



# Warrell Creek to Nambucca Heads – Pacific Highway Upgrade Project

## ENVIRONMENT PROTECTION AUTHORITY MONTHLY REPORT

■ January 2018

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Pacifico Project Number: WC2NH



A team consisting of RMS and Pacifico (ACCIONA Ferrovia JV) to upgrade the Pacific Highway at Warrell Creek to Nambucca Heads

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## 1. Introduction

Environmental Protection Licence (EPL) 20533 was issued to ACCIONA Infrastructure for the Warrell Creek to Nambucca Heads Pacific Highway Upgrade project on the 16<sup>th</sup> 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 2018 included the following:

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

Works scheduled for next month include the following:

- Bitumen sealing work
- Earthworks
- Continuing bridge works including deck concrete pours, parapet installation and stitch pours
- Continuing drainage works
- Scour rock installation
- Batter stabilisation using hydromulch (permanent design seed mix)

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

## 1.2 Consultation Activities

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

**Table 1 – Consultation Activities**

Groups	Date	Key Topics
Toolboxes	Wednesday each week	Environmental and community issues communicated to the workforce.
RMS	Fortnightly	Communications look ahead, stakeholder issues
North Facing Ramps group	15 January	Matters pertaining to ongoing works nearby – final meeting

### Other Consultation Activities:

- Followed up light spill and operational noise issues in conjunction with RMS;
- Coordinated vegetation removal and revegetation activities with stakeholders;
- Obtained a further agreement for OOHW asphaltting at Browns Crossing Rd; and
- Following up property adjustment works to gain Schedule 35 sign off;

### At House Noise Treatments

The at house noise treatment program is currently being managed by RMS and is not part of the ACCIONA (Pacifco) Scope of Works and Technical Criteria.

### Upcoming Community and stakeholder activities:

- Nambucca Shire Council liaison meeting – 13 February;
- Issue notification for traffic diversion at the southern interchange near Browns Crossing Road;
- Issue notification for night paving works at Browns Crossing Road;

- Continue to seek project wide agreements with potentially impacted residents for all anticipated Out of Hours construction works through to March 2018; and
- Continue to consult stakeholders impacted by visual mounds along the entire alignment;

## 2. Weather

### 2.1 Discussion

The automatic recording weather stations at the main site compounds (North and South) records rainfall totals daily at 9AM. The total rainfall received for the month is as follows: -

**Table 2 – Rainfall recorded at the two weather stations operated by Pacifico**

Month	Total monthly rainfall	Location
1/01/2018 – 31/01/2018	128.4 mm	Northern Compound
1/01/2018 – 31/01/2018	100.6 mm	Albert Drive Compound

The site experienced a total of eleven (11) rain days throughout the month of January 2018.

During January 2018, rainfall received on site was lower than the January monthly average of 146.9 mm. 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 2018 at the Albert Drive Compound and Northern Compound are shown below in Table 2.1 and 2.2.

Table 2.1 – Rainfall recorded at Albert Drive Southern Compound Automated Weather Station

January 2018

Date	Time	TOTAL Rain Gauge (mm)
1/01/2018	9:00:00	14.8
2/01/2018	9:00:00	21.8
3/01/2018	9:00:00	37.2
4/01/2018	9:00:00	0.2
5/01/2018	9:00:00	0
6/01/2018	9:00:00	0
7/01/2018	9:00:00	0
8/01/2018	9:00:00	0
9/01/2018	9:00:00	0
10/01/2018	9:00:00	7
11/01/2018	9:00:00	8.2
12/01/2018	9:00:00	0.2
13/01/2018	9:00:00	0
14/01/2018	9:00:00	0
15/01/2018	9:00:00	0
16/01/2018	9:00:00	0
17/01/2018	9:00:00	0
18/01/2018	9:00:00	0
19/01/2018	9:00:00	0
20/01/2018	9:00:00	0
21/01/2018	9:00:00	0.4
22/01/2018	9:00:00	0
23/01/2018	9:00:00	0
24/01/2018	9:00:00	0
25/01/2018	9:00:00	0
26/01/2018	9:00:00	0
27/01/2018	9:00:00	0
28/01/2018	9:00:00	2.4
29/01/2018	9:00:00	6.2
30/01/2018	9:00:00	2.2
31/01/2018	9:00:00	0

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

January 2018

Date	Time	TOTAL Rain Gauge (mm)
1/01/2018	9:00:00	10.4
2/01/2018	9:00:00	35.4
3/01/2018	9:00:00	49.4
4/01/2018	9:00:00	0
5/01/2018	9:00:00	0
6/01/2018	9:00:00	0
7/01/2018	9:00:00	0
8/01/2018	9:00:00	0
9/01/2018	9:00:00	0
10/01/2018	9:00:00	20
11/01/2018	9:00:00	4.4
12/01/2018	9:00:00	2
13/01/2018	9:00:00	0
14/01/2018	9:00:00	0
15/01/2018	9:00:00	0
16/01/2018	9:00:00	0
17/01/2018	9:00:00	0
18/01/2018	9:00:00	0
19/01/2018	9:00:00	0
20/01/2018	9:00:00	0
21/01/2018	9:00:00	0
22/01/2018	9:00:00	0
23/01/2018	9:00:00	0
24/01/2018	9:00:00	0
25/01/2018	9:00:00	0
26/01/2018	9:00:00	0
27/01/2018	9:00:00	0
28/01/2018	9:00:00	1.6
29/01/2018	9:00:00	0.6
30/01/2018	9:00:00	4.4
31/01/2018	9:00:00	0.2

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

<b>January 2018</b>			
Date	Minimum temperature (°C)	Maximum temperature (°C)	Rainfall (mm)
1/01/2018	22	28	1.4
2/01/2018	20.7	28.8	10.6
3/01/2018	18.5	27	29.4
4/01/2018	18	27.7	0.4
5/01/2018	18	28.9	0
6/01/2018	20.5	27.5	0
7/01/2018	22.2	27.9	0
8/01/2018	22.3	27	0
9/01/2018	21.6	NR	0
10/01/2018	NR	30.3	NR
11/01/2018	19.2	28	16.2
12/01/2018	20.5	29.2	1
13/01/2018	22.8	32	0
14/01/2018	20.9	26.1	0
15/01/2018	15.5	25	0.4
16/01/2018	17.8	29.3	0
17/01/2018	16.4	27	0
18/01/2018	16.2	28	0
19/01/2018	17.2	27.1	0
20/01/2018	17.5	28.5	0
21/01/2018	19.6	30	0
22/01/2018	22	29.1	0
23/01/2018	22	29	0
24/01/2018	22.5	29	0
25/01/2018	22.7	29.8	0
26/01/2018	23.5	30.2	0
27/01/2018	22.9	31	0
28/01/2018	22.3	30.2	0.6
29/01/2018	22.4	30.5	3.6
30/01/2018	20.5	30.6	8.4
31/01/2018	20.7	28.5	0

NT – NR (No Record Available)



### 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 3<sup>rd</sup> of January 2018 after an event was triggered (>10mm of rain in 24 hour period). Field testing and lab sampling was undertaken. Results are attached in Appendix A.

#### pH levels noted to be outside of trigger levels at:

Lower Warrell Creek recorded elevated pH levels upstream and downstream (pH 6.91 upstream, pH 7.34 downstream, 6.86 trigger level). It is noted that these levels are within ANZECC criteria (pH 6.5-8.0). These results are consistent with previous results for the site (pH 7.33 upstream, pH 7.3 downstream recorded, February 2017 and pH 7.18 upstream, pH 7.35 downstream recorded, October 2017). No construction works were completed at this location during January which may have contributed to elevated pH levels, this section of the roadway was opened as part of the partial opening of the WC2NH Project in December 2017.

Stony Creek recorded low pH levels upstream and downstream (pH 6.27 recorded upstream, pH 6.61 trigger and pH 6.08 downstream, pH 6.21 trigger). All controls were in place for the site, with no activities undertaken within or adjacent to the waterway in January 2018. It is also noted that these levels are within ANZECC criteria (pH 6.5-8.0).

