Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

- March 2016

Pacifico Project Number: WC2NH

A team consisting of RMS and Pacifico (ACCIONA Ferrovial 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 March 2016 were limited to the following:

- Clearing and Grubbing
- Topsoil stripping
- Earthworks including crushing
- Production blasting
- Continuing bridge works including piling and temporary work platforms
- Installation of permanent boundary fencing
- Fauna fence installation
- Installation of monitoring instruments – extensometers, inclinometers and piezometers
- Continuing culvert installation
- Scour rock installation
- Continuing utility works
- Batter stabilisation using hydromulch (permanent design seed mix)
- Girder deliveries to Nursery Road
- Site Survey
- Topsoil placement
- Sheet Piling Nursery Road
- Basin Decommissioning
- Girder Production
- Concrete Production

Works scheduled for next month include

- Clearing and grubbing
- Topsoil stripping

- Earthworks including crushing
- Production blasting
- Continuing bridge works including piling and temporary work platforms
- Installation of permanent boundary fencing
- Fauna fence installation
- Landscaping works
- Continuing culvert installation
- Scour rock installation
- Continuing utility works
- Batter stabilisation using hydromulch (permanent design seed mix)
- Girder deliveries to Nursery Road
- Site Survey
- Topsoil placement
- Sheet Piling Nursery Road
- Basin Decommissioning
- Girder Production
- Concrete Production

1.2 Consultation Activities

The project's consultation activities during March 2016 included the following:

Table 1 – Consultation Activities

Groups	Date	Key Topics
Environmental Review Group	15/3/16	Construction Progress, Design Update, Upcoming works, EWMS discussion, Environmental Update, Monitoring update, Out of Hours Works, Incidents and Community Complaints
Drop-in sessions + mail-out – Warrell Creek Temporary Closure -	16/3/16 and 19/3/16	Closure of Warrell Creek for Bridgeworks

Other Consultation Activities:

- Letterbox drop, business doorknock and extensive database email notification across Macksville in relation to night time girder deliveries April 2016 to March 2017
- Letterbox drop , personal notifications to local residents in relation to Mattick Road traffic changes
- Close-out email distribution and 1000+ mail out to stakeholders in relation to approved temporary closure of Warrell Creek for bridgeworks

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:

- 07/04/16 4 to 8pm Drop-in session - North facing ramps at Macksville
- Quarterly community information sessions will be held in 2016.
- Community Construction Tours will commence in 2016. The free tours will be held monthly (bookings are essential).
- Pacifico will have a stand at the annual Macksville Show on the 8th and 9th of April 2016.

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 - Precipitation

Month	Total monthly rainfall	Location
01/3/16 – 31/3/16	47.4mm	Northern Compound
01/3/16 – 31/3/16	32.6mm	Albert Drive Compound

The site experienced a total of 11 rain days throughout the month of March 2016.

During March, rainfall received on site was lower than the March monthly average of 183.0mm. 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 March 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

Date	Time	TOTAL Rain Gauge (mm)
1/03/2016	9:00:00	0
2/03/2016	9:00:00	0
3/03/2016	9:00:00	3.2
4/03/2016	9:00:00	2.2
5/03/2016	9:00:00	0.2
6/03/2016	9:00:00	0

Date	Time	TOTAL Rain Gauge (mm)
7/03/2016	9:00:00	0.6
8/03/2016	9:00:00	0
9/03/2016	9:00:00	3.8
10/03/2016	9:00:00	0
11/03/2016	9:00:00	0
12/03/2016	9:00:00	0
13/03/2016	9:00:00	0
14/03/2016	9:00:00	0
15/03/2016	9:00:00	0
16/03/2016	9:00:00	0
17/03/2016	9:00:00	5
18/03/2016	9:00:00	7.4
19/03/2016	9:00:00	4.8
20/03/2016	9:00:00	0
21/03/2016	9:00:00	0
22/03/2016	9:00:00	0
23/03/2016	9:00:00	0
24/03/2016	9:00:00	0
25/03/2016	9:00:00	0
26/03/2016	9:00:00	0
27/03/2016	9:00:00	0.8
28/03/2016	9:00:00	0
29/03/2016	9:00:00	0
30/03/2016	9:00:00	1.4
31/03/2016	9:00:00	3.2

