Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

- August 2015

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

Contents

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 M4.1; and

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

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

1.1 Description of Works

The project's construction activities during August 2015 were limited to the following:

- Clearing and Grubbing;
- Topsoil stripping;
- Earthworks including crushing;
- Production blasting;
- Commencement of piling including driven piling;
- Continuing bridge works including temporary work platforms;
- Earthworks through the flying fox area;
- Installation of erosion and sediment controls;
- Installation of permanent boundary fencing;
- Installation of monitoring instruments – extensometers, inclinometers and piezometers;
- Continuing culvert installation;
- Site compound establishment (Northern Compound);
- Geotechnical Investigations;
- Installation of temporary waterway crossings; and
- Site Survey.

The works scheduled for next month include:

- Clearing and Grubbing;
- Topsoil stripping;
- Earthworks including crushing;
- Production blasting;
- Commencement of piling including driven piling;
- Continuing bridge works including temporary work platforms;
- Earthworks through the flying fox area;
- Installation of erosion and sediment controls;
- Installation of permanent boundary fencing;
- Installation of monitoring instruments – extensometers, inclinometers and piezometers

- Continuing culvert installation;
- Site compound establishment (Northern Compound);
- Geotechnical Investigations;
- Installation of temporary waterway crossings; and
- Site Survey.

1.2 Consultation Activities

The project's consultation activities during August 2015 included various community letterbox drop notifications and the following:

Groups	Date	Key Topics
Environmental Review Group	18/08/15	Construction Progress, Design Update, Upcoming works, EWMS discussion, Environmental Update, Monitoring update.

Other consultation activities:

- Consultation for the construction of crib sheds on Bald Hill and Gumma roads.
- Consultation with Old Coast Road residents re: the new alignment of Old Coast Road
- Ongoing weekly consultation with sensitive receivers in Cut 11 re: blasting and any feedback.
- Consultation with sensitive receivers regarding the installation of first flush water tank systems
- Ongoing consultation with sensitive receivers in Cut 10 re: blasting activities

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 for September 2015:

- Community Information Sessions 16th and 17th September – ramps, flooding, noise and dust and a general project update featuring the bridge work, piling, batch plant, precast facility and earthworks

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:-

Month	Total monthly rainfall	Location
01/08/15 – 31/08/15	25mm	Northern Compound
01/08/15 – 31/08/15	18.2mm	Albert Drive Compound

The site experienced a total of 6 rain days throughout the month of August 2015.

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

The daily summaries for rainfall received in July 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 compound automated weather station

SiteName: Southern Compound		
Date	Time	TOTAL Rain Gauge
1/08/2015	9:00:00	0
2/08/2015	9:00:00	0
3/08/2015	9:00:00	0
4/08/2015	9:00:00	0
5/08/2015	9:00:00	0
6/08/2015	9:00:00	0
7/08/2015	9:00:00	0
8/08/2015	9:00:00	0.4
9/08/2015	9:00:00	1.6
10/08/2015	9:00:00	0
11/08/2015	9:00:00	0
12/08/2015	9:00:00	0
13/08/2015	9:00:00	0
14/08/2015	9:00:00	0
15/08/2015	9:00:00	0
16/08/2015	9:00:00	0
17/08/2015	9:00:00	0
18/08/2015	9:00:00	0
19/08/2015	9:00:00	0
20/08/2015	9:00:00	7.6
21/08/2015	9:00:00	7.8
22/08/2015	9:00:00	0.2
23/08/2015	9:00:00	0
24/08/2015	9:00:00	0.6

25/08/2015	9:00:00	0
26/08/2015	9:00:00	0
27/08/2015	9:00:00	0
28/08/2015	9:00:00	0
29/08/2015	9:00:00	0
30/08/2015	9:00:00	0
31/08/2015	9:00:00	0

Table 2.2 – Rainfall recorded at the Northern compound automated weather station

SiteName: Northern Compound		
Date	Time	TOTAL Rain Gauge
1/08/2015	9:00:00	0.2
2/08/2015	9:00:00	0
3/08/2015	9:00:00	0
4/08/2015	9:00:00	0
5/08/2015	9:00:00	0
6/08/2015	9:00:00	0
7/08/2015	9:00:00	0
8/08/2015	9:00:00	0
9/08/2015	9:00:00	0
10/08/2015	9:00:00	0
11/08/2015	9:00:00	0
12/08/2015	9:00:00	0.4
13/08/2015	9:00:00	0.4
14/08/2015	9:00:00	0
15/08/2015	9:00:00	0
16/08/2015	9:00:00	0
17/08/2015	9:00:00	0
18/08/2015	9:00:00	0
19/08/2015	9:00:00	0
20/08/2015	9:00:00	0
21/08/2015	9:00:00	0
22/08/2015	9:00:00	0
23/08/2015	9:00:00	0
24/08/2015	9:00:00	11.4
25/08/2015	9:00:00	11.4
26/08/2015	9:00:00	0
27/08/2015	9:00:00	0
28/08/2015	9:00:00	1.2
29/08/2015	9:00:00	0
30/08/2015	9:00:00	0
31/08/2015	9:00:00	0

Table 2.3: Weather conditions recorded in August 2015 at Smoky Cape by the Bureau of Meteorology.

