



Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

■ January 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 January 2016 were limited to the following:

- Minor clearing and grubbing;
- Topsoil stripping;
- Earthworks including crushing;
- Production blasting;
- Continuation of piling including driven piling;
- Continuing bridge works including temporary work platforms;
- Earthworks through the flying fox area and floodplain area;
- Installation of erosion and sediment controls;
- Installation of permanent boundary fencing;
- Batter stabilisation using hydromulch (permanent design seed mix)
- Continuing culvert installation;
- Longitudinal drainage installation
- Continuing utility works
- Albert Drive Intersection works
- Williamson Creek Diversion
- Steel fixing at Butchers Creek
- Scour rock installation
- Installation of temporary waterway crossings; and
- Site Survey
- Girder production
- Concrete batching

The works scheduled for next month include:

- Topsoil stripping;

- Earthworks including crushing;
- Production blasting;
- Continuation of piling including driven piling;
- Continuing bridge works including temporary work platforms;
- Clearing for Warrell Creek Twin Bridge Abutment A;
- Earthworks through the flying fox area;
- Installation of erosion and sediment controls;
- 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)
- Albert Drive Intersection works
- Installation of temporary waterway crossings; and
- Site Survey
- Heavily bound placement
- Spray seal
- Topsoil placement
- First U-Beam delivery to Nursery Road (maybe)
- Pile Driving Gumma Rd
- Pile Capping

1.2 Consultation Activities

The project’s consultation activities during January 2016 included various community letterbox drop notifications and the following:

Table 1 – Consultation Activities

Groups	Date	Key Topics
Environmental Review Group	19/1/16	Construction Progress, Design Update, Upcoming works, EWMS discussion, Environmental Update, Monitoring update, Christmas Shutdown and Site Inspections, Out of Hours Works
River Street residents, Council and the Adventist School	28/1/16	Consultation for piling activities on the southern abutment of the Nambucca River.
Residents living near Cut 10	22/1/16	Consultation for blasting as required by the Blasting Management Plan.

Residents living on Mattick Road, North Macksville	12/1/16	Consultation was carried out for the QBirt access track.
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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:

- Quarterly community information sessions will be held in 2016, the first being held in the first week of February.
- Community Construction Tours will commence in late February 2016. The free tours will be held monthly (bookings are essential).

2. Weather

2.1 Discussion

The automatic recording weather station 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
01/1/16 – 31/1/16	99.4mm	Northern Compound
01/1/16 – 31/1/16	115.8mm	Albert Drive Compound

The site experienced a total of 15 rain days throughout the month of January 2016.

During January, rainfall received on site was lower than the January monthly average of 146.9mm. 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 January 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)
1/01/2016	9:00:00	0
2/01/2016	9:00:00	0
3/01/2016	9:00:00	0
4/01/2016	9:00:00	14.4
5/01/2016	9:00:00	0.2
6/01/2016	9:00:00	29.6
7/01/2016	9:00:00	0.8
8/01/2016	9:00:00	0
9/01/2016	9:00:00	0
10/01/2016	9:00:00	0
11/01/2016	9:00:00	0
12/01/2016	9:00:00	0
13/01/2016	9:00:00	0
14/01/2016	9:00:00	0
15/01/2016	9:00:00	0
16/01/2016	9:00:00	19
17/01/2016	9:00:00	1.6
18/01/2016	9:00:00	1
19/01/2016	9:00:00	0
20/01/2016	9:00:00	0
21/01/2016	9:00:00	0
22/01/2016	9:00:00	0
23/01/2016	9:00:00	5.4
24/01/2016	9:00:00	17.2
25/01/2016	9:00:00	0
26/01/2016	9:00:00	15
27/01/2016	9:00:00	0
28/01/2016	9:00:00	0.4
29/01/2016	9:00:00	9
30/01/2016	9:00:00	2.2
31/01/2016	9:00:00	0

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

Date	Time	TOTAL Rain Gauge (mm)
1/01/2016	9:00:00	0
2/01/2016	9:00:00	0
3/01/2016	9:00:00	0
4/01/2016	9:00:00	9.2
5/01/2016	9:00:00	0.4
6/01/2016	9:00:00	38.4
7/01/2016	9:00:00	0.2
8/01/2016	9:00:00	0

9/01/2016	9:00:00	0
10/01/2016	9:00:00	0
11/01/2016	9:00:00	0
12/01/2016	9:00:00	0
13/01/2016	9:00:00	0
14/01/2016	9:00:00	0.2
15/01/2016	9:00:00	0
16/01/2016	9:00:00	19.2
17/01/2016	9:00:00	4.2
18/01/2016	9:00:00	0
19/01/2016	9:00:00	0
20/01/2016	9:00:00	0
21/01/2016	9:00:00	0
22/01/2016	9:00:00	0
23/01/2016	9:00:00	4.6
24/01/2016	9:00:00	13
25/01/2016	9:00:00	0
26/01/2016	9:00:00	2.2
27/01/2016	9:00:00	0.2
28/01/2016	9:00:00	0.6
29/01/2016	9:00:00	3.6
30/01/2016	9:00:00	3.2
31/01/2016	9:00:00	0.2

