completed with no major construction work occurring within the area.

No wet surface sampling events were triggered during the month May 2018.

4. Sediment Basin Water Monitoring

No direct releases from commissioned basins occurred during May 2018 and no overtopping of commissioned sediment basins occurred during the reporting period.

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.

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on 15th of May 2018 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 on 14th, 26th, 28th, 30th and 31st of May 2018 at 4227 Pacific Highway, Warrell Creek. Monitoring was undertaken at the property during the use of vibratory roller, graders and heavy vehicles at Fill 1. On 14/05/2018 the roller was located at the shortest distance from the sensitive receiver with vibratory roller performing works with vibration set to the highest level. Results at the property were below vibration criteria of 5mm/s (2.325mm/s).

7. Dust Monitoring

Dust deposition gauges (DDG) were collected at nearby sensitive receivers on 1st May 2018. 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 except for:

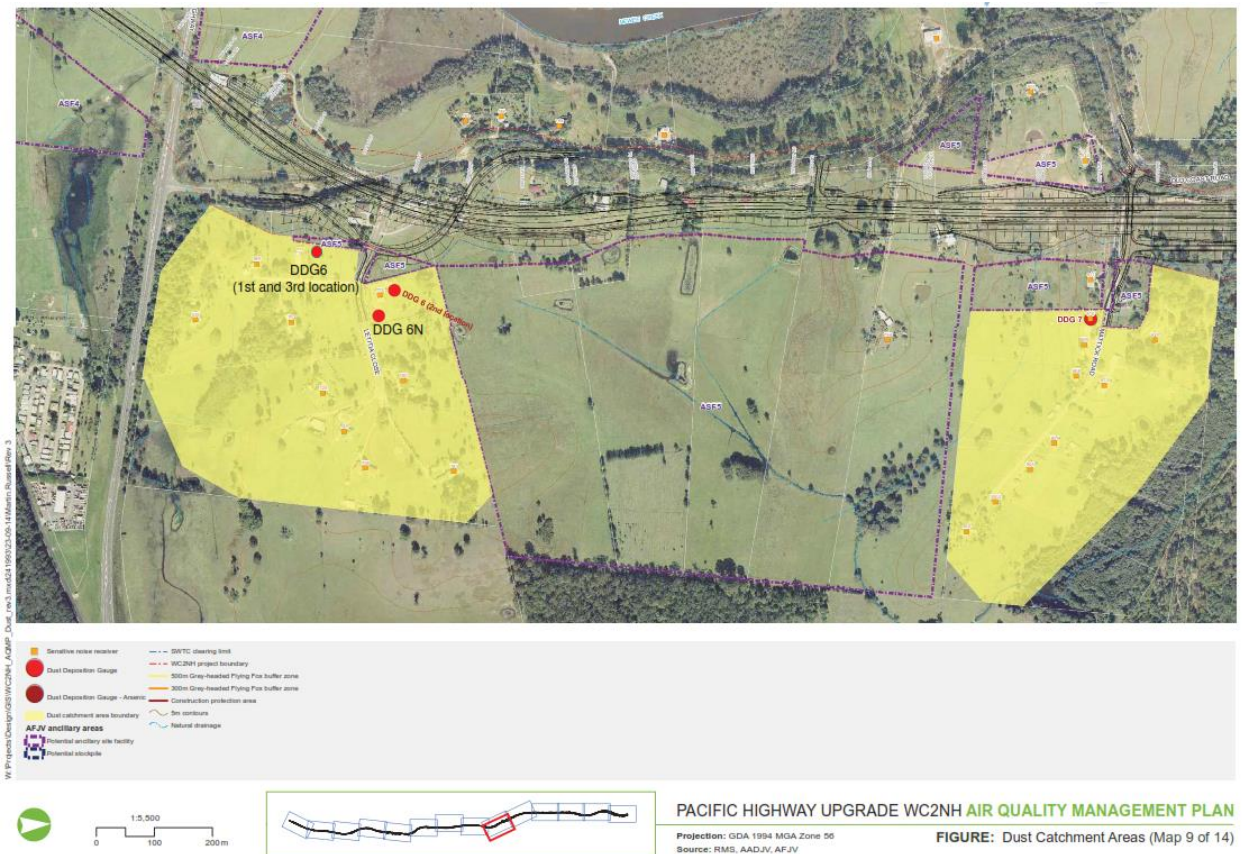
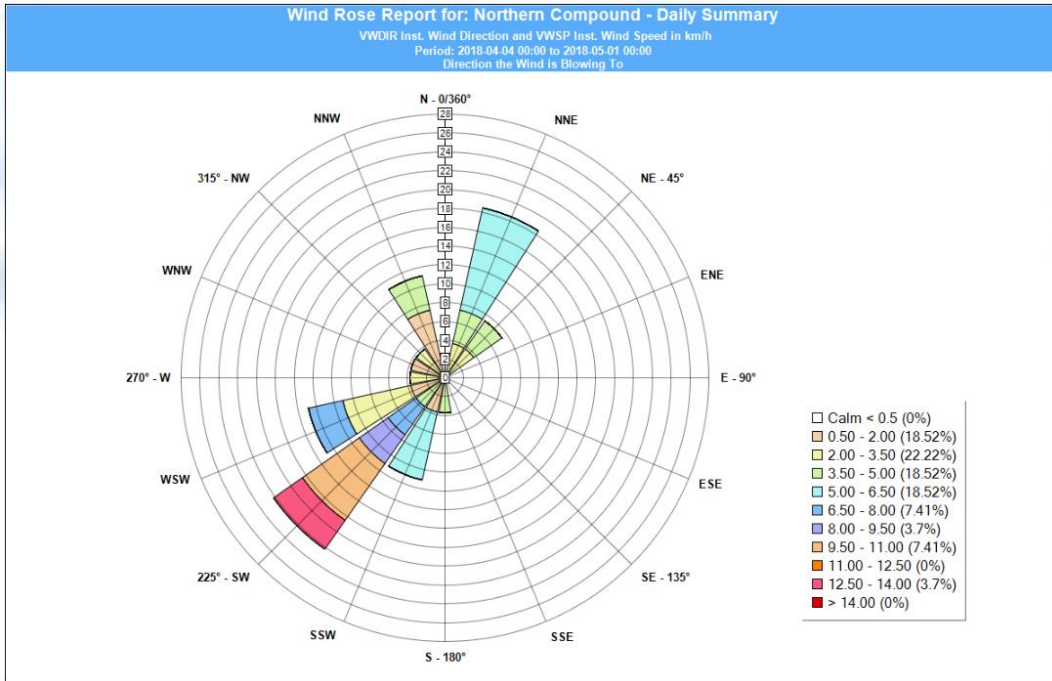
- DDG6 (TIM = 5.8g/m²/mth and AC = 1.8g/m²/mth)
- DDG6N (TIM = 4.2g/m²/mth and AC = 3.4g/m²/mth)
- DDG7 (TIM = 4.2g/m²/mth and AC = 3.1g/m² /mth)