Observations from Smoky Cape Lighthouse.

Smoky Cape Daily Summaries

August 2015

Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/08/2015	14	22	0
2/08/2015	16.5		0
3/08/2015	18.7	24.2	0
4/08/2015	10.2	19	0
5/08/2015	7	17.6	0
6/08/2015	7.7	18.5	0
7/08/2015	10	19.7	0
8/08/2015	11.2	19.7	0
9/08/2015	11.4	20	0
10/08/2015	12.9	21	0
11/08/2015	15	22.5	0
12/08/2015	14.4	21.7	0
13/08/2015	10.8	21.5	2
14/08/2015	10.2	19.4	0
15/08/2015	12.1	21.2	0
16/08/2015	12.5	21.2	9.2
17/08/2015	13	21.9	0
18/08/2015	13.8	20.5	0
19/08/2015	11.9	19.8	0
20/08/2015	12.1	21.2	0.6
21/08/2015	13.9	22.6	0
22/08/2015	17	23	0
23/08/2015	16.1	24.1	0.2
24/08/2015	15.4	21.6	4.4
25/08/2015	16.1	25.4	5.2
26/08/2015	14.1	24.1	0
27/08/2015	15.2	20.1	0
28/08/2015	13.6	22.1	1.2
29/08/2015	13.4	22.5	0
30/08/2015	11.2	20.8	0
31/08/2015	12.6	21.5	0

3. Surface Water Monitoring

Pacifico are awaiting trigger levels for baseline monitoring from RMS, so comparisons will be made to ANZECC guidelines and between upstream and downstream levels to determine site works impact.

Monthly sampling was undertaken by ACCIONA (Pacifico):

Dry Sampling Event

On the 31st August during a dry period, field tests and lab samples were taken. The results are available in Appendix A.

Below exceedances are discussed:

Dissolved oxygen (DO) levels noted to be below ANZECC criteria at:

- Gumma Wetlands upstream and downstream, this is attributed to the low-flow environment of the water as well as vegetative matter decomposing within the water body.

The low dissolved oxygen levels are consistent with baseline water quality data collected by RMS prior to the commencement of construction activities at the locations noted above.

pH levels noted to be outside of ANZECC criteria at:

A low pH level was also recorded at Upper Warrell Creek (6.46 upstream and 6.26 pH units downstream) but no activities that would decrease pH levels were undertaken during the month of August.

Unnamed Creek Gumma West upstream (6.09pH units upstream).

The low pH levels recorded for both locations are within background pre-construction pH levels, which range from pH 5.1 to pH 7.9.

Turbidity levels noted to be outside of ANZECC criteria at:

A high turbidity reading was recorded at Unnamed Channel Gumma Wetland upstream (94.7 NTU), Gumma Wetland upstream (413 NTU), Unnamed Creek Gumma West upstream (133 NTU), Unnamed creek Gumma East upstream (73.6 NTU), Unnamed Creek Gumma North downstream (76.9 NTU). This last location is downstream of all upstream locations and does not show an overall increase in turbidity.

There has been low levels of rainfall during the month. Gumma wetlands has variable background readings ranging from 2.4 – 951 NTUs.

Metals levels noted to be outside of ANZECC criteria at:

All Gumma Wetland monitoring locations excluding Gumma Wetland upstream for aluminium. It is noted that aluminium levels were not measured during baseline monitoring.

One site at Gumma Wetland (unnamed Channel Gumma Wetland) also had elevated Cadmium (0.0011mg/L), Chromium (0.001mg/L), Copper (0.02mg/L), Manganese (2.2mg/L), Nickel (0.073mg/L). Chromium and Copper were within baseline levels. Nickel was also elevated at Unnamed Channel Gumma Wetland (0.071mg/L) as well as in Gumma Wetland Upstream (0.013mg/L). These are within baseline levels of <0.005mg/L to 0.1mg/L.

It is noted that Manganese was not measured in the baseline monitoring stage. One potential cause for the increase in elevated metals at the site is due to the reduction in water level for the site. Culvert works in the Gumma wetland have had regular (hourly, initially) pH monitoring undertaken to ensure pH levels were above the existing pH levels of Gumma Wetlands to ensure no potential for additional metals leaching from material.

Elevated zinc levels were also recorded at Upper Warrell Creek downstream (0.009mg/L) which is within baseline monitoring results of <0.005mg/L to 0.02mg/L.

Nutrient levels noted to be outside of ANZECC criteria at:

Elevated total phosphorus levels were recorded at Unnamed Channel Gumma Wetland upstream (0.1mg/L), Gumma Wetland upstream (0.13mg/L), Unnamed Creek Gumma East (0.49mg/L), Unnamed Creek Gumma North downstream (0.28mg/L), Nambucca River at all sites (0.04-0.06mg/L) and Stony Creek downstream (0.05mg/L) (using trigger values from Table 8.2.2.1 Volume 2 of ANZECC water quality guidelines, as there is no value provided in the standard ANZECC 95% trigger levels for Total Phosphorus). These results are within baseline monitoring results.