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

January 2016			
Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/01/2016	17.8	27.9	0
2/01/2016	17.8	27.5	0
3/01/2016	18.4	24.1	0
4/01/2016	17	26.8	27.8
5/01/2016	19	23	6.6
6/01/2016	18.8	26.5	18.4
7/01/2016	17.8	25.5	1
8/01/2016	17.5	27.6	0
9/01/2016	19	28.5	0
10/01/2016	19.2	28.4	0
11/01/2016	21	26.8	0
12/01/2016	22	30.5	0
13/01/2016	21.5	30.5	0
14/01/2016	23	27	0

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
15/01/2016	19.5	20	0
16/01/2016	15.4	26.2	19.7
17/01/2016	16.2	27	4.2
18/01/2016	17.9	28.2	0.8
19/01/2016	20		0
20/01/2016	20.2	27.2	0
21/01/2016	22	27.6	0
22/01/2016	21.5	27.8	0
23/01/2016	22.5	31	5.2
24/01/2016	19.9	29.3	7.2
25/01/2016	21.7	30	0
26/01/2016	19.8	28	69
27/01/2016	19.1	27.7	2.2
28/01/2016	20	25.1	2.8
29/01/2016	20.4	29.4	7.6
30/01/2016	21.2	30.5	1.6
31/01/2016	24	30.5	0

3. Surface Water Monitoring

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

Monthly sampling was undertaken by ACCIONA (Pacifico):

Wet Sampling Event

A "wet" sampling event was undertaken on the 6th January after >10mm of rainfall in a 24 hour period, field and lab tests were undertaken. Results are available in Appendix A.

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

Lower Warrell Creek upstream and downstream sites. This is attributed to the decomposing vegetative matter in the waterbody, this is applicable particularly at the downstream site as opposed to upstream which is sampled where there is less vegetative matter (boat ramp).

Gumma Wetlands upstream (East) site. This is attributed to decaying vegetative matter within the environment as well as the low flow nature of the water body. It is noted that these levels are only slightly below the trigger value (1.7mg/L value recorded, 1.78mg/L 20thile trigger value).

Nambucca River upstream and downstream sites. It is noted that the DO levels increased from upstream to downstream sites (5.79mg/L to 6.12mg/L) and thus are unlikely to be attributable to construction.

pH levels noted to be outside trigger levels at:

Upper Warrell Creek upstream and downstream site. The pH decreased only minimally from upstream to downstream (5.73 to 5.68).

Nambucca River downstream. It is noted that the pH increased only minimally from upstream to downstream sites (7.45 to 7.73).

Metals noted to be above trigger levels at:

Stony creek downstream for manganese. It is noted that these levels are well within ANZECC criteria (0.146mg/L levels recorded, 1.9mg/L ANZECC criteria).

Nutrient levels above trigger levels at:

Upper Warrell Creek upstream and downstream for total nitrogen and ammonia. It is noted that levels for both of these decreased from upstream to downstream. Nitrate was also above trigger levels, although it is noted that this is well within ANZECC criteria (0.7mg/L ANZECC criteria, 0.11mg/L recorded value).

Stony Creek downstream for total nitrogen and nitrate. It is noted that nitrate was within ANZECC criteria (0.61mg/L recorded, 0.7mg/L ANZECC criteria).

Lower Warrell Creek upstream and downstream for total nitrogen and nitrate. It is noted that nitrate levels decreased from upstream to downstream sites, and so were unlikely to be attributed to construction works. Elevated levels of nitrogen within the waterway are attributed to the decomposing vegetative matter within the waterway.

Nambucca River upstream and downstream for total nitrogen and nitrate. It is noted that nitrate is within ANZECC criteria (0.7mg/L ANZECC, 0.38mg/L recorded level downstream). Levels increased slightly from upstream to downstream (0.5mg/L total nitrogen upstream, 0.7mg/L downstream, 0.18mg/L nitrate upstream, 0.38mg/L downstream. It is noted that no works impacting on runoff into the river were being undertaken, so the increased levels are attributed to vegetative matter as well as runoff from agricultural areas upstream.

Dry Sampling Event

On the 20th January a "dry" monitoring event was undertaken, field tests were undertaken. The results are available in Appendix A.

Below exceedances of trigger levels are discussed:

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

Upper Warrell Creek upstream and downstream. It is noted that DO levels increased from upstream to downstream (1.9-2.01mg/L upstream to downstream)

Stony Creek downstream, this is attributed to the low-flow environment as well as decaying vegetative matter present in the waterbody.

Lower Warrell Creek upstream and downstream. It is noted that DO levels increased from upstream to downstream and are unlikely to be attributed to construction works.