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

Date	Time	TOTAL Rain Gauge (mm)
1/03/2016	9:00:00	0
2/03/2016	9:00:00	0
3/03/2016	9:00:00	1.8
4/03/2016	9:00:00	8.8
5/03/2016	9:00:00	2.4
6/03/2016	9:00:00	0
7/03/2016	9:00:00	4.8
8/03/2016	9:00:00	0
9/03/2016	9:00:00	7
10/03/2016	9:00:00	0
11/03/2016	9:00:00	0
12/03/2016	9:00:00	0
13/03/2016	9:00:00	0
14/03/2016	9:00:00	0

15/03/2016	9:00:00	0
16/03/2016	9:00:00	0
17/03/2016	9:00:00	0
18/03/2016	9:00:00	8.4
19/03/2016	9:00:00	8.8
20/03/2016	9:00:00	0
21/03/2016	9:00:00	0
22/03/2016	9:00:00	0
23/03/2016	9:00:00	0
24/03/2016	9:00:00	0
25/03/2016	9:00:00	0
26/03/2016	9:00:00	0.4
27/03/2016	9:00:00	0
28/03/2016	9:00:00	0
29/03/2016	9:00:00	0
30/03/2016	9:00:00	2.6
31/03/2016	9:00:00	2.4

Table 2.3: Weather conditions recorded in March 2016 at Smoky Cape by the Bureau of Meteorology.

March 2016

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/03/2016	20	30.6	0
2/03/2016	20	26.8	4.8
3/03/2016	20.6	27.7	6.5
4/03/2016	20.3	29	5.4
5/03/2016	20.6	30	0
6/03/2016	20	29.8	1.2
7/03/2016	21.3	30.3	0
8/03/2016	20.8	30.5	0
9/03/2016	21.5	28	7.2
10/03/2016	22.1	28	2
11/03/2016	22.8	30.5	0
12/03/2016	22.5	30.9	0
13/03/2016	21.6	30.4	0
14/03/2016	21.7	29.8	1
15/03/2016	21.5	30.6	0
16/03/2016	19.6	26.7	0
17/03/2016	20	29.8	0
18/03/2016	21.1	27.9	1.6
19/03/2016	20.4	24	1.4
20/03/2016	17.2	27	2.8

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
21/03/2016	17	25	0.4
22/03/2016	16.8	26	4.8
23/03/2016	17.4	27.1	0
24/03/2016	19	24.2	0
25/03/2016	19.8	28.4	0
26/03/2016	20.4	30	0
27/03/2016	20.5	27	0
28/03/2016	19.5	27.3	17
29/03/2016	22	28	0
30/03/2016	21.6		8
31/03/2016	19.6	27.6	1.2

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 16th of March, field tests were undertaken. Results are available in Appendix A.

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

Stony Creek upstream and downstream sites. It is noted that the DO levels increased from upstream (1.62mg/L) to downstream (3.08mg/L).

Lower Warrell Creek upstream and downstream sites. It is noted that the DO levels increased from upstream (2.40mg/L) to downstream (3.09mg/L) sites.

Nambucca River upstream and downstream sites. It is noted that the DO levels increased from upstream (4.82m/L) to downstream (5.56mg/L) sites and thus are unlikely to be attributable to construction. It is also noted that the downstream site was within ANZECC criteria.

pH levels noted to be outside trigger levels at:

Upper Warrell Creek above pH trigger levels upstream (7.4) and downstream (7.34). No works were being undertaken in the waterway that would have impacted on pH levels and is thus unlikely to be attributed to construction.