Wet Sampling Event

A “wet” sampling event (>10mm in 24 hours) was undertaken on the 26th August, field tests and lab samples were taken. The results are available in Appendix A.

Dissolved oxygen (DO) levels noted to be below ANZECC criteria at:

All Gumma Wetland sites, both upstream and downstream. This is attributed to the high amount of decomposing vegetative matter in the water. Newee Creek also had slightly low DO levels (4.93mg/L). This was possibly due to a change in location of sampling site from the original baseline location. We are not undertaking any works that would impact upon DO in this location.

pH levels noted to be below ANZECC criteria at:

All Gumma sites except Gumma Wetland upstream. This was within baseline levels (5.1-7.9pH units).

Metals levels noted to be outside of ANZECC criteria at:

All Gumma locations except for Gumma Creek North downstream. Aluminium was not sampled for baseline monitoring. Elevated Copper levels were also recorded at all Gumma sites except for Unnamed Gumma Creek East upstream. These were within baseline levels (<0.001 to 0.022). Nickel was also elevated at Gumma Wetland upstream (0.019mg/L), which was within baseline levels (<LOR to 0.019mg/L). Zinc was also elevated at Gumma Wetland upstream (0.021mg/L), which was within baseline levels (<LOR to 0.1mg/L).

Nutrient levels noted to be outside of ANZECC criteria at:

Elevated total phosphorus levels were recorded at all sites with the exception of Stony Creek downstream, Nambucca River downstream, Nambucca River North downstream and Newee Creek. Elevated levels are possibly as a result of runoff from land, including agricultural areas, after an extended dry period.

Total Nitrogen levels were elevated at all Gumma sites, Nambucca River South upstream as well as Nambucca River/Newee Creek junction site. Gumma sites were within baseline levels (0.4-8.9mg/L), as were the Nambucca River sites (<LOR to 0.9mg/L). Nitrate was also elevated at Unnamed Creek Gumma North downstream (3.74mg/L). It is noted that nitrate was not measured during baseline monitoring and that we are not undertaking any works that could raise total nitrogen levels.

4. Sediment Basin Water Monitoring

Water was released from commissioned sediment basins between the 4th of August and 21st August after water was transferred into them from works in nearby waterways. Water pumped into basins was treated and released as soon as possible, especially if rainfall is predicted in the 5 day forecast. Table 4 below has the water quality results recorded for the water release events:

Table 4 – Water Release Register

Date	Basin ID	Oil and Grease (visible)	pH	Turbidity (NTU)	TSS (mg/L)	Approx Volume Discharged (kL)	Comments
4/08/2015	B42.87	N	7.66	5.1		300	Water released pumped into basin from waterway works during extended dry period
13/08/2015	B44.44	N	7.21	11	12	860	Water released pumped into basin from waterway works during extended dry period
21/08/2015	B42.87	N	7.61	6.3		300	Water released pumped into basin from waterway works during extended dry period

- TSS is taken every third discharge on average

5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 19th and 27th August at eight locations near to the construction works. Results from this are available in Appendix A.

LAeq levels (69.7dB(A)) were not within predicted levels (66 d(B(A)) for the fill works activity at Gumma Road. The exceedance by 3.7 dB(A) was identified as a result of numerous pieces of plant operating. The background levels at this location range from 61 – 65.4dB(A). It was investigated and extra plant were working in the area for the activity. The trucks were queuing up contributing to the noise levels. The queuing of trucks at this location was minimised in consultation with the foreman. Monitoring will be carried out in September to verify noise levels are less than predicted levels.

6. Vibration Monitoring

No vibration monitoring was undertaken in August 2015. Further vibration monitoring is planned to be undertaken across the Nambucca River at a sensitive receiver to verify minimal disturbance to sensitive receivers.

6.1 Blasting

Seven blasting events occurred in August 2015 – 3rd, 6th, 10th, 13th, 17th, 20th, 25th and 31st August.

No exceedences occurred from these blasts.

There have been no exceedances for Overpressure from these two blasts, the highest recorded was 118dB on the 17th August.

We are required to achieve less than 5% exceedance (of 5mm/s limit) within a 12month period for those sensitive receptors that have not agreed to the 25mm/s limit. We have anticipated a total of 49 blasts. At the end of August our percentage is 18.2%.

7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from the 10/7/2015 to 10/8/2015. DDG results are available in Appendix A.

An elevated level of 6.7g/m2/month total insoluble matter was recorded at dust deposition gauge DDG4 (Ash Content 5.8g/m2/month). It was noted that a large clump of dirt was within the dust gauge funnel, which would impact on results for the month.

An elevated level of 5.1g/m2/month total insoluble matter was recorded at DDG5 (Ash Content 4.2g/m2/month). It was noted that this gauge was totally full of cloudy water, despite minimal rain in the area and other gauges only having approximately 10mm of water. This extra liquid may have impacted upon results from this gauge.