Nambucca River upstream and downstream. It is noted that DO levels were within ANZECC criteria (5mg/L ANZECC criteria, 5.11mg/L recorded values downstream).

pH levels noted to be outside trigger levels at:

Lower Warrell Creek upstream and downstream with elevated pH levels, it is noted that there was a decrease in pH from upstream to downstream. It is also noted that these levels are within ANZECC criteria (6.5-8 ANZECC criteria, 7.8 pH downstream).

Nambucca River upstream and downstream. It is noted that trigger levels provided do not have any difference between 20th percentile and 80th percentile values are 7, with any value other than 7 triggering these. It is noted that these values are within ANZECC criteria.

Turbidity levels noted to be above trigger levels at:

Lower Warrell Creek upstream and downstream sites. It is noted that there was a decrease in values from upstream to downstream and so is unlikely to be attributed to construction works.

Wet Sampling Event

A "wet" monitoring event was conducted on the 25th of January 2016 after >10mm of rainfall in a 24 hour period, field tests were undertaken. Below exceedances of trigger levels are discussed.

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

Upper Warrell Creek downstream, although it is noted that the DO levels increased from upstream to downstream, and so the low levels are unlikely to be attributed to construction impacts.

Nambucca River upstream and downstream, although the levels increased from upstream to downstream (4.66 to 4.96) and so are unlikely to be attributed to construction impacts.

pH noted to be outside trigger values at:

Upper Warrell Creek downstream, although it is noted that there only was a minimal decrease from upstream to downstream (6.35 to 6.17), which is unlikely to be attributed to construction works following a review of construction activities.

Stony Creek upstream and downstream had low pH levels, although it is noted that there was an increase from upstream to downstream levels, indicating that the low levels are unlikely to be related to construction activities.

Lower Warrell Creek upstream and downstream recorded elevated pH levels, although the levels decreased from upstream to downstream, indicating that the results are unlikely to be due to construction activities.

Nambucca River upstream and downstream recorded elevated pH levels, although the levels decreased from upstream to downstream, indicating that the results are unlikely to be as a result of construction activities.

Turbidity noted to be outside trigger values at:

Nambucca River downstream. It is noted that the tide was stirring sediment up from the riverbed, resulting in the elevated reading. Controls for works within the river were verified to be in place by contacting the area foreman, with no release of material that could result in the increase in turbidity. The elevated reading is therefore attributed to the tidal flow within the waterway.

4. Sediment Basin Water Monitoring

Water was released from commissioned sediment basins between the 5th and 27th of January 2016 after rainfall. Water pumped into basins was treated and released as soon as possible, especially if rainfall is predicted in the 5 day forecast. 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)
2/01/2016	B46.38	N	6.85	50.4	400
5/01/2016	B47.60	N	6.58	32.2	500
6/01/2016	B47.14	N	6.66	37.9	800
7/01/2016	B47.60	N	6.65	14.3	400
7/01/2016	B46.96	N	6.56	42.2	500
7/01/2016	B44.55	N	7.2	50.7	400
7/01/2016	B45.00	N	7.44	80.2	400
7/01/2016	B55.9	N	6.7	10.3	800
7/01/2016	B59.6	N	6.58	17.2	550
7/01/2016	59.85	N	6.9	32.7	500
8/01/2016	B45.64	N	7.18	15.1	600
8/01/2016	B44.44	N	6.92	6	400
8/01/2016	B46.35	N	7.29	31.3	200
8/01/2016	B43.85	N	7.26	25.1	100
8/01/2016	B59	N	6.67	5.6	800
9/01/2016	B43.37	N	7.06	79.9	200
9/01/2016	B42.30	N	7.25	57.1	800
9/01/2016	B43.85	N	7.28	55.2	50

9/01/2016	B43.85	N	7.28	55.2	50
9/01/2016	B57.3	N	6.9	42.3	400
9/01/2016	B56.5	N	6.61	10.3	450
9/01/2016	B55	N	7.12	2.4	1800
11/01/2016	B54.7	N	6.84	9.6	1800
11/01/2016	B57.8	N	6.89	23.2	300
11/01/2016	B53.2	N	6.88	6.7	400
11/01/2016	B56.7	N	6.91	32.1	480
12/01/2016	57.8	N	7.32	22.1	320
12/01/2016	53.8	N	6.93	10.6	1300
12/01/2016	58.45	N	7.13	53.7	800
13/01/2016	B53.8	N	7.41	12.1	1000
15/01/2016	B43.37	N	7.47	75	200
18/01/2016	B60.5	N	6.61	24.5	170
19/01/2016	B 54.30	N	6.92	22.1	600
19/01/2016	B61.2	N	7.01	43.2	300
21/01/2016	B46.35	N	6.85	50.4	400
21/01/2016	B56.9	N	6.82	24.1	100
22/01/2016	B56.70	N	7.38	73.2	400
25/01/2016	B43.7	N	7.1	62.9	400
25/01/2016	B45.00	N	6.61	23.3	700
25/01/2016	B46.5	N	6.66	29.8	400
25/01/2016	B46.35	N	6.52	49.5	300
25/01/2016	B46.35	N	6.52	49.5	300
25/01/2016	B43.7	N	7.1	62.9	4
27/01/2016	B49.45	N	7.01	82	300
27/01/2016	B60.5	N	6.87	43.2	300
27/01/2016	B56.5	N	7.01	77.3	350
27/01/2016	B55.8	N	6.73	11.2	850
28/01/2016	B55.9	N	6.71	77.3	800