Lower Warrell Creek upstream (7.9) and downstream (8.14). It is noted that while levels increased minimally, no works were being undertaken in the area that would have impacted on pH levels and controls were verified to be in place.

Turbidity levels above trigger levels at:

Upper Warrell Creek downstream (28.9NTU), an increase from the upstream result of (5.3NTU) that is within the downstream trigger levels. It is noted that no works were being undertaken in the waterway, with controls verified to be in place and silt curtain in place downstream.

Stony Creek downstream (19.3NTU), an increase from the upstream result of (6.5NTU) that is within the downstream trigger levels. No works were being undertaken within the waterway, with controls verified to be in place.

As this was a dry sampling event, the NTU levels downstream above trigger levels is not contributed to from run-off from construction works.

4. Sediment Basin Water Monitoring

Water was released from commissioned sediment basins between the 1st and 31st of March 2016 after rainfall. Water pumped into basins was kept below the design Sediment Storage Zone and was treated and released as soon as possible, especially if rainfall was predicted in the 5 day forecast. TSS sampling was not undertaken during the month due to the lack of release events (<10), additional TSS sampling is being undertaken throughout April 2016 to ensure we maintain compliance with 1 in 10 sampling. Table 3 below has the water quality results recorded for the water release events:

Table 3 – Water Release Register

Date	Basin ID	Oil and Grease (visible)	pH	Turbidity (NTU)	Approx Volume Discharged (kL)
1/03/2016	B42.87	N	7.8	19	150
2/03/2016	B45.00	N	7.98	38.2	300
3/03/2016	B45.00	N	8.05	55.3	50
10/03/2016	B42.3	N	7.6	24.4	300
16/03/2016	B43.75	N	6.78	50.2	100
23/03/2016	B47.96	N	8.09	41.1	400
31/03/2016	B49.01	N	6.86	4.3	300

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 7th and 17th of March 2016 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.

6. Vibration Monitoring

Vibration monitoring was undertaken as part of blasting works during March 2016. Monitoring Results are available in Appendix A, Table 5.

6.1 Blasting

Four blasting events occurred in March 2016. No exceedances of overpressure or vibration limits occurred from this blast.

We are required to achieve less than 5% exceedance (of 5mm/s limit and 115dB (LinPeak)) within the reporting period for those sensitive receptors that have not agreed to the 25mm/s and 125dB limits. For the second reporting period commencing 16th December 2015, we have had eight blasts with no exceedances of these limits.

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from the 5th February 2016 to the 8th March 2016. DDG results are available in Appendix A.

All dust deposition gauges were below the level of concern (4g/m2.month) during the monitoring period, with the exception of gauge DDG5, DDG5W and DDG6.

DDG5 and DDG5W

DDG5W was installed recently due to elevated results in previous months DDG5 despite little works being undertaken. DDG5 recorded Total Insoluble Matter at 218g/m2/month, Ash Content (AC) was slightly lower with a reading of 187g/m2.month. DDG5W recorded TIM of 751g/m2/month, with AC of 6. It was noted that DDG5E, on the other side of the alignment recorded significantly lower levels (1.4g/m2/month TIM, 1.1g/m2/month AC). It was noted during collection of the latest round of gauges (5th February 2016 to 8th March 2016) that, while results have not yet been obtained, the gauges (DDG5 and DDG5W) appeared to have clumps of dirt within them, which would be unlikely to be attributable to wind-blown dust from construction.

As agreed in the ERG 24 on 12/04/2016, the project community team will be talking to the resident whos property the two dust gauges are on to inform them that the gauges are there to provide information to the project and agencies that they can act upon. The extreme nature of the results given the level of construction works and controls render the information useless. Any observations of tampering by anyone would be appreciated.

DDG6

DGG6 had marginally elevated AC (4.2g/m2/month) level and the TIM (8.1g/m2/month). The AC portion of TIM can be contributable to construction sources.