Whilst the potential construction related dust (AC) was below 4g/m²/mth, AFJV upon receipt of the laboratory results reviewed the limited operations in the area and reminded area engineers and foreman responsible for works in these areas to actively visually monitor dust and continue the use of water carts as the AC for DDG6N and DDG7 had increased by more than 2g/m²/mth.

No dust complaints were received during the monitoring period.

As shown in the Wind Rose below, the predominate prevailing wind direction during the reporting period was from the South West and to a lesser extent South South West directions.

The three dust gauges are located to the east of the new alignment with DDG7. The precast area is located to the north of DDG6 and 6N.



8. Groundwater Monitoring

ACCIONA (Pacífico) undertook groundwater monitoring on the 10th of May 2018. Field and laboratory testing was undertaken. Groundwater monitoring results are available in Appendix A.

pH levels noted to be outside of trigger levels at:

4BH037a – Fill 15 west bore recorded an elevated pH reading (pH 7.18 recorded, pH 6.51 80th %ile 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 is consistent with April 2018 results (pH 7.15 recorded)

4BH058c – Cut 15 upstream bore recorded elevated pH reading (pH 6.68 recorded, 6.396 80th %ile 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.

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

4BH037a – Fill 15 west bore recorded elevated conductivity levels (9mS/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 (9.36mS/cm recorded April, 9.9 mS/cm recorded in March and February 2018).

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

4BH022c - Cut 11 bore east upgradient bore recorded elevated TDS levels (1.18g/L recorded, 0.1306 g/L trigger) however downgradient bore 4BH021 recorded TDS levels within trigger values. Therefore, it is unlikely that the elevated TDS values were due to construction works. It should also be noted that Cut 11 has had construction works completed and was included within the Partial Opening of the Project to traffic in December 2017.