Land Irrigation

Date	Basin ID	Oil and Grease (visible)	pH	Approx Volume Discharged (kL)
9/01/2016	B56.5	N	6.61	545
27/01/2016	B56.5	N	7.01	545

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 13th and 18th January 2016 at eight locations near to construction works. Monitoring results are available in Appendix A.

All sites were within predicted levels for the activity being undertaken.

6. Vibration Monitoring

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

6.1 Blasting

One blasting event occurred in January 2016 – 28th January. 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 three blasts with no exceedances.

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from the 11th December 2015 to the 8th January 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, which recorded an elevated reading of 18.6g/m².month for total insoluble matter. Ash content was slightly lower with a reading of 15.7g/m².month. It was noted that the result was very unusual due to the hydromulching of abutment (26th Oct 15) nearby as well as the lack of construction activity over the time period, which captured the Christmas shutdown period. Further gauges have been installed to help verify the cause of the exceedance, as to whether this is related to construction activity or another source, such as the unsealed road near the council yard.

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 the Christmas Shutdown period and continuing onwards.

8. Groundwater Monitoring

ACCIONA (Pacifico) have undertaken groundwater monitoring on the 29th and 28th of January 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.

It is noted that 1BH04 (Cut 7) recorded a very low pH level of 2.17. PACIFICO has investigated and the only potential construction works in the vicinity of this location (new albert drive intersection) that may have contributed to the results is the exposed material as part of the excavation works as it is within the potential area for acid rock to be located.

Samples have been taken to determine the acidity of this material, and 6.8kg of lime / tonne has been recommended (including a factor of safety). PACIFICO are liaising with EAL to determine appropriate mitigation strategy such as liming the exposed face to neutralise potential acidic rock.

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 January 2015. A summary of these approvals is below in Table 4.

Field monitoring was conducted for Out of Hours Works undertaken in January 2016. These results are attached in Appendix A (Table 6), no works were found to exceed the modelled noise levels.

Table 4 – January Out of Hours Works Assessed

OOH Request Title	Residential Agreements Required (Y/N)	Approval Date
Nambucca Heavily Bound Placement	N	12/1/2016
Precast Yard Reo Fixing	N	14/1/2016
Rosewood Reo Fixing	N	14/1/2016
OC13 Pumparound	N	20/1/2016
South Compound Generator Connection	N	22/1/2016

10. Complaints

10.1 Summary of Complaints for the month

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

On 11th January, a resident of Macksville (Wedgewood Drive) contacted AFJV regarding concerns about air brake noise pollution from a truck on the alignment. AFJV contacted the supervisor for the area and undertook a global toolbox addressing the issue on 13th January 2016 advising truck drivers to minimise utilisation of air brake due to community impact. No further issues have been raised regarding the issue.

On 21st January a resident of Macksville (East Street) contacted AFJV regarding concerns about dust as the works began to progress into the floodplain area. AFJV are continuing to utilise water carts with Polo Citrus surfactant additive to help minimise dust production, with ongoing usage and reminders during daily prestarts about minimisation of dust production through speed limitation, contacting water carts as required, etc. A further dust gauge is being installed for the area to help capture dust levels for the area.

11. Non-Compliance

11.1 Summary of Non-compliances

On the 7th January 2016, water was discharge from Sediment Basin 49.45 north of Bald Hill Road to manage water levels.

From 9am 3rd January to 9am 7th January 2016, the Southern Compound Weather Station on Albert Drive received 45mm. ASSTA 2 sumps would have likely overtopped and any potential runoff would have entered Sediment Basin 49.45 at the bottom of the catchment. Sediment Basin 49.45 did not overtop as it is over excavated by 378%.

Sediment Basin 49.45 Water Release Permit 0493 recorded the basin did not require treatment prior to discharge, and the parameters of the water discharged were pH = 6.74, turbidity = 78.2 with no visible pollution or hydrocarbons observed.

PACIFICO did not comply with EPL Condition L2.6 (b) as samples of dissolved aluminium and iron were not taken.

PACIFICO has raised an NCR and identified corrective actions (including tool boxing our environmental crews) to prevent this occurring in the future.