To help mitigate fugitive dust emissions extra water carts have been utilised on site to dampen soil.

8. Groundwater Monitoring

ACCIONA (Pacifico) have undertaken groundwater monitoring on the 17/8/2015. 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 have not been issued from RMS to Pacifico including groundwater triggers.

9. Acoustic Investigations

No acoustic investigations were undertaken in August 2015.

10. Complaints

10.1 Summary of Complaints for the month

The following is a brief summary of environmental complaints received in August 2015.
On 5th August, a resident of Kerr Drive contacted RMS to express concerns about dust generation and damage to Bald Hill Road. The community team spoke with the resident about the air quality management plan and identified the dust gauge within the resident's catchment area. The team also notified the resident of upcoming repairs for Bald Hill Road which have since been completed.

On 26th August a resident of Kerr Drive contacted Pacifico to express concerns about noise generation from the crusher at Cut 11. The Community team consulted with the resident and asked that the resident contact the project if the resident continued to have concerns about noise from the crusher when it started back up again a member from the Environmental Team would attend site with a noise meter to measure sound produced from the crusher.

On 28th August a resident of Letitia Drive contacted Pacifico to express concern about dust on their Photo Voltaic Roof System. The resident was consulted regarding latest dust deposition levels which were compliant. Water carts will continue to be utilised on site to suppress dust, with additives to be used once received.

11. Non-Compliance

11.1 Summary of Non-compliances

No non-compliances occurred on the site during the month of August 2015.

Appendix A – Monitoring Results

Table 1 - Surface Water Sampling Results – 1 dry

Surface Water Results - August 2015 - Dry				Weather: Overcast				Low Tide: 7:05am											
				SW01	SW02	SW03	SW04	SW05	SW06	SW07	SW08	SW09	SW10	SW11	SW12	SW13	SW14	SW15	SW16
Location	Units	Levels of Concern		Upper Warrell Creek	Upper Warrell Creek	Stony Creek	Stony Creek	Lower Warrell Creek	Lower Warrell Creek	Unnamed Channel Gumma Wetland	Gumma Wetland	Unnamed Creek Gumma West	Unnamed Creek Gumma East	Unnamed Creek Gumma North	Nambucca River South	Nambucca River South	Nambucca River North/ Newee Creek Junction	Nambucca River North	Newee Creek
Type		ANZECC 2000 95% species protected		Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Upstream	Upstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream
Freshwater / Estuarine				Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Estuarine	Estuarine	Estuarine	Estuarine	Estuarine
Date of Sampling				31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15	31-Aug-15
Time of Sampling		Freshwater	Marine	10:40 AM	11:06 AM	12:20 PM	12:30 PM	12:50 PM	1:05 PM	1:33 PM	1:45 PM	2:10 PM	2:01 PM	2:38 PM	2:20 PM	3:54 PM	4:23 PM	4:41 PM	4:12 PM
Comments									Lab unable to locate sample										
Laboratory data																			
Metals																			
Aluminium	mg/L	0.055	-	<0.01	<0.01	0.01	0.01	<0.01		0.25	0.03	0.07	0.14	0.06	<0.10	<0.10	<0.10	<0.10	<0.10
Arsenic	mg/L	0.024	0.0023	<0.001	<0.001	<0.001	<0.001	<0.001		0.002	0.001	<0.001	0.002	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium	mg/L	0.0002	0.0055	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001		0.0011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
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	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010
Copper	mg/L	0.0014	0.0013	<0.001	<0.001	<0.001	<0.001	<0.001		0.02	<0.001	<0.001	<0.001	<0.001	<0.010	<0.010	<0.010	<0.010	<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	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010
Manganese	mg/L	1.9	0.08	0.047	0.042	0.031	0.009	0.178		2.2	0.715	0.041	0.254	0.195	0.034	0.022	0.04	0.037	0.044
Nickel	mg/L	0.011	0.07	<0.001	0.001	<0.001	<0.001	0.001		0.073	0.014	<0.001	0.004	<0.001	<0.010	<0.010	<0.010	<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	<0.01	<0.10	<0.10	<0.10	<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	<0.001	<0.010	<0.010	<0.010	<0.010	<0.010
Zinc	mg/L	0.008	0.015	<0.005	0.009	<0.005	<0.005	<0.005		0.071	0.013	<0.005	<0.005	<0.005	<0.050	<0.050	<0.050	<0.050	<0.050
Iron	mg/L	-	-	0.31	0.24	0.36	0.44	<0.05		4.66	2.1	0.75	1.79	1.05	<0.50	<0.50	<0.50	<0.50	<0.50
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	<0.0001	<0.0001	<0.0001	<0.0001
Total Recoverable Hydrocarbons																			
Naphthalene	µg/L	16	50	<5	<5	<5	<5	<5		<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
C6 - C10 Fraction	µg/L	-	-	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)	µg/L	-	-	<20	<20	<20	<20	<20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	µg/L	-	-	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	µg/L	-	-	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	µg/L	-	-	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)	µg/L	-	-	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	<100	<100	<100	<100	<100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
BTEX																			
Benzene	µg/L	950	700	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	µg/L	180	180	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	µg/L	80	5	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
m&p-Xylenes	µg/L	-	-	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
o-Xylene	µg/L	350	350	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Xylenes - Total	µg/L	-	-	<2	<2	<2	<2	<2		<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX	µg/L	-	-	<1	<1	<1	<1	<1		<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Nutrients																			
Total Phosphorus	mg/L	0.05	0.03	0.04	0.02	0.01	0.05	<0.01		0.1	0.13	0.04	0.49	0.28	0.04	0.06	0.05	0.05	0.04
Phosphate (reactive phosphorus)	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
Total Nitrogen	mg/L	0.5	0.3	0.3	0.2	0.2	0.3	0.3		5.8	3.1	1.2	8.2	6.4	<0.2	0.2	0.4	0.6	0.4
Total Kjeldahl Nitrogen	mg/L	-	-	0.3	0.2	0.1	0.2	0.2		5.7	3.1	1.2	8.2	6.4	<0.2	0.2	0.4	0.5	0.4
Nitrate	mg/L	0.7	-	0.04	0.03	0.09	0.08	0.08		0.07	0.03	0.03	0.05	0.05	0.03	0.02	0.03	0.05	0.03
Nitrite	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
Ammonia	mg/L	0.9	-	<0.01	<0.01	<0.01	<0.01	<0.01		2.62	0.38	<0.01	0.19	0.04	<0.05	<0.05	<0.05	<0.05	<0.05
TSS																			
Turbidity		50	10	2.8	1.9	2.6	5.7	1.8		88.4	155	29.4	121	70.7	6	6.5	2.6	2.5	7.9
TSS	mg/L	<40	<10	13	14	12	14	<5		22	132	33	410	32	7	27	19	<5	<5
Field Physical data																			
Temperature	°C	-	-	14.4	15.08	16.54	15.11	19.43	19.62	16.58	18.9	17.76	16.17	19.45	20.74	20.51	20.69	20.36	20.83
pH	pH	-	6.5-8	6.46	6.26	6.73	6.66	6.95	6.95	6.6	6.74	6.09	6.59	6.65	7.93	7.96	7.88	7.92	7.82
pHmV	pHmV	-	-	-13	-2	-29	-24	-41	-41	-21	-29	8	-20	-24	155	-98	-94	-97	90
ORPmV	ORPmV	-	-	186	229	169	169	171	164	88	60	45	35	81	45.1	137	150	147	159
Conductivity	mS/cm	0.125-2.2	-	0.272	0.274	0.262	0.253	10.7	10.7	2.43	1.47	0.522	0.755	0.965	45.1	45.4	45.3	45.4	44.6
Turbidity	NTU	50	10	0	0	0	0	0	0	94.7	413	133	73.6	76.9	2.5	10.9	1.6	1.2	3
Dissolved Oxygen	mg/L	5	5	6.25	6.8	9.26	5.35	7.78	7.45	7.59	3.28	0	0	3.54	8.63	8.73	7.98	8.28	7.6
TDS	g/L	-	-	0.177	0.178	0.17	0.164	6.64	6.65	1.55	0.942	0.334	0.483	0.617	27.5	27.7	27.6	111.9	27.2

