Wastewater Monitoring Report - October 2019

Cargill Australia Limited

24 October 2019

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1 Introduction

Cargill Australia Limited, herein referred to as Cargill, owns and operates an Oilseed Processing Facility located at 51 Raven Street, Kooragang Island, NSW 2300. The Cargill Newcastle facility operates 24 hours per day, 7 days per week.

Cargill holds NSW Environmental Protection Authority (EPA) Environmental Protection Licence (EPL) 5810. The Scheduled Activities in the EPL includes Agricultural Processing and Shipping in Bulk.

Cargill irrigates areas onsite using treated wastewater from site processes and amenities. Effluent from the wastewater treatment plant originates at Point 12. Effluent from the sewage water treatment plant originates at Point 13. The wastewater is used to irrigate areas of Cargill's site known as EPL Points 14, 15, 16 and 17.

MJM Environmental (MJM) was commissioned by Cargill to complete wastewater sampling on 2 October 2019. The sampling was performed as stipulated by Cargill's EPL 5810 requirements.

This report outlines the results of the wastewater monitoring for October 2019.

2 Site Identification

Cargill operates an Oilseed Processing Facility located at 51 Raven Street, Kooragang Island, NSW 2300. The site layout and location of the wastewater monitoring points and irrigation areas are presented in Figure 2-1.

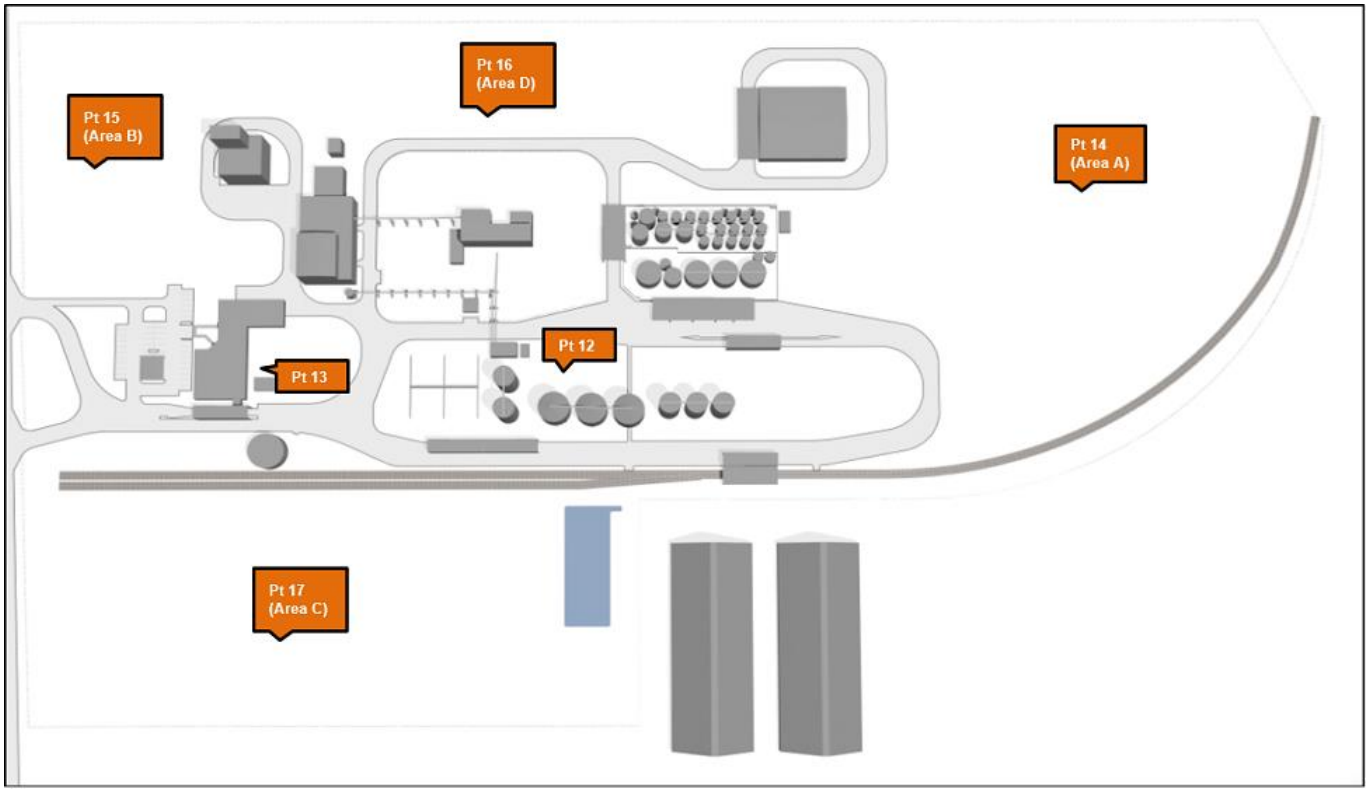

Figure 2-1: Cargill Newcastle site layout and location of monitoring points and irrigation areas