Appendix A – Monitoring Results

Table 1a - Surface Water Sampling Results January – 1st Wet

Location	Units	Levels of Concern		Upper Warrell Creek			Upper Warrell Creek			Stony Creek			Stony Creek			Lower Warrell Creek			Lower Warrell Creek			Unnamed Creek Gumma West			Unnamed Creek Gumma East			Unnamed Creek Gumma North			Nambucca River South			Nambucca River South				
				Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Downstream			Upstream			Downstream							
Freshwater / Estuarine		ANZECC 2000 95% species protected		Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Freshwater			Estuarine			Estuarine							
Date of Sampling				6-Jan-16			6-Jan-16			6-Jan-16			6-Jan-16			6-Jan-16			6-Jan-16			6-Jan-16			6-Jan-16			6-Jan-16			6-Jan-16							
Time of Sampling				11:00 AM			10:50 AM			5:45 PM			5:30 PM			3:40 PM			3:30 PM			5:00 PM			4:40 PM			4:50 PM			4:10 PM			4:00 PM				
Type		ANZECC 2000 95%		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					
Comments				Unable to sample - water level too low																																		
Laboratory data																																						
Metals																																						
Aluminium	mg/L	0.055	-	0.244	0.0162	0.03	0.194	0.016	0.02	0.098	0.02	0.01	0.114	0.01	0.02	0.28	0.01	0.06	0.28	0.01	0.05	0.25	0.02	0.03	0.25	0.02	0.06	0.25	0.02	-	0.11	0.01	0.01	0.11	0.01	0.01		
Arsenic	mg/L	0.002	0.0023	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	0.001	0.002	0.001	<0.001	0.001	0.001	<0.001	0.001	0.001	<0.001	0.002	0.001	0.001	<0.001	0.002	0.001	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	<0.001	0.002	0.001	0.003
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0002	0.0001	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	<0.0001
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.0002	0.0001	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	<0.001
Copper	mg/L	0.0014	0.0013	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.0002	0.0001	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	<0.001
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.0002	0.0001	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	<0.001
Manganese	mg/L	1.9	0.08	0.3	0.01	0.159	0.158	0.0178	0.145	0.0726	0.0218	0.056	0.083	0.0164	0.146	0.35	0.087	0.155	0.35	0.087	0.129	0.49	0.011	0.066	0.49	0.011	0.224	0.49	0.011	0.076	0.006	0.066	0.076	0.006	0.066			
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	0.001	-	-	0.001	-	-	0.001	0.0034	0.001	0.003	0.0034	0.001	0.003	0.002	0.001	0.003	0.002	0.001	0.003	0.002	0.001	-	-	<0.001	-	-	<0.001	-	<0.001	
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	<0.01
Silver	mg/L	0.00005	0.0014	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	<0.001
Zinc	mg/L	0.008	0.015	0.007	0.005	<0.005	0.0062	0.0042	<0.005	0.0064	0.005	<0.005	0.006	0.005	<0.005	0.018	0.005	0.016	0.018	0.005	0.015	0.011	0.005	0.013	0.011	0.005	0.011	0.005	0.011	0.005	0.011	0.005	<0.005	0.005	0.005	<0.005	0.005	<0.005
Iron	mg/L	-	-	1.38	0.48	0.3	0.99	0.366	0.24	1.4	0.41	0.19	1.48	0.35	0.25	0.52	0.05	0.38	0.52	0.05	0.25	1.65	0.37	0.34	1.65	0.37	0.43	1.65	0.37	0.26	0.05	<0.05	0.26	0.05	<0.05	<0.05		
Mercury	mg/L	0.006	0.0004	-	-	<0.0001	-	-	<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	NA	16	NA	NA	16	NA	NA	16	NA	NA	16	NA	NA	16	NA	NA	16	NA	NA	16	NA	NA	16	NA	NA	16	NA	NA	50	NA	50	NA	
C6 - C10 Fraction	µg/L	-	-	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	NA	
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	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	-	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	-	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	-	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	-	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	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	NA	
BTEX																																						
Benzene	µg/L	950	700	950	NA	NA	950	NA	NA	950	NA	NA	950	NA	NA	950	NA	NA	950	NA	NA	950	NA	NA	950	NA	NA	950	NA	NA	950	NA	NA	700	NA	700	NA	
Toluene	µg/L	180	180	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	NA	180	NA	180	NA	
Ethylbenzene	µg/L	80	5	80	NA	NA	80	NA	NA	80	NA	NA	80	NA	NA	80	NA	NA	80	NA	NA	80	NA	NA	80	NA	NA	80	NA	NA	80	NA	NA	5	NA	5	NA	
m&p-Xylenes	µg/L	-	-	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	NA	
o-Xylene	µg/L	350	350	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	NA	350	NA	350	NA	
Xylenes - Total	µg/L	-	-	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	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	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	-	NA	NA	NA	
Nutrients																																						
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	<0.01	0.044	0.016	<0.01	0.03	0.016	<0.01	0.034	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	<0.01	0.11	0.03	<0.01	0.11	0.03	0.07	0.11	0.03	-	0.07	0.02	<0.02	0.07	0.02	<0.02		
Phosphate (reactive phosphorus)	mg/L	-	-	0.01	0.0034	<0.01	0.01	0.004	<0.01	0.018	0.0022	<0.01	0.01	0.003	<0.01	0.011	0.006	<0.01	0.011	0.006	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.013	0.005	-	0.029	0.01	<0.01	0.029	0.01	<0.01		
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	1.3	0.52	0.2	1	0.48	0.2	0.3	0.63	0.2	0.7	0.54	0.31	0.8	0.54	0.31	1.8	3.1	0.9	10.6	3.1	0.9	1.1	3.1	0.9	-	0.46	0.2	0.5	0.46	0.2	0.7		
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	1.3	0.5	0.2	0.9	0.34	0.2	0.2	0.6	0.2	0.1	0.5	0.2	0.5	0.5	0.2	1.6	2.8	0.8	1.8	2.8	0.8	1	2.8	0.8	-	0.3	0.2	0.3	0.3	0.2	0.3		
Nitrate	mg/L	0.7	-	0.102	0.01	0.03	0.054	0.01	0.11	0.208	0.01	0.12	0.2	0.01	0.61	0.05	0.01	0.27	0.05	0.01	0.15	0.03	0.01	8.76	0.03	0.01	0.1	0.03	0.01	-	0.04	0.01	0.18	0.04	0.01	0.38		
Nitrite	mg/L	-																																				