Taken from alternative trigger levels provided in ANZECC Water Guidelines Volume 1 and Volume 2 where insufficient data was available for 95%

Exceedances of ANZECC Level of Concern

Table 2 - Noise Monitoring Results

Monthly Noise Monitoring Results August 2015

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
19/08/2015	12:59 PM	Albert Drive	74	1	50	Cut	62	54.1	79.7	42.7	64.2	56.4	54.4	50.3	46.9	Dozer, moxys	N/A		Within predicted levels
19/08/2015	1:32 PM	Cockburns Lane	16	1	50	Cut	65	54.6	69	44.7	65.5	58.2	56.9	52.7	49	Scraper, dozer	N/A		Within predicted levels
27/08/2015	10:28 AM	Bald Hill Rd	197	3	50	Cut	72	55.6	79.6	45.8	72.2	56.3	54	50.3	48.6	Excavator loading moxy	N/A		Within predicted levels
19/08/2015	2:50 PM	Letitia Rd	410	4	59	Cut	60	48	75.5	36.9	64.8	52.6	50/6	44.3	40.3	Dozer	N/A		Within predicted levels
19/08/2015	2:29 PM	Mattick Rd	442	6	44	Cut	62	51.7	72.4	41.3	65.4	53.2	51.8	47.4	44.9	Moxy - excavator loading	N/A		Within predicted levels
27/08/2015	12:05 PM	Nursery Rd	415	4	59	N/A		55.3	75.7	38.6	62.2	61.2	57.2	49.5	45.3	Vibration piling, pile splicing	N/A		Background - pile splicing hand tools - occassionally barely audible audible over bg
19/08/2015	2:04 PM	Wallace St	148	3	50	Cut	47	63.5	74.4	50.9	71.4	68.3	67.1	61.6	55.5	Traffic, other construction	N/A		Background - scraper and dozer from construction site near golf course
27/08/2015	11:00 AM	Gumma Rd	383	3	50	Fill	66	69.7	92.7	45.1	78.7	73	67.5	54.9	50.8	Truck + dog, traffic, unloading rock	Truck + dog	The queuing of trucks at this location was minimised in consultation with the foreman.	No piling at time of monitoring - slight elevation from background levels with no construction approx. 65dB(A).