4BH037A - Fill 15 west bore recorded an elevated TDS (5.67 g/L recorded, 0.1326 g/L 80th 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 (5.90 g/L recorded April, 6.26g/L recorded March 2018 and 6.23 g/L in February 2018).

Water depth noted to be below trigger levels at:

4BH037A – Fill 15 west bore recorded low water depth (1.33m from top of casing recorded, 1.2 m 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. This result is consistent with previous results for the bore (1.69 and 1.39m from top of casing recorded in April and March 2018).

4BH058C – Cut 15 upslope bore recorded low water depth (15.13m from top of casing recorded, 13.84 m 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. This result is consistent with previous results for the bore (15.21m from top of casing recorded April, 15.63m recorded March 2018, 15.63m recorded in February 2018).

9. Acoustic Investigations

Out of Hours Works undertaken during the month of May 2018 under Condition L4.2(d) of the EPL are outlined in Table 4 below. Acoustic Investigations (field monitoring) have been conducted for Out of Hours Works during the month of May 2018, results are included in Appendix A, Table 5.

Table 4 – May 2018 Out of Hours Works approved under L4.2 (d)

Out of Hours Activity	> 5dB(A) above background	Complete? Y/N
OCR North Realignment (eastern Approach to bridge 12)	N	Y

10. Complaints

10.1 Summary of Environmental Complaints for the month of May 2018

Date of Complaint	Means of first contact	Category of complaint	Area of Residence	Reason for contacting Community Team	Related to project?	Description & Action Taken	Date of first response by Community team	Means of first response by Community Team	Date of Resolution
7/5/18	Phone call	Property damage	Warrell Creek	Stakeholder says Pacifico workers have broken fence wires during work and a patch of his land was wet due to water from the projects operational drainage following a rainfall event.	Yes	Pacifico informed the stakeholder that the water that flowed onto his land was a result of the approved final design of the stormwater for the project and that it was not contaminated. The fence was repaired.	7/5/18	Phone	9/5/18
12/5/18	Phone call	Vibration	Upper Warrell Creek	Stakeholder said the vibration rolling was shaking their house.	Yes	Pacifico stopped vibration rolling work in that area until Monday. Vibration monitoring has since been undertaken on Sepate occasions all within compliance limits. Refer to Section 6 Vibration of this report.	12/5/18	Phone	12/5/18
15/5/18	Phone call	Vibration	Upper Warrell Creek	The same stakeholder said the resumed vibration rolling was shaking their house.	Yes	Pacifico arranged for vibration on the roller to be turned off when not required and to undertake periodic vibration monitoring when vibratory component of the roller was needed to achieve required compaction.	15/5/18	Phone	15/5/18
22/5/18	Email	Property	Warrell	Stakeholder says their	Yes	Pacifico agreed to replace the	22/5/18	Phone	22/5/18

Warrell Creek to Nambucca Heads Pacific Highway Upgrade

		damage	Creek	windscreen was broken by a rock from a drawbar of a Pacifico truck.		windscreen.			
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11. Non-Compliance

11.1 Summary of Non-compliances

No Non-compliances were raised against ACCIONA's Environmental Protection Licence during the month of May 2018.