Upper Warrell Creek recorded low pH levels upstream and downstream (pH 6.02 recorded upstream, pH 6.23 trigger and pH 6.12 recorded downstream, pH 6.42 trigger). It is noted that these levels are within ANZECC criteria (pH 6.5-8.0). All controls were in place, with no additional activities being undertaken within or adjacent to the waterway. It should also be noted that during the monitoring event flooding was occurring at Upper Warrell Creek due to rainfall received in late December 2017 and early January 2018 which may have contributed to the above exceedance.

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

Upper Warrell Creek recorded elevated NTU upstream and downstream (76.7 NTU upstream and 74.2 NTU downstream). It is noted that levels decreased between upstream and downstream sites, with construction impacts unlikely to be the cause of the elevated levels. It should also be noted that during the monitoring event flooding was occurring at Upper Warrell Creek due to rainfall received in late December 2017 and early January 2018 which contributed to the above exceedance.

Lower Warrell Creek recorded elevated NTU upstream and downstream (143 NTU upstream and 105 NTU downstream). It is noted that levels decreased between upstream and downstream sites, with construction impacts unlikely to be the cause of the elevated levels.

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

Lower Warrell Creek recorded low DO levels upstream and downstream (4.45 mg/L recorded upstream, 4.51 mg/L recorded downstream, 5.02 mg/L trigger). It is noted that these levels increased from upstream to downstream and are therefore unlikely to be due to construction impacts. No works occurred within or adjacent to this waterway in January 2018.

Nambucca River recorded low DO levels upstream and downstream (5.93 mg/L recorded upstream, 6.06 mg/L recorded downstream, 6.88 mg/L trigger). It is noted that these levels are above ANZECC criteria (5mg/L). It should be noted that these levels increased from upstream to downstream and are therefore unlikely to be due to construction impacts. No works occurred within or adjacent to this waterway in January 2018.

Unnamed Creek Gumma (East) recorded low DO levels upstream (1.74 mg/L recorded upstream, 1.78 mg/L trigger). It should be noted that Unnamed Creek Gumma (West) upstream and Unnamed Gumma Creek (North) downstream both recorded DO levels within trigger values during the monitoring event. Decaying vegetation within this waterway may have contributed to the low DO levels recorded at this location.

Metals noted to be above trigger levels at:

Upper Warrell Creek downstream recorded elevated levels of aluminium (0.42 mg/L recorded downstream, 0.194 mg/L trigger). These levels are consistent with previous results for the site (e.g. 0.32 mg/L recorded downstream, August 2016). It should also be noted that flooding was occurring at Upper Warrell Creek during the monitoring event due to rainfall received in late December 2017 and early January 2018.

Stony Creek recorded slightly elevated levels of aluminium upstream (0.1 mg/L recorded upstream, trigger 0.098 mg/L). It is noted that aluminium at Stony Creek downstream was within trigger values (0.04 mg/L recorded downstream, 0.114 mg/L trigger). As levels decreased from upstream to downstream it is unlikely that this elevated level is due to construction impacts.

Lower Warrell Creek recorded elevated levels of aluminium upstream (0.3 mg/L recorded, 0.28 mg/L trigger) and iron upstream (0.55 mg/L recorded, 0.52 mg/L trigger). It is noted that downstream results for aluminium and iron decreased from upstream and were within trigger values and therefore are unlikely to be attributed to construction impacts. Lower Warrell Creek recorded elevated levels of nickel downstream (0.005 mg/L recorded, 0.0034 mg/L trigger) and zinc downstream (0.023 mg/L recorded, 0.018 mg/L trigger). These downstream levels are consistent with previous results for the site (e.g. nickel 0.006 mg/L and zinc 0.02 mg/L recorded downstream, October 2017).

Unnamed Creek Gumma (East) recorded elevated levels of zinc upstream (0.016 mg/L recorded, 0.011 mg/L trigger). It should be noted that Unnamed Creek Gumma (North) downstream recorded zinc within trigger values (0.007 mg/L recorded, 0.011 mg/L trigger). As levels decreased from upstream to downstream it is unlikely that the elevated result was due to construction impacts.

Unnamed Creek Gumma (North) recorded elevated levels of nickel downstream (0.004 mg/L recorded, 0.002 trigger). This result is consistent with previous results for the site (e.g. 0.022 mg/L recorded downstream, October 2017).

Nutrients noted to be outside trigger levels at

Upper Warrell Creek recorded elevated levels of phosphorus upstream (0.07 mg/L recorded, 0.05 mg/L trigger) and downstream (0.05 mg/L recorded, 0.044 mg/L trigger), nitrogen upstream (0.8 mg/L recorded, 0.56 mg/L trigger) and downstream (0.8 mg/L recorded, 0.52 mg/L trigger). All controls were verified to be in place for the site and it should be noted that phosphorus decreased from upstream to downstream and is therefore unlikely to be attributed to construction activities. In addition, nitrogen levels were consistent between upstream and downstream sites. A possible source for the elevated levels is the surrounding agricultural and forestry activities.

Stony Creek recorded elevated levels of nitrogen upstream (0.7 mg/L recorded, 0.48 mg/L trigger), nitrate upstream (0.41 mg/L recorded, 0.208 mg/L trigger) and phosphorus downstream (0.04 mg/L recorded, 0.034 mg/L trigger). All controls were verified to be in place for the site. It should be noted that for nitrogen and nitrate downstream levels were within trigger values and therefore are unlikely to be due to construction impacts. The surrounding agricultural lands were a possible source for the elevated levels.

Lower Warrell Creek recorded elevated levels of phosphorus upstream and downstream (0.09 mg/L recorded upstream, 0.07 mg/L downstream, 0.04 mg/L trigger), phosphate upstream (0.02 mg/L recorded, 0.011 mg/L trigger), nitrogen upstream and downstream (1.1 mg/L recorded upstream, 0.90 mg/L recorded downstream, 0.54 trigger) and nitrate upstream and downstream (0.17 mg/L recorded upstream, 0.08 mg/L recorded downstream, 0.05 mg/L trigger). It should be noted that all results decreased from upstream to downstream sites and are therefore unlikely to be attributed to construction activities. A potential cause of the elevated levels is runoff from the surrounding agricultural properties.

Nambucca River recorded elevated levels of phosphorus downstream (0.12 mg/L recorded, 0.07 mg/L trigger). This is consistent with previous results for the site (e.g. 0.20 mg/L recorded in November 2015). All controls were verified to be in place for the site. A potential cause of the elevated levels is runoff from the surrounding agricultural properties.

Total Suspended Solids noted to be outside trigger levels at:

Upper Warrell Creek downstream recorded an elevated Suspended Solids levels (23 mg/L). All controls were verified to be in place for the site as per the Progressive Erosion and Sediment Control Plan. It should be noted that flooding was occurring at Upper Warrell Creek during the monitoring event due to rainfall received during late December 2017 and early January 2018.

Stony Creek downstream recorded elevated Suspended Solids levels downstream (30mg/L). All controls were verified to be in place for the site as per the Progressive Erosion and Sediment Control Plan, with no uncontrolled discharges noted from site. A potential cause of the elevated levels is from runoff from the nearby roadway or adjacent agricultural activities.

Lower Warrell Creek upstream and downstream recorded elevated Suspended Solids levels (30 mg/L recorded upstream, 36 mg/L recorded downstream). All controls were verified to be in place for the site as per the Progressive Erosion and Sediment Control Plan, with no uncontrolled discharged noted from site.

## Dry Sampling Event

A "dry" sampling event was undertaken on 17<sup>th</sup> January 2018. Field testing and lab sampling was undertaken. Results are attached in Appendix A.

### pH levels noted to be outside of trigger levels at:

Nambucca River recorded elevated levels upstream (pH 7.61) and downstream (pH 7.37). It is noted that trigger levels are pH 7.00, with any value outside of this being outside of trigger levels. It is also noted that bridge construction works have been completed at this location with only isolated finishing works being undertaken. It is also noted that these levels are within ANZECC criteria (6.5-8.0).