Table 3 - Dust Monitoring Results December 2015/January 2016

		DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG7	DDG8	DDG A1	DDG A2	
			Start date of sampling	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	11/12/2015	
			Finish date of sampling	8/01/2016	8/01/2016	8/01/2016	8/01/2016	8/01/2016	8/01/2016	8/01/2016	8/01/2016	8/01/2016	8/01/2016	
Analyte	Time Period	Unit	Levels of Concern	LOR										
Ash Content	Current Month	g/m ² .month	4	0.1	0.1	0.4	0.9	0.4	15.7	0.8	0.4	0.7	----	----
		mg	N/A	1	2	7	15	6	259	13	7	11	----	----
	Previous Month	g/m ² .month			0.4	1	2.3	0.5	0.4	1.2	0.6	0.8	----	----
	Change	g/m ² .month	Increase of 2		-0.3	-0.6	-1.4	-0.1	15.3	-0.4	-0.2	-0.1	----	----
Combustible Matter	Current Month	g/m ² .month	N/A	0.1	0.1	0.5	0.6	<0.1	2.9	<0.1	0.3	0.6	----	----
		mg	N/A	1	1	8	9	1	47	<1	4	11	----	----
Total Insoluble Matter (TIM)	Current Month	g/m ² .month	4	0.1	0.2	0.9	1.5	0.4	18.6	0.8	0.7	1.3	----	----
		mg	N/A	1	3	15	24	7	306	13	11	22	----	----
	Previous Month	g/m ² .month		0.1	0.5	1.7	3.3	0.6	0.4	2	0.9	1.3	----	----
	Change	g/m ² .month	Increase of 2	0.1	-0.3	-0.8	-1.8	-0.2	18.2	-1.2	-0.2	0	----	----
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	0.001	<0.001	
Comments														