Appendix A – Monitoring Results

Table 1a – Surface Water Results May 2018 – Dry Event

Surface Water Results - May 2018 - Dry		Weather: Fine		SW01			SW03			SW04			SW05			SW06			SW07			SW08			SW09			SW10			SW11								
Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gurra West			Unnamed Creek Gurra East			Unnamed Creek Gurra North			Nambucca River South			Nambucca River South					
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine								
Date of Sampling				4-May-18			4-May-18			4-May-18			4-May-18			4-May-18			4-May-18			4-May-18			4-May-18			4-May-18			4-May-18								
Time of Sampling				11:45AM			11:30AM			12:15PM			12:00PM			10:15AM			10:00AM			12:45PM			1:00PM			12:30PM			8:30AM			8:15AM					
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						
Laboratory data																																							
Metals																																							
Aluminium	mg/L	0.055	-	0.06	0.01	<0.01	0.05	0.01	0.01	0.05	0.01	<0.01	0.04	0.01	<0.01	0.06	0.01	0.02	0.06	0.01	0.02	0.1	0.01	0.01	0.1	0.01	0.02	0.1	0.01	0.01	<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	0.001	<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	-	-	<0.001	-	-	<0.010	-	-	<0.010			
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	-	-	<0.010	-	-	<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	-	-	<0.010	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	-	-	<0.001	-	-	<0.010	-	-	<0.010			
Manganese	mg/L	1.9	0.08	0.21	0.02	0.05	0.2	0.03	0.054	0.06	0.02	0.094	0.052	0.013	0.1	0.26	0.08	0.064	0.26	0.08	0.073	0.23	0.019	0.204	0.23	0.019	0.264	0.23	0.019	0.004	0.03	0.002	0.064	0.03	0.002	0.063			
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	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	<0.010	-	-	<0.010			
Selenium	mg/L	11	-	-	-	<0.01	-	-	<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	-	-	<0.001	-	-	<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	<0.005	0.006	0.005	<0.005	0.005	0.005	<0.005	0.005	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	0.11	0.82	0.42	0.13	0.78	0.37	0.11	0.83	0.05	0.11	0.83	0.05	0.08	2.01	0.25	0.26	2.01	0.25	0.44	2.01	0.25	<0.05	-	-	<0.10	-	-	<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	-	-	<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	16	-	NA	50	-	NA	50	-	NA
CB - C10 Fraction	µg/L	-	-	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA	-	-	NA
CB - C10 Fraction minus BTEX (F1)	µg/L	-	-	-	-	NA	-	-	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	-	-	NA
>C16 - C34 Fraction	µg/L	-	-	-	-	NA	-	-	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	-	-	NA
>C10 - C40 Fraction (sum)	µg/L	-	-	-	-	NA	-	-	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	-	-	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	0.02	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	0.02	0.12	0.03	0.02	0.12	0.03	0.02	0.12	0.03	0.02	0.12	0.03	<0.01	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	0.0044	<0.01	0.01	0.0044	<0.01	0.01	0.0044	<0.01	0.01	0.008	0.01	0.008	0.01	0.008	0.01	0.008	
Total Nitrogen	mg/L	0.5	0.3	0.62	0.2	0.5	0.6	0.2	0.7	0.3	0.1	0.3	0.41	0.1	0.1	0.5	0.2	0.5	0.5	0.2	0.4	2.8	1.1	0.8	2.8	1.1	0.8	2.8	1.1	0.5	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	0.6	0.3	0.1	0.2	0.4	0.1	0.1	0.5	0.2	0.4	0.5	0.2	0.3	2.4	1	0.8	2.4	1	0.8	2.4	1	0.4	0.5	0.2	<0.5	0.5	0.2	<0.5			
Nitrate	mg/L	0.7	-	0.04	0.01	0.06	0.03	0.01	0.13	0.03	0.01	0.07	0.03	0.01	0.04	0.01	0.11	0.04	0.01	0.11	0.04	0.01	0.04	0.01	0.04	0.01	0.04	0.01	0.04	0.01	0.06	0.02	0.01	0.01	0.02	0.01	0.03		
Nitrite	mg/L	-	-	-	-	<0.01	0.01	0.01	<0.01	0.01	0.01	<0.01	0.01	0.01																									

Table 2 - Noise Monitoring Results May 2018


Monthly Noise Monitoring Results May 2018																	
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
15/05/2018	8:40AM	Albert Drive	74	1	50	Cut	62	46.1	61.9	39	49.7	43.8	40.9	Construction	Y	N/A	Within predicted levels and NML. Construction dominant (42.3-50.0) Stockpile area behind cut to mitigate noise impacts.
15/05/2018	9:20AM	Bald Hill Rd	197	3	50	KCB	79	52.5	66.7	39.7	55.6	49.5	44.1	Bald Hill Road	N	N/A	Within predicted levels. Construction noise not dominant. Dominant noise sources: BHR (48.6-66.7) Noise mound and noise wall in place to reduce impact.
15/05/2018	11:25AM	Letitia Rd	413	4	59	HTR	58	51.6	76.3	37	51.7	43.9	39.3	PAC HWY	N	N/A	Within predicted levels and NML. Regular consultation undertaken with residents impacted by NFR construction activities. HWY dominant (40.1-51.7)
15/05/2018	12:50AM	Mattick Rd	442	6	44	HTR	71	51	68.8	41.2	54.2	48.8	45.7	PAC HWY	N	N/A	Within predicted levels. Permanent noise mounds in place to reduce construction noise at sensitive receivers. HWY dominant (47.5-59.1)
11/04/2018	10:00AM	Gumma Rd	383	3	50	Ser	59	56.5	72.1	41.6	59.3	53.5	47.1	PAC HWY	N	N/A	Construction noise not dominant. Dominant noise sources: highway (51.2 -70.4).