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

Stony Creek recorded conductivity levels outside of trigger values downstream (0.127 mS/cm recorded, 0.2168 mS/cm trigger). These levels are consistent with previous results for the site (e.g. 0.171 mS/cm upstream, recorded December 2016).

Lower Warrell Creek recorded conductivity levels outside of trigger values upstream and downstream (0.583 mS/cm recorded upstream, 0.601 mS/cm recorded downstream, 0.679 mS/cm trigger). It is noted that conductivity increased from upstream to downstream and is therefore unlikely to be attributed to construction activities.

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

Lower Warrell Creek recorded elevated NTU levels downstream (14.6 NTU recorded upstream, 6.82 NTU trigger). Controls were noted to be installed onsite as per the Progressive Erosion and Sediment Control Plan with no site runoff or dewatering activities being undertaken during the monitoring session. It is also noted that bridge construction works have been completed at this location with only isolated finishing works being undertaken. It should also be noted that TSS results for Lower Warrell Creek downstream were within trigger values (7 mg/L recorded, 17.6 mg/L trigger).

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

Upper Warrell Creek recorded low DO levels downstream (1.99 mg/L recorded downstream, 2.6 mg/L trigger). These levels are consistent with previous results for the sites (e.g. 1.87 mg/L downstream in February 2017). Pacifico believe that the low levels are most likely due to a source unrelated to construction, such as decaying vegetation within the waterway.

Lower Warrell Creek recorded low DO levels upstream and downstream (3.98 mg/L recorded upstream, 5.03 mg/L recorded downstream, 5.07 mg/L trigger level). It is noted that levels increased between upstream and downstream sites and works within the waterway had been completed (i.e. piling, headstocks etc). Pacifico believe that the low levels are most likely due to a source unrelated to construction, such as decaying vegetation present within the waterway.

Unnamed Creek Gumma (North) recorded high DO levels downstream (6.74 mg/L recorded, 6.4 mg/L trigger). It is noted that this result is above the 80<sup>th</sup> percentile and that DO level increased from upstream to downstream.

Nambucca River recorded low levels upstream and downstream (5.70 mg/L recorded upstream, 5.37 mg/L recorded downstream, trigger level 7.4mg/L). It is noted that levels

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

Metals noted to be above trigger levels at:

Upper Warrell Creek recorded elevated levels of manganese upstream and downstream (0.299 mg/L recorded upstream, 0.21 mg/L trigger and 0.321 mg/L recorded downstream, 0.20 mg/L trigger). These levels are consistent with previous monitoring at the site (e.g. 0.22 mg/L recorded upstream in November 2016).

Stony Creek recorded elevated levels of manganese upstream and downstream (0.155 mg/L recorded upstream, 0.06 mg/L trigger and 0.152 mg/L recorded downstream, 0.052 mg/L trigger). It should be noted that manganese levels decreased from upstream to downstream and are therefore unlikely to be attributed to construction activities. In addition, Stony Creek recorded an elevated level of zinc upstream (0.013 mg/L recorded, 0.005 mg/L trigger). It should be noted that downstream was within trigger values and therefore this elevated level of zinc is not attributed to construction activities.

Lower Warrell Creek recorded elevated levels of aluminium upstream and downstream (0.11 mg/L recorded upstream, 0.13 mg/L recorded downstream, 0.06 mg/L trigger). This is consistent with previous monitoring at the site (e.g. 0.08 mg/L upstream, 0.10 mg/L downstream recorded in September 2016). Lower Warrell Creek recorded elevated levels of nickel upstream and downstream (0.0020 mg/L recorded at both upstream and downstream sites, 0.001 mg/L trigger). It should be noted that nickel levels were consistent between upstream and downstream sites and therefore unlikely to be attributed to construction activities. Lower Warrell Creek also recorded an elevated level of zinc upstream (0.007 mg/L recorded, 0.006 mg/L trigger). It should be noted that downstream results were within trigger values and that the source of this exceedance is upstream of the construction site.

Unnamed Creek Gumma recorded elevated levels of arsenic upstream and downstream (0.004 mg/L recorded upstream, 0.005 mg/L recorded downstream, 0.002 mg/L trigger). It should be noted that this is consistent with previous results (e.g. 0.007 mg/L and 0.006 mg/L recorded in March 2017). It should also be noted that levels were consistent between upstream and downstream sites with this section of the roadway now operational with no construction activities being completed in January 2018 at this location.

Unnamed Creek Gumma also recorded elevated levels of manganese upstream and downstream (0.539 mg/L and 0.391 mg/L recorded upstream, 0.435 mg/L recorded downstream, 0.230 mg/L trigger), nickel upstream and downstream (0.002 mg/L recorded upstream, 0.002 mg/L recorded downstream, 0.001 mg/L trigger), zinc upstream and downstream (0.012 mg/L and 0.006 mg/L recorded upstream and 0.01 mg/L recorded downstream, 0.005 mg/L trigger) and iron upstream and downstream (2.15 mg/L recorded upstream, 3.11 mg/L recorded downstream, 2.01mg/L trigger). It should be noted that manganese, nickel and zinc levels decreased between upstream and downstream sites and are therefore unlikely to be due to construction impacts. It should also be noted that no major construction works were undertaken within this section of the site during January 2018 and that this section of roadway is now operational and therefore these results are unlikely to be due to construction impacts.

Nambucca River recorded slightly elevated level of manganese downstream (0.038 mg/L recorded, 0.03 mg/L trigger). This is consistent with previous results at Nambucca River (e.g. 0.06 mg/L recorded downstream in November 2017).

#### Nutrients noted to be outside trigger levels at

Upper Warrell Creek recorded elevated levels of nitrogen upstream (0.80 mg/L recorded, 0.62 mg/L trigger) and nitrate upstream and downstream (0.08 mg/L recorded upstream, 0.04 mg/L trigger and 0.04 mg/L recorded downstream, 0.03 mg/L trigger). Nitrogen and nitrate decreased from upstream to downstream monitoring points and therefore is unlikely to be due to construction works.

Lower Warrell Creek recorded elevated levels of nitrogen upstream and downstream (1.0 mg/L recorded upstream and 0.70 mg/L recorded downstream, 0.50 mg/L trigger) and nitrate upstream (0.05 mg/L recorded, 0.04 mg/L trigger). It should be noted that for nitrogen levels decreased from upstream to downstream and that nitrate was within trigger levels downstream (0.02 mg/L) and therefore these elevated levels are unlikely to be due to construction works.

Unnamed Creek Gumma (West) recorded an elevated level of nitrate upstream (0.07 mg/L recorded, 0.04 mg/L trigger). It should be noted that Unnamed Creek Gumma (North) nitrate downstream recorded a result of 0.02 mg/L which was within trigger values. As nitrate levels decreased from upstream to downstream it is unlikely that this exceedance would be due to construction impacts.

Nambucca River recorded elevated results for ammonia upstream and downstream (0.09 mg/L upstream, 0.06 mg/L downstream, 0.03 mg/L trigger). As levels decreased from upstream to downstream it is unlikely that this elevated result is due to construction impacts. In addition, the Nambucca River also returned elevated results downstream for phosphorus (0.09 mg/L recorded, 0.04mg/L trigger), nitrogen (0.7 mg/L recorded, 0.5 mg/L trigger) and nitrate (0.04 mg/L recorded, 0.02 mg/L trigger). No major construction activities were undertaken during the month of January 2018 at the Nambucca River and this section of the roadway is now operational. At the time of monitoring all controls were verified as installed and no water releases were noted.

#### Total Suspended Solids noted to be outside trigger levels at:

Lower Warrell Creek recorded an elevated TSS results upstream (28 mg/L recorded, 17.6 mg/L trigger). It should be noted that downstream recorded a result within trigger values (7 mg/L) and therefore this elevated level is unlikely to be due to construction impacts.