Table 3 - Dust monitoring results

Monthly Dust Monitoring Results - July/Aug 2015

		Unit	Levels of Concern	LOR	DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG7	DDG8	DDG A1	DDG A2
DDG ID														
Jul-Aug 15	Start date of sampling				10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015	10/07/2015
	Finish date of sampling				11/08/2015	10/08/2015	10/08/2015	10/08/2015	10/08/2015	10/08/2015	10/08/2015	10/08/2015	10/08/2015	10/08/2015
	Ash Content	g/m².month	N/A	0.1	0.2	0.4	0.9	5.8	4.2	0.3	0.2	1.2	----	----
		mg	N/A	1	3	8	16	106	77	6	3	22	----	----
	Combustible Matter	g/m².month	N/A	0.1	<0.1	0.2	0.3	0.9	0.9	0.4	0.1	<0.1	----	----
		mg	N/A	1	<1	3	6	16	16	7	3	<1	----	----
	Total Insoluble	g/m².month	4 or increase of 2	0.1	0.2	0.6	1.2	6.7	5.1	0.7	0.3	1.2	----	----
		mg	N/A	1	3	11	22	122	93	13	6	22	----	----
	Arsenic	mg/L	0.001	0.001	----	----	----	----	----	----	----	----	<0.001	<0.001
	Comments							Large dirt clod in funnel	Gauge was full to brim with water. Other gauges had approx 10mm of water					

Table 4 – Groundwater Monitoring results

August 2015 Groundwater Monitoring (Coffeys)