It is noted that this property has been vacated due to the upcoming Northern Access Ramps construction. Due to the lack of maintenance the grass around the gauge has come to approximately the same level as the top of the gauge.

Due to the upcoming North Facing Ramps, this gauge will be moved to its original location (the gauge was moved to its current location to respond to complaints from the original resident). Additionally, the original location was selected due to being closer to the current worksite and will thus be a better indication of worksite impacts.

Surfactant additives have been utilised and will continue to be utilised onsite in water carts to assist with dust mitigation. Water cart usage outside of standard construction hours has been utilised to assist with reducing dust emissions from the project, during public holidays on Sundays throughout the Project. We are progressively stabilising cuts and fills that have reached their final profile.

8. Groundwater Monitoring

ACCIONA (Pacifico) have undertaken groundwater monitoring on the 24th and 29th of March 2016. The results from the groundwater monitoring is available in Table 4 of Appendix A.

The groundwater monitoring results have been provided to RMS to provide advice on the trigger levels determined during the baseline sampling. The finalised groundwater report from the baseline sampling has not been issued from RMS to Pacifico including groundwater triggers.

9. Acoustic Investigations

Acoustic Investigations (modelling) have been conducted and approved for several Out of Hours Works proposed to model impact on residents during the month of March 2016. A summary of these approvals is below in Table 4.

No field monitoring was conducted for Out of Hours Works undertaken in March 2016. Monitoring was not undertaken due to no high risk out of hours works being undertaken that had not been monitored before. Field monitoring has been undertaken for crane mobilisation in April 2016, and will be included in the EPL Monthly Report for April 2016.

Table 4 – March Out of Hours Works Assessed

OOH Request Title	>5dB(A) above background	Approval Date
Northern crib shed generators bore pumps	N	1/3/2016
Pile cap pumping	N	15/3/2016

Lower Warrell Creek Bridgeworks Deliveries	N	21/3/2016
Fill 24 Pumparound	N	23/3/2016
Crane Mobilisation/Demobilisation Girders	N	31/3/2016

10. Complaints

10.1 Summary of Complaints for the month

The following is a brief summary of environmental complaints received in March 2016.

On the 3rd of March 2016, a resident contacted AFJV regarding concerns about dust generation from the utilisation of their driveway for access to RMS road reserve for utilities works. There was no other possible access into the property to install fencing between RMS property and the landowners' property. The landowner had agreed his driveway could be utilised by project staff. Staff were reminded to reduce speed whilst passing the residence and it was agreed with the resident for their property to be cleaned once works have been completed in the area. Works are now complete and no further issues have been raised.

11. Non-Compliance

11.1 Summary of Non-compliances

No Non Compliances against the ACCIONA Environmental Protection Licence (EPL) 20533 occurred in March 2016.