## 4. Sediment Basin Water Monitoring

Water was released from commissioned basins after rainfall on the 1<sup>st</sup> – 3<sup>rd</sup> January 2018. A statistical correlation has been developed which identified the relationship between Turbidity (NTU) and Total Suspended Solids (TSS) for water quality in the WC2NH Project sediment basins in order to determine the NTU equivalent of 50mg/L TSS. This statistical correlation has been developed to meet EPL Licence No 20533 Condition L2.7 to determine compliance with the Water and/or Land Concentration Limits Condition L2.4. A positive correlation has been calculated between Total Suspended Solids (TSS) and Turbidity (NTU) ( $R^2 = 0.4941$ ,  $p < 0.00001$ ,  $n=227$ ). The regression equation for the analytical results calculates a turbidity (NTU) value of 120.716 for a TSS value of 50mg/L. A safety factor

of 30% has been applied to the NTU result of the correlation, providing a turbidity (NTU) value of 84.50, rounded to an NTU value of 85. To measure NTU in the field a Horiba U-52G multi-parameter water quality meter has been utilised, which is maintained and calibrated in accordance with manufacturer’s specifications. TSS sampling is being undertaken to ensure compliance with 1 in 10 sampling to validate the correlation.

Table 3 below has the water quality results recorded for the water release events:

**Table 3 – Water Release Register December 2017**

Date	Basin ID	Oil and Grease (visible) (Limit = No visible)	pH (6.5-8.5)	Turbidity (NTU) (Limit <85 NTU)	TSS (mg/L) (Limit <50mg/L)	Approx Volume Discharged (kL)	Comments
03/01/2018	B42.80	N	7.32	46	9	800	
04/01/2018	B42.30	N	6.97	68.2	24	130	
05/01/2018	B49.45	N	7.64	82.6	33	1500	
05/01/2018	B42.30	N	6.82	60.1		30	
06/01/2018	B49.45	N	7.6	71.4		300	
24/01/2018	B42.80	N	7.01	16.9	<5	30	Released for Desilting Operation

## 5. Noise Monitoring

Monthly routine construction noise monitoring was undertaken on the 12<sup>th</sup> and 18<sup>th</sup> of January 2018 at five locations near to construction works. Monitoring results are available in Appendix A, Table 2.

All sites were within predicted levels for the activity being undertaken or were not the dominant noise source at the nearest residence.

## 6. Vibration Monitoring

Vibration monitoring was undertaken during the month of January 2018. Results are available in Appendix A, Table 5. Results were within compliance levels (5mm/s) for building damage.

## 7. Dust Monitoring

Dust deposition gauges (DDG) were placed at nearby sensitive receivers from the 4<sup>th</sup> December 2017 to 3<sup>rd</sup> January 2018. DDG results are available in Appendix A, Table 3.

All dust deposition gauges were below the level of concern for Total Insoluble Matter (TIM) and Ash Content (AC) (4g/m<sup>2</sup>.month or increase of 2g/m<sup>2</sup>/month) during the monitoring period with the exception of DDG5, DDG6N and DDG4.

DDG5 recorded elevated levels of TIM (640g/m<sup>2</sup>/month) and AC (598g/m<sup>2</sup>/month). It was noted that during gauge collection that the grass directly adjacent to the gauge had been mowed and this may have contributed to this elevated reading. The result at this gauge is unusual as the bulk earthworks at this location have been completed and the section of alignment closest to the gauge is sealed and paved and open to traffic in December 2017. The high reading from DDG5 in December 2017 is not believed to be due to construction activities, with tampering of the gauge suspected. The Community team have contacted the resident and asked for any tampering with the gauge to be reported to ACCIONA.

DDG6N recorded elevated levels of TIM (5.7g/m<sup>2</sup>/month). It is noted that AC recorded at DDG6N was 2.3g/m<sup>2</sup>/month which is within the criteria of 4g/m<sup>2</sup>/month. During December 2017 mulch was placed from a stockpile directly adjacent to DDG6N onto the E22 Permanent Visual Mound in preparation for landscape planting works. ACCIONA believe that this elevated TIM result is due to localised contamination of the gauge by mulch particles during loading and hauling operations. It is also noted that the second gauge installed at this location DDG6, recorded results within criteria (1.2g/m<sup>2</sup>/month TIM, 1g/m<sup>2</sup>/month AC). No dust complaints have been received during the monitoring period at this location.

DDG4 recorded results of TIM (3.5g/m<sup>2</sup>/month) and AC (2.7g/m<sup>2</sup>/month) which has resulted in an increase in TIM of 2.2g/m<sup>2</sup>/month when compared with the results from the last monitoring period. During gauge collection it was noted that there were insects within the gauge which may have contributed to an increase above 2g/m<sup>2</sup>/month at this location.

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

## 8. Groundwater Monitoring

ACCIONA (Pacifico) undertook groundwater monitoring on the 10<sup>th</sup> of January 2018. Field and laboratory testing was undertaken. The results from the groundwater monitoring is available in Appendix A.

### pH levels noted to be outside of trigger levels at:

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

Fill 15 bores recorded elevated pH at 4BH037a (pH 6.59 recorded, pH 6.51 trigger) and 4BH038 (pH 7.57 recorded, 7.30 trigger). It is noted that 4BH037a has been relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. These are consistent with previous results for 4BH037a e.g. pH 7.07 in April 2017 and 4BH038 e.g. pH 8.03 recorded in August 2017.

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



4BH037a – Fill 15 west bore recorded elevated conductivity levels (10.60 mS/cm recorded, 5.55 mS/cm trigger). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. This result is consistent with previous results for the bore e.g. 9.68mS/cm recorded in November 2017.

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

Cut 11 bores recorded elevated TDS levels at upgradient bore 4BH022c (1.05 g/L recorded, 0.1306 g/L trigger) and downgradient bore 4BH021 (0.106 g/L recorded, 0.0946 g/L trigger). It is noted that TDS levels decreased from upgradient to downgradient bores and are unlikely to be due to construction impacts. This result is consistent with previous results for the bores e.g. 1.12g/L recorded at 4BH022c, 0.104g/L recorded at 4BH021 in October 2017.

4BH037a – Fill 15 west bore recorded elevated TDS (6.56g/L recorded, 0.1326g/L trigger level). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. This is consistent with previous results for the bore e.g. 5.74g/L in January 2017.

Water depth noted to be below trigger levels at:

4BH058c – Cut 15 upslope bore recorded low water depth (15.51 m from top of casing recorded, 13.84m trigger). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. It is also noted that bulk earthworks have been completed in this area, with no groundwater seepage from cut faces or groundwater ingress noted.

Metals noted to be above trigger levels at:

4BH022c – Cut 11 upgradient bore recorded elevated levels of aluminium (0.400 mg/L recorded, 0.0122 mg/L trigger), cadmium (0.0082 mg/L recorded, 0.0001 mg/L trigger), copper (0.010 mg/L recorded, 0.003 mg/L trigger), manganese (1.480 mg/L recorded, 0.4856 mg/L trigger), nickel (0.1140 mg/L recorded, 0.0036 mg/L trigger) and zinc (0.432 mg/L recorded, 0.0085 mg/L trigger). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. These results are consistent with previous results for the new location of the bore e.g. 0.410 mg/L aluminium, 0.0096 mg/L cadmium, 0.008 mg/L copper, 2.380 mg/L manganese, 0.129 mg/L nickel, 0.430 mg/L zinc recorded July 2017.

4BH021 – Cut 11 downgradient bore recorded elevated levels of copper (0.014 mg/L recorded, 0.0108 mg/L trigger) and zinc (0.022 mg/L recorded, 0.0176 mg/L trigger). It is noted that both copper and zinc decreased from Cut 11 upgradient bore (4BH022c) and therefore is unlikely to be due to construction impacts.