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH007	4BH008	4BH010	4BH011	4LDBH009	1BH04	4LDBH011	4LDBH012	1BH10	1BH12	4BH021	4BH022	4BH024	4BH025	4BH026	4LDBH015	4BH037	4BH038	1BH49	4BH058	4BH061	4BH062	4BH065	4BH064	4BH066	2bBH06
Cut/Fill			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	Cut 12	Cut 12	Fill 15	Fill 15	Cut 17	Cut 17	Cut 26	Cut 26	Cut 28	Cut 28	Cut 28	Fill 28
Date of Sampling			17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015	17/08/2015
Comments			DRY	DRY		DRY		Unable to obtain sample (damaged). No logger			DRY				Unable to sample (buried)	DRY	DRY		Unable to sample (damaged)		Pungent water (egg)		Dry - no logger	Dry - no logger		Dry - no logger present	Unable to sample (bore not able to be found)	Dry
Laboratory data																												
Metals																												
Aluminium	mg/L	0.055	-	-	<0.005	-	0.007029	-	<0.005	<0.005	-	<0.005	<0.005	0.005	-	-	-	0.010	-	<0.005	<0.005	0.005	-	-	0.038	-	-	-
Arsenic	mg/L	0.024	-	-	<0.001	-	<0.001	-	0.0018	0.00144	-	0.00314	0.00501	<0.001	-	-	-	0.005	-	0.001	0.001	<0.001	-	-	0.001	-	-	-
Cadmium	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	-	-	-
Chromium	mg/L	0.001	-	-	0.001	-	<0.001	-	0.001368	0.001919	-	0.0012635	<0.001	0.001	-	-	-	<0.001	-	0.001	<0.001	<0.001	-	-	<0.001	-	-	-
Copper	mg/L	0.0014	-	-	<0.001	-	0.012856	-	0.00063	<0.001	-	<0.001	0.001309	0.003	-	-	-	0.013	-	<0.001	<0.001	0.008	-	-	0.059	-	-	-
Lead	mg/L	0.0034	-	-	<0.001	-	<0.001	-	<0.001	<0.001	-	<0.001	<0.001	<0.001	-	-	-	<0.001	-	<0.001	<0.001	<0.001	-	-	<0.001	-	-	-
Manganese	mg/L	-	-	-	<0.001	-	0.003672	-	<0.001	<0.001	-	<0.001	0.013735	0.396	-	-	-	0.092	-	0.002	0.363	0.011	-	-	0.504	-	-	-
Nickel	mg/L	0.011	-	-	<0.001	-	<0.001	-	<0.001	<0.001	-	<0.001	0.003652	0.005	-	-	-	0.022	-	<0.001	0.001	0.003	-	-	0.023	-	-	-
Selenium	mg/L	-	-	-	0.001	-	<0.001	-	0.00063	0.00098	-	0.00084	<0.001	<0.001	-	-	-	0.002	-	0.001	<0.001	0.001	-	-	<0.002	-	-	-
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	-	-	-
Zinc	mg/L	0.008	-	-	<0.001	-	0.0016169	-	<0.001	<0.001	-	<0.001	0.0066842	0.007	-	-	-	0.033	-	<0.001	0.004	0.005	-	-	0.035	-	-	-
Iron	mg/L	-	-	-	<0.005	-	0.006777	-	<0.005	<0.005	-	<0.005	0.433532	0.022	-	-	-	0.063	-	<0.005	7.023	0.036	-	-	0.024	-	-	-
Mercury	mg/L	0.0006	-	-	<0.0005	-	<0.0005	-	<0.0005	<0.0005	-	<0.0005	0.000562	<0.0005	-	-	-	0.001	-	<0.0005	0.002	0.001	-	-	<0.0005	-	-	-
Antimony	mg/L	0.009	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
Boron	mg/L	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.033	-	-	-
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.031	-	-	-
Molybdenum	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.001	-	-	-
Other Non-Metals																												
Cyanide	µg/L or ppb	7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<4	-	-	-
Total Recoverable Hydrocarbons																												
C10-C14 Fraction	µg/L or ppb	-	-	-	**100**	-	<50	-	<50	<50	-	**76**	<50	<50	-	-	-	<50	-	<50	<50	<50	-	<50	<50	-	-	-
C15-C28 Fraction	µg/L or ppb	-	-	-	<100	-	<100	-	<100	<100	-	**570**	<100	<100	-	-	-	<100	-	<100	<100	<100	-	<100	<100	-	-	-
C29-C36 Fraction	µg/L or ppb	-	-	-	<100	-	<100	-	<100	<100	-	<100	<100	<100	-	-	-	<100	-	<100	<100	<100	-	<100	<100	-	-	-
C10-C16 Fraction	µg/L or ppb	-	-	-	**100**	-	<50	-	<50	<50	-	**610**	<50	<50	-	-	-	<50	-	<50	<50	<50	-	<50	<50	-	-	-
C16-C34 Fraction	µg/L or ppb	-	-	-	<100	-	<100	-	<100	<100	-	<100	<100	<100	-	-	-	<100	-	**100**	<100	<100	-	<100	<100	-	-	-
C34-C40 Fraction	µg/L or ppb	-	-	-	<100	-	<100	-	<100	<100	-	<100	<100	<100	-	-	-	<100	-	<100	<100	<100	-	<100	<100	-	-	-
BTEX																												
Benzene	µg/L or ppb	950	-	-	<1	-	<1	-	<1	<1	-	<1	<1	<1	-	-	-	<1	-	<1	<1	<1	-	<1	<1	-	-	-
Toluene	µg/L or ppb	-	-	-	<1	-	<1	-	<1	<1	-	<1	<1	<1	-	-	-	<1	-	<1	<1	<1	-	<1	<1	-	-	-
Ethylbenzene	µg/L or ppb	-	-	-	<1	-	<1	-	<1	<1	-	<1	<1	<1	-	-	-	<1	-	<1	<1	<1	-	<1	<1	-	-	-
m+p-Xylene	µg/L or ppb	-	-	-	<2	-	<2	-	<2	<2	-	<2	<2	<2	-	-	-	<2	-	<2	<2	<2	-	<2	<2	-	-	-
o-Xylene	µg/L or ppb	-	-	-	<1	-	<1	-	<1	<1	-	<1	<1	<1	-	-	-	<1	-	<1	<1	<1	-	<1	<1	-	-	-
Naphthalene	µg/L or ppb	-	-	-	Not detected	-	Not detected	-	Not detected	Not detected	-	Not detected	Not detected	Not detected	-	-	-	Not detected	-	Not detected	Not detected	Not detected	-	Not detected	<1	-	-	-
Polycyclic Aromatic Hydrocarbons (PAH)																												
Acenaphthene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Acenaphthylene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Anthracene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Benz(a)anthracene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Benzo(a)pyrene	µg/L or ppb	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Benzo(b) & (k) flouranthene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	-	-	-