Appendix A – Monitoring Results

Table 1a - Surface Water Sampling Results March 2016 – Dry

Surface Water Results -March 2016 - Dry						Weather:	Fine											Low Tide:	12:07 PM																	
				SW01			SW02			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 Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South		
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Upstream			Downstream			Upstream			Downstream		
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine		
Date of Sampling				16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16			16-Mar-16		
Time of Sampling		Freshwater	Marine	8:00 AM			7:45 AM			9:00 AM			8:30 AM			11:45 AM			11:30 AM			9:30 AM			9:45 AM			9:28 AM			11:00 AM			10:45 AM		
Comments																													Unable to sample - water level low								
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result
Laboratory data																																				
Field Physical data																																				
Temperature	°C	-	-	24.86	14.99	22.95	25.1	16.3	23.71	24.4	16	21.75	26.46	15.94	22.89	27.9	18.4	26.84	27.9	18.4	26.93	26.5	16.3	23.04	26.5	16.3	22.5	26.5	16.3	NA	27.9	18.1	26.6	27.9	18.1	26.55
pH	pH	-	6.5-8	7.25	6.48	7.4	7.3	6.4	7.34	7.5	6.6	6.84	7.33	6.26	6.9	7.02	6.57	7.90	7.02	6.57	8.14	7	6.1	7.28	7	6.1	7.33	7	6.1	NA	7	7	8.13	7	7	7.96
Conductivity	mS/cm	0.125-2.2	-	0.316	0.232	0.271	0.348	0.227	0.24	0.348	0.227	0.278	0.3338	0.2168	0.26	20.946	0.679	11.20	20.946	0.679	11.1	0.808	0.4234	0.75	0.808	0.4234	0.866	0.808	0.4234	NA	47.32	29.44	33.5	47.32	29.44	40.3
Turbidity	NTU	50	10	10.96	4	5.3	9.9	3.5	28.9	9.9	3.5	6.5	5.97	3.74	19.3	6.82	1.83	1.4	6.82	1.83	2.4	52.78	11.3	41.7	52.78	11.3	10.6	52.78	11.3	NA	19.3	6.7	24.3	19.3	6.7	2.8
Dissolved Oxygen	mg/L	5	5	4.98	1.91	3.97	4.8	2.6	5.53	4.8	2.6	1.62	6.34	3.52	3.08	7.98	5.07	2.40	7.98	5.07	3.09	6.4	1.75	1.73	6.4	1.75	1.53	6.4	1.75	NA	9.1	7.4	4.82	9.1	7.4	5.56
TDS	g/L	-	-	-		0.176	-		0.168	-		0.181	-		0.169	-		6.95	-		6.89	-		0.48	-		0.555	-		NA	-		21.5	-		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 March 2016

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	LAeq	LAFMAX	LAFMIN	LCEQ	LAF05	LAF10	LAF50	LAF90	Principal sources/ operations	Measurements exceeding criteria, plant/ operations causing	Corrective actions	Notes
17/03/2016	4:09 PM	Albert Drive	74	1	50	Cut	62	51.5	72.7	38.3	67.6	54.7	50.8	45	42.1	Moxy, excavator	NA	NA	Within predicted levels for activity
7/03/2016	2:30 PM	Cockburns Lane	16	1	50	Cut	65	52.8	72.4	43.9	64.5	53.4	51.6	48.8	46.9	Excavator loading	NA	NA	Within predicted levels for activity
17/03/2016	2:45 PM	Bald Hill Rd	197	3	50	Cut	72	48.4	69.3	36.9	67	50.6	46.3	42.5	40.1	Truck + dog, loader	NA	NA	Within predicted levels for activity
7/03/2016	4:03 PM	Letitia Rd	406	4	59	Cut	74	59.1	77.4	47.6	72.3	64.3	62	52.8	49.6	Dozer, grader	NA	NA	Within predicted levels for activity
7/03/2016	3:42 PM	Mattick Rd	442	6	44	Cut	62	49.7	66.3	38.7	71.3	56	53.1	43.9	41.2	Moxy, water cart, loader, roller	NA	NA	Within predicted levels for activity
7/03/2016	4:29 PM	Nursery Rd	415	4	59	NA	NA	62.6	81.1	50.3	70	68.8	66.1	55.7	53.3	Highway, mower	NA	NA	Background - construction not audible
7/03/2016	3:03 PM	Wallace St	148	3	50	NA	NA	59.3	74.3	47.1	67.2	65.6	62.1	53.1	49.7	Highway	NA	NA	Background - construction not audible
17/03/2016	3:28 PM	Gumma Rd	383	3	50	Bridgeworks	67	52.2	65.6	40.5	65.2	57.2	55.5	49.9	44.6	Crane, water truck	NA	NA	Within predicted levels for activity