Fill 15 east and west bores 4BH038 and 4BH037a recorded elevated levels of zinc (0.1080 mg/L recorded, 0.0196 mg/L trigger for 4BH037a, 0.0310 mg/L recorded, 0.0132 mg/L trigger at 4BH038). Fill 15 west bore 4BH037a recorded elevated level of nickel (0.0140 mg/L recorded, 0.0068 mg/L trigger). Fill 15 east bore recorded elevated level of chromium (0.0020 mg/L recorded, 0.0007mg/L trigger). It is noted that bore 4BH037a had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. These results are consistent with previous results for the bores e.g. 0.015mg/L nickel, 0.030mg/L zinc recorded for bore 4BH037a in July 2017 and 0.0013 mg/L chromium, 0.0130 mg/L zinc recorded for bore 4BH038 in August 2015 and January 2016 respectively.

Cut 15 upgradient bore 4BH058c recorded elevated level of zinc (0.0140 mg/L recorded, 0.0100 mg/L trigger). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger values not necessarily corresponding to the new bore location.

Nutrients were noted to be above trigger levels at:

4BH010 – Cut 6 downgradient bore recorded elevated levels of phosphorus (0.06 mg/L recorded, 0.0284 mg/L trigger), nitrogen (0.8 mg/L recorded, 0.58 mg/L trigger) and nitrate (0.04 mg/L recorded, 0.0250 mg/L trigger). It is noted that bulk earthworks have completed in this area, with no groundwater seepage from any cut faces or groundwater ingress noted. These results are consistent with previous results for the bore e.g. 0.08 mg/L phosphorus, 1.0 mg/L nitrogen and nitrate 0.03 mg/L recorded in April 2017.

4BH022c – Cut 11 upgradient bore recorded elevated levels of nitrogen (3.6 mg/L recorded, 0.5786 mg/L trigger) and nitrate (2.98 mg/L recorded, 0.400 mg/L trigger). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. These results are consistent with previous results for this bore e.g. 4.2 mg/L nitrogen, 3.79 mg/L nitrate recorded April 2017.

4BH037a – Fill 15 west bore recorded slightly elevated level of nitrite (0.02 mg/L recorded, 0.0130 mg/L trigger). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location.

4BH038 – Fill 15 east bore recorded slightly elevated level of nitrate (0.470 mg/L recorded, 0.4546 mg/L trigger). This result is consistent with previous results for the bore e.g. 0.560 mg/L recorded July 2016.

4BH058c – Cut 15 upgradient bore recorded elevated levels of phosphorus (0.18 mg/L recorded, 0.030 mg/L trigger), phosphate (0.0100 mg/L recorded, 0.0070 mg/L trigger), nitrogen (0.80 mg/L recorded, 0.70 mg/L trigger) and nitrate (0.350 mg/L recorded, 0.120 mg/L trigger). It is noted that this bore had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore

location. These results are consistent with previous results for the bore e.g. 0.17 mg/L phosphorus, 1.1 mg/L nitrogen and nitrate 0.38 mg/L recorded October 2017.

Major anions and cations noted to be above trigger levels at:

Cut 11 – upgradient bore 4BH022c and downgradient bore 4BH021 recorded elevated levels of chloride (136 mg/L recorded, 78.8 mg/L trigger at 4BH022c, 16 mg/L recorded, 15.2 mg/L trigger at 4BH021). Upgradient bore 4BH022c also recorded elevated levels of sulfate (690 mg/L recorded, 61.8 mg/L trigger), sodium (183 mg/L recorded, 72 mg/L trigger), potassium (7 mg/L recorded, 5 mg/L trigger), calcium (83 mg/L recorded, 50.40 mg/L trigger) and magnesium (75 mg/L recorded, 11.8 mg/L trigger). Downgradient bore 4BH021 also recorded elevated levels of bicarbonate (28 mg/L recorded, 27.4 mg/L trigger), sodium (22 mg/L recorded, 18 mg/L trigger), calcium (2 mg/L recorded, 1.4797 mg/L trigger) and magnesium (3 mg/L recorded, 2 mg/L trigger). It is noted that bore 4BH022c had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. These results are consistent with previous results for the bores e.g. 735 mg/L sulfate, 197 mg/L sodium, 252 mg/L chloride, 90 mg/L magnesium and 73 mg/L calcium at bore 4BH022c recorded July 2017 and 16 mg/L chloride, 4 mg/L calcium and 3 mg/L magnesium at bore 4BH021 recorded April 2017.

Fill 15 – western bore 4BH037a recorded elevated levels of chloride (1970 mg/L recorded, 949 mg/L trigger), sulfate (3350 mg/L recorded, 2056 mg/L trigger), bicarbonate (722 mg/L recorded, 61 mg/L trigger), sodium (1470 mg/L recorded, 720 mg/L trigger), potassium (79 mg/L recorded, 41 mg/L trigger), calcium (414 mg/L recorded, 190 mg/L trigger) and magnesium (636 mg/L recorded, 306 mg/L trigger). It is noted that bore 4BH037a had to be relocated from its original location due to it being within the construction footprint, with trigger levels not necessarily corresponding with the new bore location. These results are consistent with previous results for this bore e.g. 1760 mg/L chloride, 3700 mg/L sulfate, 704 mg/L bicarbonate, 1340 mg/L sodium, 75 mg/L potassium, 382 mg/L calcium, 564 mg/L magnesium recorded July 2017.

## 9. Acoustic Investigations

No Out of Hours Works were undertaken during the month of January 2018 under Condition L4.2(d) or Condition L4.5 of the Environmental Protection Licence.

## 10. Complaints

### 10.1 Summary of Complaints for the month of January 2018

04/01/2018 – A resident from River Street contacted Pacifico regarding water flows adjacent to his property. The resident stated that water was running into his

property and not towards the Council Laydown Yard as per the permanent design at this location. The community and environment managers met with the resident and discussed the water management arrangement at this location. Works were undertaken in January 2018 to finalise the drainage arrangements under the Nambucca River Bridge with the swale drain under the abutment finalised as per the permanent design facilitating water movement away from the resident's property.