Table 4 – Groundwater Monitoring Results January 2016

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH007	4BH008	4BH010	4BH011	4LDBH009	1BH04	4LDBH011	4LDBH012	1BH10	1BH12	4BH021	4BH022	4BH025	4BH026	4BH037	4BH038	1BH49	4BH058	4BH061	4BH062	4BH065	4BH066	4BH064	
			Cut 4	Cut 4	Cut 6	Cut 6	Cut 7	Cut 7	Cut 8	Cut 9	Cut 9	Cut 10	Cut 11	Cut 11	Cut 12	Cut 12	Fill 15	Fill 15	Cut 17	Cut 17	Cut 26	Cut 26	Cut 28	Cut 28	Cut 28	Cut 28
Date of Sampling			29/01/2016	29/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016	29/01/2016	29/01/2016	29/01/2016	29/01/2016	29/01/2016	29/01/2016	29/01/2016	29/01/2016	29/01/2016	29/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016	28/01/2016	
Comments			DRY	DRY		DRY										DRY			Pungent water (egg)		DRY	DRY			Unable to sample - bore not located	
Laboratory data																										
Metals																										
Aluminium	mg/L	0.055	-	-	0.2400	-	<0.01	<0.01	<0.01	0.0300	<0.01	0.0500	<0.01	<0.01	0.0200	-	0.0100	<0.01	<0.01	<0.01	-	-	0.1800	<0.01	-	
Arsenic	mg/L	0.024	-	-	<0.001	-	<0.001	<0.001	0.0020	0.0060	<0.001	0.0010	0.0020	<0.001	<0.001	<0.001	<0.001	0.0010	<0.001	<0.001	-	-	0.0020	<0.001	-	
Cadmium	mg/L	<LOR	-	-	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0031	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	
Chromium	mg/L	0.001	-	-	<0.001	-	0.0010	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	-	0.0010	<0.001	<0.001	<0.001	-	-	<0.001	<0.001	-	
Copper	mg/L	0.0014	-	-	0.0030	-	0.0020	<0.001	<0.001	0.0040	<0.001	0.0040	0.0330	<0.001	<0.001	-	<0.001	0.0020	<0.001	<0.001	-	-	0.0030	<0.001	-	
Lead	mg/L	0.0034	-	-	0.0830	-	0.0830	0.0550	<0.001	<0.001	0.1760	1.2900	<0.001	<0.001	0.0010	-	<0.001	<0.001	<0.001	0.0240	-	-	<0.001	0.0020	-	
Manganese	mg/L	-	-	-	0.2210	-	0.0310	0.2230	0.8790	0.4060	0.0410	4.9100	0.0140	0.3360	0.0050	-	5.2200	1.4900	2.0700	0.0340	-	-	0.2200	0.0920	-	
Nickel	mg/L	0.011	-	-	0.0180	-	0.0080	0.0020	0.0020	0.0100	0.0030	0.1140	0.0060	<0.001	<0.001	-	0.0050	0.0060	0.0040	<0.001	-	-	0.0100	0.0050	-	
Selenium	mg/L	-	-	-	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	-	
Silver	mg/L	<LOR	-	-	<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	-	
Zinc	mg/L	0.008	-	-	0.0500	-	0.0180	0.0100	<0.005	0.0330	0.0100	0.2990	0.0200	<0.005	0.0120	-	0.0220	0.0130	<0.005	0.0100	-	-	0.0140	<0.005	-	
Iron	mg/L	-	-	-	10.3000	-	<0.05	<0.05	0.4100	0.1800	<0.05	1.6300	<0.05	<0.05	<0.05	-	79.2000	4.9900	3.6200	0.0600	-	-	0.6500	0.2600	-	
Mercury	mg/L	0.0006	-	-	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	-	-	<0.0001	<0.0001	-	
Total Petroleum Hydrocarbons																										
C6-C9 Fraction	µg/L or ppb	-	-	-	<20	-	<20	<20	<20	<20	<20	<20	<20	<20	<20	-	<20	<20	<20	<20	-	-	<20	<20	-	
C10-C14 Fraction	µg/L or ppb	-	-	-	<50	-	<50	<50	<50	<50	870.0000	330.0000	<50	490.0000	<50	-	510.0000	<50	2160.0000	180.0000	-	-	<50	640.0000	-	
C15-C28 Fraction	µg/L or ppb	-	-	-	<100	-	<100	<100	<100	<100	<100	340.0000	<100	<100	<100	-	400.0000	<100	200.0000	<100	-	-	<100	<100	-	
C29-C36 Fraction	µg/L or ppb	-	-	-	<50	-	<50	<50	<50	<50	<50	<50	<50	<50	-	<50	<50	<50	<50	-	-	<50	<50	-		
C10-C36 Fraction	µg/L or ppb	-	-	-	<50	-	<50	<50	<50	<50	870.0000	670.0000	<50	490.0000	<50	-	910.0000	<50	2360.0000	180.0000	-	-	<50	640.0000	-	
BTEX																										
Benzene	µg/L or ppb	950	-	-	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1	-	<1	<1	<1	<1	-	-	<1	<1	-	
Toluene	µg/L or ppb	-	-	-	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	<2	<2	<2	<2	-	-	<2	<2	-	
Ethylbenzene	µg/L or ppb	-	-	-	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	<2	<2	<2	<2	-	-	<2	<2	-	
m+p-Xylene	µg/L or ppb	-	-	-	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	<2	<2	<2	<2	-	-	<2	<2	-	
o-Xylene	µg/L or ppb	-	-	-	<2	-	<2	<2	<2	<2	<2	<2	<2	<2	<2	-	<2	<2	<2	<2	-	-	<2	<2	-	
Naphthalene	µg/L or ppb	-	-	-	<5	-	<5	<5	<5	<5	<5	<5	<5	<5	-	<5	<5	<5	<5	-	-	<5	<5	-		
Nutrients																										