Benzo(g.h.i)perylene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Chrysene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Dibenz(a.h)anthracene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Fluoranthene	µg/L or ppb	1.4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Fluorene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Indeno(1.2.3-cd)pyrene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Naphthalene	µg/L or ppb	16	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Phenanthrene	µg/L or ppb	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Pyrene	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<1	-	-	-
Sum of reportes PAHs	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	-	-	-
Volatile Halogenated Compounds (VHC)																												
Bromochloromethane	µg/L or ppb		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	16.000	-	-	-
Chloroform	µg/L or ppb		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.000	-	-	-
Pesticide Analysis Screen																												
Methoxychlor	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-
4, 4 DDT	µg/L or ppb	<LOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Other Organochlorine (OC) Pesticides	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Organophosphate (OP) Pesticides	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.2	-	-	-
Polychlorinated Biphenyls (PCB's)	µg/L or ppb	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<2	-	-	-
Nutrients																												
Total Phosphorus	mg/L	-	-	-	0.036	-	0.067	-	0.063	0.044	-	0.178	0.061	0.030	-	-	-	0.091	-	0.792	0.045	0.030	-	0.032	0.070	-	-	-
Phosphate	mg/L	-	-	-	0.011	-	0.012	-	0.028	0.025	-	0.132	0.025	0.014	-	-	-	0.056	-	0.045	0.010	0.007	-	0.007	0.053	-	-	-
Total Nitrogen	mg/L	-	-	-	0.120	-	0.48	-	1.718	0.402	-	3.578	0.17	0.242	-	-	-	0.179	-	1.524	0.140	0.185	-	0.174	0.334	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	0.120	-	0.146	-	1.711	0.377	-	3.57	0.168	0.081	-	-	-	0.159	-	1.076	0.140	0.063	-	0.068	0.306	-	-	-
			-	-	<0.005	-	0.334	-	0.007	0.025	-	0.008	0.002	0.161	-	-	-	0.020	-	0.448	<0.005	0.122	-	0.106		-	-	-
Nitrate	mg/L	-	-	-	<0.005	-	0.333	-	<0.005	0.015	-	0.005	<0.005	0.161	-	-	-	0.019	-	0.446	<0.005	0.120	-	0.106	0.022	-	-	-
Nitrite	mg/L	-	-	-	<0.001	-	0.001	-	0.007	0.01	-	0.003	<0.001	<0.001	-	-	-	0.001	-	0.002	<0.001	0.002	-	<0.001	0.006	-	-	-
Ammonia	mg/L	-	-	-	0.086	-	0.02	-	0.538	0.115	-	0.204	0.198	0.004	-	-	-	0.064	-	<0.001	0.074	0.005	-	0.004	0.011	-	-	-
Major anions																												
Chloride	mg/L	-	-	-	1,750	-	19.5	-	154	981	-	255	13.7	26.1	-	-	-	104	-	2,542	13.8	20.0	-	20.3	186.000	-	-	-
Sulfate	mg/L	-	-	-	0.00	-	0.90	-	15.9	29.8	-	0.00	2.57	4.41	-	-	-	55.6	-	970	2.18	5.12	-	5.33	0.640	-	-	-
Bicarbonate	mg/L	-	-	-	6	-	3	-	420	300	-	190	28	36	-	-	-	16	-	930	49	12	-	12	20.000	-	-	-
Major cations																												
Sodium	mg/L	-	-	-	934	-	12.8	-	248	360	-	222	17.8	25.4	-	-	-	162	-	2078	11.8	19.2	-	18.3	108.000	-	-	-
Potassium	mg/L	-	-	-	1.93	-	0.41	-	2.34	21.1	-	4.25	0.76	1.33	-	-	-	1.12	-	99.5	1.61	0.34	-	0.31	1.280	-	-	-
Calcium	mg/L	-	-	-	6.10	-	0.11	-	67.5	227	-	25.0	1.12	3.85	-	-	-	1.71	-	265	1.20	1.09	-	0.96	4.610	-	-	-
Magnesium	mg/L	-	-	-	134	-	0.90	-	27.6	89.6	-	16.9	1.30	3.39	-	-	-	2.56	-	569	8.08	2.65	-	2.38	11.400	-	-	-
Physical																												
pH	pH	-	-	-	4.68	-	5.02	-	7.37	7.36	-	6.99	6.05	6.42	-	-	-	6.16	-	7.52	6.17	5.70	-	5.86	5.590	-	-	-
Conductivity	dS/m	-	-	-	5.316	-	0.080	-	1.561	3.666	-	1.369	0.106	0.178	-	-	-	0.757	-	11.670	0.156	0.128	-	0.122	0.626	-	-	-
Total Dissolved Solids	mg/L	-	-	-	3,615	-	54	-	1,061	2,493	-	931	72	121	-	-	-	515	-	7,936	106	87	-	83	425.7	-	-	-
Field Physical data																												
Depth to standing water level from TOC	m	-	-	-	15.04 m	-	10:36 m	-	3.07 m	5.65 m	-	7.59 m	7.97 m	16.24 m	-	-	-	10.5 m	-	0.97 m	16.06 m	11.76 m	-	-	13.12 m	-	-	-
pH	pH	-	-	-	5.28	-	3.05	-	4.73	4.9	-	3.34	2.18	3.7	-	-	-	2.21	-	4.69	1.94	3.82	-	-	3.57	-	-	-
Conductivity	mS/cm	-	-	-	5.02	-	0.165	-	1.51	3.47	-	1.34	0.149	0.187	-	-	-	0.867	-	10.6	0.156	0.126	-	-	0.547	-	-	-
Temperature	○C	-	-	-	18.28	-	20.65	-	19.57	21.06	-	20.98	20.7	19.05	-	-	-	19.99	-	17.18	19.21	19.98	-	-	19.48	-	-	-
Dissolved Oxygen	mg/L	-	-	-	5.18	-	6.23	-	4.1	4.62	-	4.42	4.41	5.72	-	-	-	3.99	-	5.79	4.76	5.95	-	-	4.51	-	-	-
Turbidity	NTU	-	-	-	201	-	43.3	-	19.6	37.8	-	12.8	10.7	22.8	-	-	-	34.5	-	102	29.6	41.5	-	-	346	-	-	-