## 11. Non-Compliance

### 11.1 Summary of Non-compliances

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

Appendix A – Monitoring Results

Table 1a – Surface Water Results January 2018 – Wet Event

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					
		ANZECC 2000 95% species protected		Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream	Upstream	Downstream								
Freshwater / Estuarine				Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Freshwater	Estuarine	Estuarine	Estuarine	Estuarine									
Date of Sampling				3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18	3-Jan-18									
Time of Sampling				11:45 AM	11:30 AM	12:30 PM	12:15 PM	2:40 PM	2:30 PM	1:10 PM	1:00 PM	12:50 PM	2:10 PM	2:30 PM																									
Comments																																							
Type				80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result	80th %ile	20th %ile	Result						
Laboratory data																																							
Metals																																							
Aluminium	mg/L	0.055	-	0.244	0.0162	0.05	0.194	0.016	0.42	0.098	0.02	0.1	0.114	0.01	0.04	0.28	0.01	0.3	0.28	0.01	0.26	0.25	0.02	0.04	0.25	0.02	0.08	0.25	0.02	0.04	0.11	0.01	0.02	0.11	0.01	0.02			
Arsenic	mg/L	0.024	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	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	<0.001	0.002	0.001	<0.001			
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0002	0.0001	<0.0001	0.0002	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	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001			
Copper	mg/L	0.0014	0.0013	-	-	0.001	-	-	0.001	-	-	<0.001	-	-	0.003	-	-	0.002	-	-	0.003	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			
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	-	-	<0.001			
Manganese	mg/L	1.9	0.08	0.3	0.01	0.031	0.158	0.0178	0.033	0.0726	0.0218	0.058	0.083	0.0164	0.052	0.35	0.087	0.068	0.35	0.087	0.078	0.49	0.011	0.228	0.49	0.011	0.313	0.49	0.011	0.178	0.076	0.006	0.066	0.076	0.006	0.073			
Nickel	mg/L	0.011	0.07	-	-	<0.001	-	-	0.002	-	-	<0.001	-	-	<0.001	0.0034	0.001	0.001	0.0034	0.001	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.002	0.002	0.001	0.004	-	-	<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			
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	-	-	0.008	-	-	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	0.006	0.018	0.005	0.006	0.018	0.005	0.006	0.011	0.005	0.016	0.011	0.005	0.007	0.005	0.005	0.006	0.005	0.005	0.006			
Iron	mg/L	-	-	1.38	0.48	0.6	0.99	0.366	0.54	1.4	0.41	0.33	1.48	0.35	0.19	0.52	0.05	0.55	0.52	0.05	0.46	1.65	0.37	0.37	1.65	0.37	0.25	1.65	0.37	0.36	0.26	0.05	<0.05	0.26	0.05	<0.05			
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001			
Total Recoverable Hydrocarbons																																							
Naphthalene	µg/L	16	50	16	NA	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	NA	50	NA	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	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	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	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	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	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	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	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	700	NA	NA	700	NA	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	NA	180		
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	5	NA	NA	5	NA	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	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	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	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	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
Nutrients																																							
Total Phosphorus	mg/L	0.05	0.03	0.05	0.02	0.07	0.044	0.016	0.05	0.03	0.016	0.03	0.034	0.01	0.04	0.01	0.09	0.04	0.01	0.07	0.11	0.03	0.04	0.11	0.03	0.11	0.11	0.03	0.11	0.03	0.03	0.07	0.02	0.06	0.07	0.02	0.12		
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	0.02	0.011	0.006	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.013	0.005	<0.01	0.029	0.01	<0.01	0.029	0.01	<0.01
Total Nitrogen	mg/L	0.5	0.3	0.56	0.3	0.8	0.52	0.2	0.8	0.48	0.2	0.7	0.63	0.2	0.5	0.54	0.31	1.1	0.54	0.31	0.9	3.1	0.9	1.3	3.1	0.9	1.6	3.1	0.9	0.8	0.46	0.2	<0.5	0.46	0.2	<0.5			
Total Kjeldahl Nitrogen	mg/L	-	-	0.5	0.3	0.8	0.5	0.2	0.8	0.34	0.2	0.3	0.6	0.2	0.3	0.5	0.2	0.9	0.5	0.2	0.8	2.8	0.8	1.3	2.8	0.8	1.6	2.8	0.8</										

Table 1b – Surface Water Results January 2018 – Dry Event

Location	Units	Levels of Concern	Upper Warrell Creek			Upper Warrell Creek			Story Creek			Story 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	Marine	ANZECC 2000 95% species protected	17-Jan-18 12:15pm	17-Jan-18 12:00pm	17-Jan-18 12:50pm	17-Jan-18 12:35pm	17-Jan-18 12:50pm	17-Jan-18 12:35pm	17-Jan-18 3:45pm	17-Jan-18 3:30pm	17-Jan-18 2:45pm	17-Jan-18 3:00pm	17-Jan-18 2:30pm	17-Jan-18 4:15pm	17-Jan-18 4:00pm																		
Laboratory data																																				
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							
Metals																																				
Aluminium	mg/L	0.055	-	0.06	0.01	0.03	0.05	0.01	0.02	0.05	0.01	0.02	0.04	0.01	0.11	0.06	0.01	0.13	0.1	0.01	0.03	0.1	0.01	0.04	0.1	0.01	0.04	0.02	0.01	<0.10	0.02	0.01	<0.10			
Arsenic	mg/L	0.024	0.0023	-	-	<0.001	-	-	<0.001	-	-	<0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.002	0.001	0.004	0.002	0.001	0.005	0.002	0.001	<0.010	0.002	0.001	<0.010			
Cadmium	mg/L	0.0002	0.0055	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	0.0001	0.0001	<0.0001	0.0001	0.0001	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.010	-	-	<0.010			
Chromium	mg/L	0.001	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.010	-	-	<0.010			
Copper	mg/L	0.0014	0.0013	-	-	0.001	-	-	<0.001	-	-	<0.001	-	-	0.001	-	-	0.001	-	-	0.001	-	-	<0.001	-	-	<0.001	0.001	0.001	<0.010	0.001	0.001	<0.010			
Lead	mg/L	0.0034	0.0044	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.001	-	-	<0.010	-	-	<0.010			
Manganese	mg/L	1.9	0.08	0.21	0.02	0.299	0.2	0.03	0.321	0.06	0.02	0.155	0.052	0.013	0.152	0.26	0.08	0.114	0.26	0.08	0.112	0.23	0.019	0.539	0.23	0.019	0.391	0.23	0.019	0.435	0.03	0.002	0.021	0.03	0.002	0.038
Nickel	mg/L	0.011	0.07	-	-	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	0.002	0.001	0.001	0.002	-	-	<0.010	-	-	<0.010			
Selenium	mg/L	11	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	<0.10	-	-	<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	-	-	<0.010	-	-	<0.010			
Zinc	mg/L	0.008	0.015	-	-	<0.005	-	-	<0.005	0.005	0.005	0.013	0.005	0.005	0.007	0.006	0.005	0.007	0.006	0.005	0.005	0.005	0.005	0.012	0.005	0.005	0.006	0.005	0.005	0.01	0.005	0.005	<0.050	0.005	<0.050	
Iron	mg/L	-	-	0.99	0.46	0.78	0.93	0.31	0.53	0.82	0.42	0.2	0.78	0.37	0.1	0.83	0.05	0.67	0.83	0.05	0.72	2.01	0.25	2.15	2.01	0.25	1.51	2.01	0.25	3.11	-	-	<0.10	-	<0.10	
Mercury	mg/L	0.0006	0.0004	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	-	<0.0001	-	<0.0001	
Total Recoverable Hydrocarbons																																				
Naphthalene	µg/L	16	50	16	NA	16	NA	16	NA	16	NA	16	NA	16	NA	16	NA	16	NA	16	NA	16	NA	16	NA	16	NA	50	NA	700	NA	700	NA	NA		
C6 - C10 Fraction	µg/L	-	-	-	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	
>C10 - C16 Fraction	µg/L	-	-	-	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	
>C34 - C40 Fraction	µg/L	-	-	-	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	
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	-	-	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	
BTEX																																				
Benzene	µg/L	950	700	950	NA	950	NA	950	NA	950	NA	950	NA	950	NA	950	NA	950	NA	950	NA	950	NA	950	NA	950	NA	700	NA	700	NA	700	NA	NA		
Toluene	µg/L	180	180	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	180	NA	
Ethylbenzene	µg/L	80	5	80	NA	80	NA	80	NA	80	NA	80	NA	80	NA	80	NA	80	NA	80	NA	80	NA	80	NA	80	NA	5	NA	5	NA	5	NA	NA		
m,p-Xylenes	µg/L	-	-	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	-	NA	
o-Xylene	µg/L	350	350	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	NA	350	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	
Sum of BTEX	µg/L	-	-	-	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	0.04	0.01	0.02	0.03	0.01	0.01	0.04	0.01	<0.01	0.02	0.01	0.02	0.04	0.01	0.04	0.04	0.01	0.02	0.12	0.03	0.02	0.12	0.03	0.02	0.12	0.03	0.02	0.04	0.02	<0.05	0.04	0.02	0.09
Phosphate (reactive phosphorus)	mg/L	-	-	-	-	<0.01	-	-	<0.01	-	-	<0.01	-	-	0.01	0.01	0.0044	<0.01	0.01	0.0044	<0.01	0.01	0.005	<0.01	0.01	0.005	<0.01	0.01	0.005	<0.01	0.01	0.008	<0.01	0.01	0.008	<0.01
Total Nitrogen	mg/L	0.5	0.3	0.62	0.2	0.8	0.6	0.2	0.6	0.3	0.1	0.2	0.41	0.1	0.2	0.5	0.2	1	0.5	0.2	0.7	2.8	1.1	1.4	2.8	1.1	1.1	2.8	1.1	1.1	0.5	0.2	<0.5	0.5	0.2	0.7
Total Kjeldahl Nitrogen	mg/L	-	-	0.6	0.2	0.7	0.6	0.2	0.6	0.3	0.1	0.2	0.4	0.1	0.2	0.5	0.2	1	0.5	0.2	0.7	2.4	1	1.3	2.4	1	1.1	2.4	1	1.1	0.5	0.2	<0.5	0.5	0.2	0.7
Nitrate	mg/L	0.7	-	0.04	0.01	0.08	0.03	0.01	0.04	0.03	0.01	0.03	0.03	0.01	<0.01	0.04	0.01	0.05	0.04	0.01	0.02	0.04	0.01	0.07	0.04	0.01	0.01	0.04	0.01	0.02	0.01	0.01	0.02	0.01	0.04	
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	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.05	0.01	<0.01	0.02	0.01	<0.001	0.02	0.01	<0.01
Ammonia	mg/L	0.9	-	-	-	<0.01	-	-	0.02	-	-	<0.01	-	-	<0.01	0.16	0.06	0.07	0.16	0.06	0.06	0.04	0.01	<0.01	0.04	0.01	<0.01	0.04	0.01	<0.01	0.03	0.01	0.09	0.03	0.01	0.06
TSS	mg/L	<40	<10	14.8	5	8	8	5	5	9	5	<5	5.8	5	<5	17.6	5	28	17.6	5	7	290	15	8	290	15	10	290	15	8	71	19	68	71	19	66
Field Physical data																																				
Temperature	C	-	-	24.86	14.99	22.18	25.1	16.3	22.3	24.4	16	20.2	26.46	15.94	20.68	27.9	18.4	26.44	27.9	18.4	26.03															