Table 3 - Dust Monitoring Results February/March 2016

			DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG5E	DDG5W	DDG6	DDG7	DDG8	DDG A1	DDG A2
			Start date of sampling		5/02/2016	5/02/2016	5/02/2016	5/02/2016	5/02/2016	5/02/2016	5/02/2016	5/02/2016	5/02/2016	5/02/2016	29/02/2016	5/02/2016
			Finish date of sampling		8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016	8/03/2016
Analyte	Time Period	Unit	Levels of Concern	LOR												
Ash Content	Current Month	g/m².month	4	0.1	0.3	0.4	1.2	0.6	187	1.1	679	4.2	0.9	2.1	----	----
		mg	N/A	1	5	8	22	12	3520	21	12800	79	17	40	----	----
	Previous Month	g/m².month			0.4	0.5	2.2	0.6	49.4	----	----	0.8	0.6	1.2	----	----
	Change	g/m².month	Increase of 2		-0.1	-0.1	-1	0	137.6	----	----	3.4	0.3	0.9	----	----
Combustible Matter	Current Month	g/m².month	N/A	0.1	0.1	0.1	0.1	0.2	31.5	0.3	72.3	3.9	0.3	0.6	----	----
		mg	N/A	1	3	2	2	3	593	5	1360	73	6	10	----	----
Total Insoluble Matter (TIM)	Current Month	g/m².month	4	0.1	0.4	0.5	1.3	0.8	218	1.4	751	8.1	1.2	2.7	----	----
		mg	N/A	1	8	10	24	15	4120	26	14200	152	23	50	----	----
	Previous Month	g/m².month		0.1	0.9	1	2.7	1	58.1	----	----	1.3	0.7	1.7	----	----
	Change	g/m².month	Increase of 2	0.1	-0.5	-0.5	-1.4	-0.2	159.9	----	----	6.8	0.5	1	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----			----	----	----	<0.001	<0.001
Comments							Grass seeds sprouted inside		Clumps of dirt in gauge		Unable to see through - totally opaque	Frog inside gauge - grass grown around gauge		Grass clippings in gauge		Frog in gauge

Table 4 – Groundwater Monitoring Results March 2016

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH007	4BH008	4BH010	4BH011	4BH021	4BH022	4BH025	4BH026	4BH037	4BH038	1BH49	4BH058	4BH061	4BH062
Cut/Fill			Cut 4	Cut 4	Cut 6	Cut 6	Cut 11	Cut 11	Cut 12	Cut 12	Fill 15	Fill 15	Cut 17	Cut 17	Cut 26	Cut 26
Date of Sampling			24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	24/03/2016	29/03/2016	29/03/2016
Comments			DRY	DRY		DRY				DRY				DRY	DRY	DRY
Field Physical data																
Depth to standing water level from TOC	m	-	-	-	16.60	-	8.40	1.50	8.80	-	0.90	1.10	15.00	-	-	-
pH	pH	-	-	-	5.82	-	6.84	7.74	7.55	-	8.81	7.50	6.37	-	-	-
Conductivity	mS/cm	-	-	-	5.33	-	0.144	0.138	0.186	-	2.440	11.200	0.169	-	-	-
Temperature	○C	-	-	-	16.30	-	20.44	18.20	23.09	-	21.95	21.40	24.34	-	-	-