Table 3 – Dust Monitoring Results April – May 2018



Monthly Dust Monitoring Results - April 2018 - May 2018																		
		DDG ID	DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8A	DDG9NE	DDG9E	DDG10	DDG A1	DDG A2		
		Start date of sampling	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18	04-04-18		
		Finish date of sampling	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18	01-05-18		
Analyte	Time Period	Unit	Levels of Concern	LOR														
Ash Content	Current Month	g/m ² .month	4	0.1	0.4	0.2	0.4	0.1	0.5	1.8	3.4	3.1	0.1	0.4	0.8	0.6	----	----
		mg	N/A	1	6	3	6	2	8	28	54	49	2	6	13	9	----	----
	Previous Month	g/m ² .month			0.7	0.3	1.5	0.4	1.4	1	0.4	0.5	0.2	0.6	5.8	1	----	----
	Change	g/m ² .month	Increase of 2		-0.3	-0.1	-1.1	-0.3	-0.9	0.8	3	2.6	-0.1	-0.2	-5	-0.4	----	----
Combustible Matter	Current Month	g/m ² .month	N/A	0.1	0.3	0.2	0.4	0.2	0.6	4	0.8	1.1	0.5	0.2	0.5	0.2	----	----
		mg	N/A	1	5	4	7	3	10	65	13	18	8	3	8	4	----	----
Total Insoluble Matter (TIM)	Current Month	g/m ² .month	4	0.1	0.7	0.4	0.8	0.3	1.1	5.8	4.2	4.2	0.6	0.6	1.3	0.8	----	----
		mg	N/A	1	11	7	13	5	18	93	67	67	10	9	21	13	----	----
	Previous Month	g/m ² .month		0.1	1.2	1.8	1.7	1.4	2.8	1.2	1.1	1.1	0.8	0.9	7.4	1.3	----	----
	Change	g/m ² .month	Increase of 2	0.1	-0.5	-1.4	-0.9	-1.1	-1.7	4.6	3.1	3.1	-0.2	-0.3	-6.1	-0.5	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	----	<0.001	0.005
Comments								grass mown next to,				works observed by resident next to gauge, material in and around gauge		grass mown near,				

Table 4 – Groundwater Monitoring Results May 2018

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				10/05/2018		10/05/2018		10/05/2018		10/05/2018		10/05/2018		10/05/2018		10/05/2018		10/05/2018								
				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			2.15pm		11am		12.45pm		DRY		11.45am		11-Jan-00		DRY		3pm									
Field Physical data																										
Depth to standing water level from TOC	m	-	16.802	16.23	8.7420	7.33	16.0140	2.39	8.4500	-	1.2000	1.33	1.3520	1.17	17.4120	-	13.84	15.13								
pH	pH	-	6.26	4.74	6.06	6.78	5.81	6.47	7.09	5.93	6.10	6.78	6.21	-	6.51	5.92	7.18	7.30	6.77	7.25	6.98	5.24	-	6.3960	5.56	6.68
Conductivity	mS/cm	-	3630	2.81	111.3	0.120	231	1.84	0.342	-	-	5.550	9.00	8366	10.000	121.100	-	132.660	0.157							
Temperature	°C	-	22.4420	25.84	22.3600	20.35	21.1500	23.90	22.6040	-	-	25.9820	22.34	22.5600	21.07	22.8200	-	23.1940	21.11							
Total Dissolved Solids	g/L	-	3.5720	1.80	0.0946	0.085	0.1306	1.18	0.1326	-	-	0.1326	5.67	8.10	6.210	0.106	-	0.111	0.102							
			Exceedance of trigger level																							

Table 5 – Field Monitoring for Out of Hours Works May 2018 (Acoustic Investigation)

Out of Hours Works Field Verification																	
Permit #	Description of Works	Date	Time	Location	Rec ID	NCA	NML	At monitoring location						Distance to receiver (m)	Actual Calculated level	Compliant	Principal sources/ operations
								Laeq	LAFmax	LAFmin	LAF10	LAF90					
308	OCR Nth Realignment (eastern Approach to bridge 12)	26/05/2018	07:35am	Old Coast Road North	10	5	44	54.6	71.6	40.8	57.6	45.3	approx 200m	38.9	Yes	Local Traffic Alexandria Drive and birds dominant noise	