**Table 2 - Noise Monitoring Results January 2018**

Date	Time	Location	Rec ID	NCA	NML	Activity	Predicted levels for activity	Laeq	LAFMAX	LAFMIN	LAF10	LAF50	LAF90	Principal sources/ operations	Construction noise dominant?	Corrective actions	Notes
12/01/2018	11:29AM	Albert Drive	74	1	50	Cut	62	44.7	72.8	37.5	41	43.2	41	Birds/HWY	N	N/A	Within NML and predicted levels. Stockpile area behind cut to mitigate noise impacts.
18/01/2018	11:51AM	Bald Hill Rd	197	3	50	Services	75	51.7	71	35.9	53.4	44.9	39.3	HWY	N	N/A	Within predicted levels. Construction noise not dominant. Dominant noise sources: HWY (45-55), BHR (50-65) Noise mound and noise wall in place to reduce noise.
18/01/2018	12:43 PM	Letitia Rd	413	4	59	Cut	60	50.8	65	44.7	53.1	49.9	47.3	backhoe	Y	N/A	Within predicted levels and NML. Regular consultation undertaken with residents impacted by NFR construction activities.
18/01/2018	5:01 PM	Mattick Rd	442	6	44	Finishing Works (trucks hauling)	71	46.1	61.4	39	48.6	44.6	41.9	HWY/Birds	N	N/A	Within predicted levels. Construction noise not dominant. Dominant noise sources: highway (45-47), Birds (47-55). Permanent noise mounds in place to reduce construction noise at sensitive receivers.
12/01/2018	12:57pm	Gumma Rd	383	3	50	Services	59	59.9	76.6	42.8	63.1	56.2	50.2	HWY	N	N/A	Within predicted levels. Construction noise not dominant. Dominant noise sources: highway (50-60), trucks on highway (75-80)

**Table 3 – Dust Monitoring Results October – January 2018**

Analyte	Time Period	Unit	DDG ID		DDG1	DDG2	DDG3	DDG4	DDG5	DDG6	DDG6N	DDG7	DDG8A	DDG9NE	DDG9E	DDG10	DDG A1	DDG A2	
			Start date of sampling	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017	4/12/2017
			Finish date of sampling	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018	3/01/2018
Levels of Concern	LOR																		
Ash Content	Current Month	g/m <sup>2</sup> .month	4	0.1	0.6	0.7	0.6	2.7	598	1	2.3	1.5	1.1	1.1	1.2	1.2	----	----	
		mg	N/A	1	10	12	10	47	10600	17	41	26	19	20	21	21	----	----	
	Previous Month	g/m <sup>2</sup> .month			0.4	0.8	0.5	1	8.5	1.4	2.9	2.6	0.9	11	0.5	1.5	----	----	
	Change	g/m <sup>2</sup> .month	Increase of 2		0.2	-0.1	0.1	1.7	589.5	-0.4	-0.6	-1.1	0.2	-9.9	0.7	-0.3	----	----	
Combustible Matter	Current Month	g/m <sup>2</sup> .month	N/A	0.1	1.7	1.2	0.9	0.8	42.4	0.2	3.4	0.8	2.2	0.5	1.2	0.7	----	----	
		mg	N/A	1	31	22	16	14	749	5	59	15	39	8	21	13	----	----	
Total Insoluble Matter (TIM)	Current Month	g/m <sup>2</sup> .month	4	0.1	2.3	1.9	1.5	3.5	640	1.2	5.7	2.3	3.3	1.6	2.4	1.9	----	----	
		mg	N/A	1	41	34	26	61	11300	22	100	41	58	28	42	34	----	----	
	Previous Month	g/m <sup>2</sup> .month		0.1	1	1.3	0.7	1.3	10.4	1.7	4.2	3.3	1.9	12.2	0.7	1.8	----	----	
	Change	g/m <sup>2</sup> .month	Increase of 2	0.1	1.3	0.6	0.8	2.2	629.6	-0.5	1.5	-1	1.4	-10.6	1.7	0.1	----	----	
Arsenic	Current Month	mg/L		0.001	----	----	----	----	----	----	----	----	----	----	----	----	<0.001	<0.001	
Comments								Beetles in gauge	Grass mowed adjacent to gauge										