Total Phosphorus	mg/L	-	-	-	0.0200	-	0.0400	0.0400	0.0600	1.4800	0.0100	0.0100	0.1000	0.0400	0.0600	-	0.2400	0.3100	0.2000	<0.01	-	-	0.0600	<0.01	-	
Phosphate	mg/L	-	-	-	<0.01	-	<0.01	<0.01	0.0500	0.0200	<0.01	<0.01	0.0100	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	-	0.0200	<0.01	-	
Total Nitrogen	mg/L	-	-	-	0.3000	-	0.6000	0.4000	0.7000	5.0000	1.8000	12.6000	0.4000	1.1000	0.7000	-	2.4000	0.7000	4.2000	0.7000	-	-	0.3000	1.6000	-	
Total Kjeldahl Nitrogen	mg/L	-	-	-	0.3000	-	0.2000	0.4000	0.7000	4.7000	1.8000	4.8000	0.2000	1.1000	0.4000	-	2.4000	0.6000	4.2000	0.7000	-	-	0.3000	1.6000	-	
Nitrate	mg/L	-	-	-	0.0400	-	0.4500	0.0400	0.0300	0.1900	0.0300	6.1300	0.2500	0.0300	0.3000	-	0.0400	0.1300	0.0400	0.0300	-	-	0.0300	0.0400	-	
Nitrite	mg/L	-	-	-	<0.01	-	<0.01	<0.01	0.0100	0.1200	<0.01	1.6500	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	-	-	<0.01	<0.01	-	
Ammonia	mg/L	-	-	-	0.0500	-	0.0700	0.0400	0.3100	0.2400	0.0200	0.6900	0.0400	0.0100	0.0500	-	0.7000	0.2300	0.1700	0.0100	-	-	<0.01	0.0300	-	
Major anions																										
Chloride	mg/L	-	-	-	1520.0000	-	39.0000	28.0000	186.0000	21.0000	18.0000	117.0000	11.0000	78.0000	18.0000	-	962.0000	2290.0000	343.0000	21.0000	-	-	81.0000	70.0000	-	
Sulfate	mg/L	-	-	-	54.0000	-	10.0000	6.0000	56.0000	327.0000	33.0000	436.0000	9.0000	39.0000	6.0000	-	2080.0000	2760.0000	24.0000	14.0000	-	-	4.0000	26.0000	-	
Bicarbonate	mg/L	-	-	-	3.0000	-	27.0000	28.0000	431.0000	143.0000	46.0000	78.0000	22.0000	148.0000	14.0000	-	54.0000	837.0000	31.0000	29.0000	-	-	44.0000	43.0000	-	
Major cations																										
Sodium	mg/L	-	-	-	788.0000	-	34.0000	31.0000	223.0000	120.0000	36.0000	169.0000	18.0000	72.0000	23.0000	-	723.0000	1700.0000	207.0000	34.0000	-	-	73.0000	74.0000	-	
Potassium	mg/L	-	-	-	2.0000	-	1.0000	3.0000	2.0000	11.0000	<1	10.0000	1.0000	5.0000	<1	-	41.0000	93.0000	13.0000	<1	-	-	<1	1.0000	-	
Calcium	mg/L	-	-	-	5.0000	-	8.0000	1.0000	69.0000	54.0000	5.0000	48.0000	1.0000	55.0000	1.0000	-	192.0000	239.0000	9.0000	<1	-	-	3.0000	6.0000	-	
Magnesium	mg/L	-	-	-	126.0000	-	4.0000	3.0000	27.0000	30.0000	5.0000	51.0000	2.0000	12.0000	<1	-	288.0000	509.0000	16.0000	2.0000	-	-	5.0000	5.0000	-	
Field Physical data																										
Depth to standing water level from TOC	m	-	-	-	15.98	-	11.59	11.65	2.81	12.73	12.81	11.00	7.23	0.97	6.20	-	0.61	0.83	19.61	14.00	-	-	13.62	7.42	-	
pH	pH	-	-	-	5.54	-	6.93	2.17	7.05	6.60	6.45	6.76	6.30	6.75	6.80	-	6.23	6.75	5.76	6.32	-	-	5.90	6.17	-	
Conductivity	mS/cm	-	-	-	1.84	-	0.167	1.92	1.110	1.080	0.187	0.716	0.066	0.599	0.251	-	4.490	8.090	0.539	0.137	-	-	0.319	0.365	-	
Temperature	°C	-	-	-	25.32	-	26.99	25.04	27.81	27.38	30.16	29.63	26.36	28.58	28.61	-	29.07	30.10	25.70	25.68	-	-	23.73	22.69	-	
Total Dissolved Solids	mg/L	-																								

Table 5 – Blasting Monitoring Results January 2016

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
28-Jan	10-019	10		16.410	-	-	115.200	-	-					32
Totals No of Exceedances										3	2nd Reporting Period			
December percentage exceedance										9.68%	Exceedances			0
1st reporting Period										Percentage exceedance at 16th December 2015				
										10.00%				
Note	17 July blasting criteria increase approved by DP&E with signed agreements													
	16 December is Anniversary date of EPL													
	Monitor 3 is the only monitor where an agreement does not exist for 25mm/s													
* Flat Battery														
- Did not trigger														
** Power Pole														

Table 6 – Acoustic Investigation January

Out of Hours Works Field Verification											
Permit #	Description of Works	Date	Time	Location	Rec ID	NCA	NML	Predicted levels at receiver	Actual Calculated level	Principal sources/ operations	Notes
29	Albert Drive Connection	14/11/2015	12:45 PM	Albert Drive	19	1	40	35.2	33.1	Positrack, excavator, truck	Backhoe + truck loading material on stockpile during monitoring