Table 5 – Blasting Monitoring Results March 2016

Vibration and Overblast Tracking Register for Production Blasting

Date	Blast no.	Cut	BCM	Monitor 1 (PPV)	Monitor 2 (PPV)	Monitor 3 (PPV)	Monitor 1 (dB)	Monitor 2 (dB)	Monitor 3 (dB)	EPA Exceedances (5mm/s)	EPA Exceedances (10mm/s)	EPA Exceedance (120dB)	EPA Exceedance (115dB) 5%	No. of Blasts
30-Jun	11-001	11	1008	5.46	2.67	2.67	106.00	108.40	101.90	1				1
07-Jul	11-002	11	1622	5.77	3.51	2.35	108.00	103.50	108.40	1				2
27-Jul	11-003	11	7002	6.17	3.96	0.00	104.20	103.50	0.00					3
03-Aug	11-004	11	3616	11.64	3.43	1.03	113.10	107.00	95.92					4
06-Aug	10-001	10	8319	6.08	0.73	0.00	118.20	107.00	0.00					5
10-Aug	11-005	11	7006	14.67	7.68	2.45	114.60	115.60	104.20					6
13-Aug	10-002	10	3500	4.35	1.20	0.47	117.09	103.50	109.90					7
17-Aug	11-006	11	5382	12.99	6.45	1.79	118.20	118.60	104.20					8
20-Aug	10-003	10	10263	4.46	1.35	1.45	107.50	112.10	103.50					9
25-Aug	11-007	11	16100	6.21	1.78	0.00	115.60	98.84	0.00					10
31-Aug	11-008	11	14430	10.07	5.18	5.37	113.50	111.50	106.50	1				11
7-Sep	10-004	10	10281	9.76	1.94	0.70	119.90	112.30	98.84					12
17-Sep	10-005	10	7901.25	16.940	5.520	3.533	119.400	114.800	114.200					13
25-Sep	10-006	10	13200	19.490	6.092	-	113.800	118.800	-					14
1-Oct	11-009	11	8190	5.173	2.831	1.426	110.600	110.200	88.000					15
1-Oct	10-007	10	4485	10.240	1.308	-	118.500	88.000	-					16
13-Oct	10-008	10	6563.75	24.150	6.717	-	117.500	117.900	-					17
16-Oct	11-010	11	4641.25	3.126	1.926	-	109.200	1.926	-					18
20-Oct	10-009	10	9034.375	5.337	1.442	-	116.100	107.000	-					19
27-Oct	10-010	10	12247.5	5.039	3.297	-	97.500	117.500	-					20
27-Oct	11-011	11	11708.75	2.973	1.295	1.308	104.900	107.500	98.840					21
3-Nov	10-011	10	14462.5	6.971	2.012	0.684	124.000	117.200	102.800					22
12-Nov	10-012	10		3.919	0.933	-	88.000	116.300	-					23
16-Nov	8-001	8		*	8.638	4.591	*	112.300	108.800					24
24-Nov	8-002	8		8.875	1.308	1.000	124.900	98.840	107.000					25
26-Nov	10-013	10		12.100	1.024	-	119.800	106.500	-					26
1-Dec	10-014	10		8.371	-	-	120.600	-	-					27
2-Dec	8-003	8		15.39**	1.332	-	106.500	95.120	-					28
8-Dec	10-015	10		8.951	1.157	-	113.800	116.600	-					29
15-Dec	10-016	10		20.120	6.275	3.295	117.200	118.500	112.300					30
17-Dec	10-017	10		4.879	1.301	-	106.000	109.500	-					31
14-Jan	10-018	10		5.180	2.010	-	113.100	105.500	-					32
28-Jan	10-019	10		16.410	-	-	115.200	-	-					33
9-Feb	10-020	10		8.716	8.344	-	124.000	119.800	-					34
3-Mar	9-001	9		-	1.198	-	-	122.10	-					35
3-Mar	10-021	10		16.760	4.195	1.212	113.30	113.50	102.80					36
16-Mar	10-022	10		16.500	3.056	1.092	115.70	110.60	88.00					37
31-Mar	10-023	10		5.887	4.773	2.879	114.200	110.600	88.000					38

Note	17 July blasting criteria increase approved by DP&E with signed agreements	**Totals No of Exceedances**	**3**	**EPL 2nd Reporting Period Exceedances**	**0**
	16 December is Anniversary date of EPL	**Current Percentage exceedance**	**7.89%**		
	Monitor 3 is the only monitor where an agreement does not exist for 25mm/ from blast no. 3 onwards DP&E Approval 26/02/16 to extend the duration of blasting up to 25mm/s and overpressure up to 125 dBA for cut 10 widening	**RPL Percentage exceedance at 16th December 2015**	**10.00%**	* Flat Battery ** Power Pole - Did not trigger	