Table 4 – Groundwater Monitoring Results January 2018

Location	Units	Groundwater Investigation Levels (GILs) from Interpretive Report	4BH010		4BH021		4BH022c		4BH025a		4BH037a		4BH038		4BH057		4BH058c								
			Cut 6 - West (DS)		Cut 11 - West (DS)		Cut 11 - East (US)		Cut 12 - West (DS)		Fill 15 - West		Fill 15 - East		Cut 15 - West (DS)		Cut 15 - East (US)								
Date of Sampling			10/01/2018		10/01/2018		10/01/2018		10/01/2018		10/01/2018		10/01/2018		11/01/2018		11/01/2018								
			Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results	Trigger levels 80 / 20%ile	Results							
Comments			DRY																						
Laboratory data - awaiting results																									
<b>Metals</b>																									
Aluminium	mg/L	0.055	0.2740	0.0500	0.0216	<0.01	0.0122	0.400	0.0324	-	0.0264	0.0200	0.0050	<.01	0.0050	-	0.0050	<0.01							
Arsenic	mg/L	0.024	0.0009	<0.001	0.0020	<0.001	0.0001	<0.001	0.0005	-	0.0005	<0.001	0.0010	<.001	0.0010	-	0.0005	<0.001							
Cadmium	mg/L	<LOR	0.0005	<0.0001	0.0001	<0.0001	0.0001	0.0082	0.0002	-	0.0002	<0.0001	0.0005	<.0001	0.0005	-	0.0005	<0.0001							
Chromium	mg/L	0.001	0.0013	<0.001	0.0001	<0.001	0.0002	<0.001	0.0007	-	0.0010	<0.001	0.0007	0.0020	0.0005	-	0.0005	<0.001							
Copper	mg/L	0.0014	0.1620	0.108	0.0108	0.014	0.0030	0.0139	0.0139	-	0.0139	0.0040	0.0026	0.0020	0.0009	-	0.0082	<0.001							
Lead	mg/L	0.0034	0.0010	<0.001	0.0002	<0.001	0.0016	<0.001	0.0022	-	0.0005	<0.001	0.0005	<0.001	0.0009	-	0.0005	<0.001							
Manganese	mg/L	-	0.2258	0.0630	0.0139	0.0060	0.4856	1.480	0.0124	-	5.2480	2.1500	1.5084	0.0110	0.4518	-	0.0800	0.0080							
Nickel	mg/L	0.011	0.0196	0.0050	0.0058	0.0040	0.0036	0.1140	0.0007	-	0.0068	0.0140	0.006	0.005	0.0030	-	0.0033	<0.01							
Selenium	mg/L	-	0.0050	<0.01	0.0050	<0.01	0.0050	<.01	0.0050	-	0.0050	<0.01	0.0050	<0.01	0.0050	-	0.0050	<0.01							
Silver	mg/L	<LOR	0.0005	<0.001	0.0001	<0.001	0.0001	<0.001	0.0005	-	0.0005	<0.001	0.0005	<0.001	0.0005	-	0.0005	<0.001							
Zinc	mg/L	0.008	0.0532	0.014	0.0176	0.022	0.0085	0.432	0.0102	-	0.0196	0.1080	0.0132	0.0310	0.0090	-	0.0100	0.0140							
Iron	mg/L	-	6.5800	1.7200	0.0354	<0.05	1.1600	0.0600	0.0322	-	84.5600	2.0200	1.7500	4.6344	0.0600	-	0.0600	<0.05							
Mercury	mg/L	0.0006	0.0003	<0.0001	0.0001	<0.0001	0.0001	<.0001	0.0001	-	0.0001	<0.0001	0.0003	<0.0001	0.0003	-	0.0003	<0.0001							
<b>Total Petroleum Hydrocarbons</b>																									
C6-C9 Fraction	µg/L or ppb	-	10	<20	16	<20	16	<20	10	-	10.0000	<20	10.0000	<20	10.0000	-	10.0000	<20							
C10-C14 Fraction	µg/L or ppb	-	85	<50	25	<50	45	<50	25	-	219.0000	<50	25.0000	<50	25.0000	-	25.0000	<50							
C15-C28 Fraction	µg/L or ppb	-	50	<100	50	<100	50	<100	50	-	190.0000	<100	50.0000	<100	25.0000	-	25.0000	<100							
C29-C36 Fraction	µg/L or ppb	-	50	<50	50	<50	50	<50	35	-	35.0000	<50	50.0000	<50	25.0000	-	25.0000	<50							
C10-C36 Fraction	µg/L or ppb	-	178	<50	35	<50	226	<50	25	-	556.0000	<50	25.0000	<50	1426.0000	-	149.0000	<50							
<b>BTEX</b>																									
Benzene	µg/L or ppb	950	0.5	<1	0.5	<1	0.5	<1	0.5	-	0.5000	<1	0.5000	<1	0.5000	-	0.5000	<1							
Toluene	µg/L or ppb	-	1	<2	1	<2	1	<2	1	-	1.0000	<2	1.0000	<2	1.0000	-	1.0000	<2							
Ethylbenzene	µg/L or ppb	-	1	<2	1	<2	1	<2	1	-	1.0000	<2	1.0000	<2	1.0000	-	1.0000	<2							
m+p-Xylene	µg/L or ppb	-	1	<2	1	<2	1	<2	1	-	1.0000	<2	1.0000	<2	1.0000	-	1.0000	<2							
o-Xylene	µg/L or ppb	-	1	<2	1	<2	1	<2	1	-	1.0000	<2	1.0000	<2	1.0000	-	1.0000	<2							
Naphthalene	µg/L or ppb	-	3	<5	2	<5	2	<5	2	-	2.5000	<5	2.5000	<5	2.0000	-	2.0000	<5							
<b>Nutrients</b>																									
Total Phosphorus	mg/L	-	0.0284	0.06	0.0568	<0.01	0.0480	<0.01	0.0680	-	0.1260	<0.01	0.4064	<0.01	0.0740	-	0.0300	0.18							
Phosphate	mg/L	-	0.0110	<0.01	0.0142	<0.01	0.0126	<0.01	0.0070	-	0.0160	<0.01	0.0410	<0.01	0.0090	-	0.0070	0.0100							
Total Nitrogen	mg/L	-	0.5800	0.8	0.3800	0.2	0.5786	3.6	0.7000	-	2.1600	1.3	1.1232	0.6	0.6600	-	0.7000	0.8							
Total Kjeldahl Nitrogen	mg/L	-	0.5800	0.8	0.1936	<.1	0.2536	0.6	0.4000	-	2.1600	1.0	0.7752	0.1000	0.3678	-	0.7000	0.50							
Nitrate	mg/L	-	0.0250	0.04	0.2460	0.21	0.4000	2.98	0.3840	-	0.4000	0.3200	0.4546	0.4700	0.2712	-	0.1200								
Nitrite	mg/L	-	0.0050	<0.01	0.0050	<0.01	0.0050	<0.01	0.0050	-	0.0130	0.02	0.0160	<0.01	0.0050	-	0.0050	<0.01							
Ammonia	mg/L	-	0.1148	0.10	0.0640	<0.01	0.0940	0.04	0.0440	-	0.7920	0.40	0.2300	0.02	0.0672	-	0.0310	<0.01							
<b>Major anions</b>																									
Chloride	mg/L	-	1704.3	424	15.2	16	78.8	136	24.4	-	949	1970	2340	181	22.2000	-	39.1000	15							
Sulfate	mg/L	-	53.000	15	10.392	8	61.8	690	10.6	-	2056	3350	2752	209	22.9680	-	35.0000	14							
Bicarbonate	mg/L	-	63.6	43	27.4	28	142.2	3	18.4	-	61	722	942	33	34.4000	-	29.0000	12							
<b>Major cations</b>																									
Sodium	mg/L	-	866	237	18	22	72.0000	183	29.0800	-	720	1490	1872	91	28.2000	-	52	21							
Potassium	mg/L	-	2.00	1.0000	0.96	<1	5.0000	7	0.5000	-	41	79	97	4	1.5509	-	1	<1							
Calcium	mg/L	-	5.99	2	1.4797	2	50.4000	83	1.4000	-	190	414	266	74	2.7120	-	1	<1							
Magnesium	mg/L	-	135	29	2	3	11.8000	75	0.9280	-	306	636	565	27	8.0077	-	3	2							
<b>Field Physical data</b>																									
Depth to standing water level from TOC	m	-	16.802	16.18	8.7420	5.97	16.0140	1.20	8.4500	-	1.2000	0.59	1.3520	0.62	17.4120	-	13.84	15.51							
pH	pH	-	6.26	4.74	6.07	6.78	5.81	5.96	7.09	5.93	5.17	6.78	6.21	6.51	5.92	6.59	7.30	6.77	7.57	6.98	5.24	-	6.3960	5.56	6.15
Conductivity	mS/cm	-	3630	1.45	111.3	0.164	231	1.64	0.342	-	5.550	10.60	8366	1.310	121.100	-	132.660	0.129							
Temperature	C	-	22.4420	28.01	22.3600	26.79	21.1500	28.28	22.6040	-	25.9820	26.33	22.5600	25.80	22.8200	-	23.1940	23.93							
Total Dissolved Solids	g/L	-	3.5720	0.93	0.0946	0.106	0.1306	1.05	0.1326	-	0.1326	6.56	8.10	0.840	0.106	-	0.111	0.084							
Exceedance of trigger level																									



**Table 5 – Vibration Monitoring January 2018**

Location	DATE	TIME	Triggered	Vector Sum (mm/s)	Comments
1 Kerr Drive (Bald Hill Road)	2018-01-30	15:08:00	Continuous	0.099	Background
1 Kerr Drive (Bald Hill Road)	2018-01-30	15:09:00	Continuous	0.274	Light vibe padfoot ~30m
1 Kerr Drive (Bald Hill Road)	2018-01-30	15:10:00	Continuous	0.410	Light vibe padfoot ~30m
1 Kerr Drive (Bald Hill Road)	2018-01-30	15:11:00	Continuous	0.721	Heavy vibe padfoot ~30m
1 Kerr Drive (Bald Hill Road)	2018-01-30	15:12:00	Continuous	0.640	Heavy vibe padfoot ~30m