3 Monitoring Locations

Cargill irrigates areas onsite using treated wastewater from site processes and amenities. Effluent from the wastewater treatment plant originates at Point 12 and is used to irrigate the southern area of Cargill's site described in the EPL as the 'spray irrigation area'.

Effluent from the sewage water treatment plant originates at Point 13 and is used to irrigate the northern area of Cargill's site, which is described in the EPL as the 'drip irrigation area'.

Monitoring of points 12 and 13 is performed quarterly and annually. Quarterly water quality analytes were analysed during the October 2019 sampling event.

4 Sampling Methodology

The sampling was performed in accordance with ANZECC monitoring standards (AS/NZS 5667.11:1998 and AS/NZS 5667.1:1998). These procedures include the name and location of the sample point, date and time of sample collection, the type of sample point, method of sample collection, depth of sampling and sample appearance at the time of collection. At the conclusion of sampling all individual, marked sealed containers were transferred to a local NATA approved laboratory. A certificate of analysis is presented in Appendix A and the field notes for the sampling work completed are presented in Appendix B.

Wastewater sampling was undertaken by taking grab samples with appropriate bottles provided by a NATA accredited laboratory. A bailer was used to collect samples from Point 13, and samples were taken from a valve located at Point 12. Samples were put immediately into an esky to avoid heat and sunlight, and taken directly to the laboratory.

5 Results

The wastewater monitoring results for October 2019 are presented in Table 5-1.

Table 5-1: Cargill Newcastle wastewater monitoring results (2 October 2019)

Analyte	Unit	Point 12	Point 13
pH	pH Unit	3.05	7.99
Sodium Absorption Ratio	-	2.9	1.93
Electrical Conductivity	µS/cm	1,340	1,080
Chloride	mg/L	73	59
Nitrite	mg/L	0.15	1.62
Total Kjeldahl Nitrogen (TKN)	mg/L	39.3	68.7
Total Nitrogen	mg/L	39.4	70.3
Total Phosphorus	mg/L	2.38	9.29
Oil and Grease	mg/L	36	<5
Enterococci	CFU/100mL	-	28,000
Faecal Coliforms	CFU/100mL	-	2,100,000
Dissolved Major Cations			
Calcium	mg/L	36	36
Magnesium	mg/L	9	9
Sodium	mg/L	75	50
Potassium	mg/L	8	28

Figure 5-1 to Figure 5-13 illustrates the current and historical data for Point 12 and Point 13.

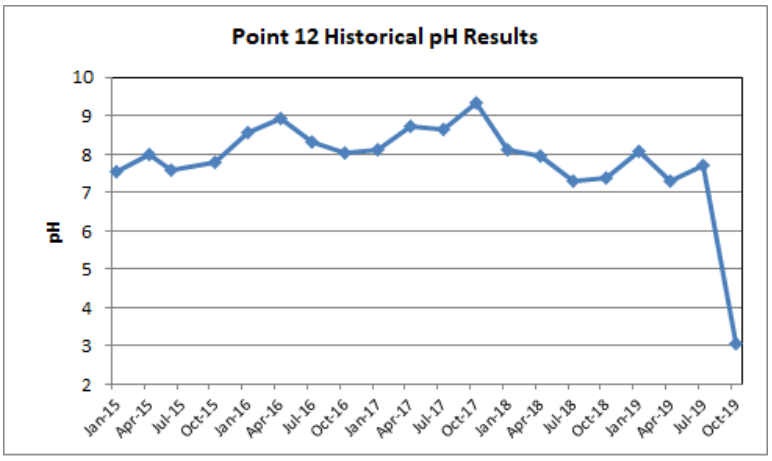

Figure 5-1: Point 12 pH Results

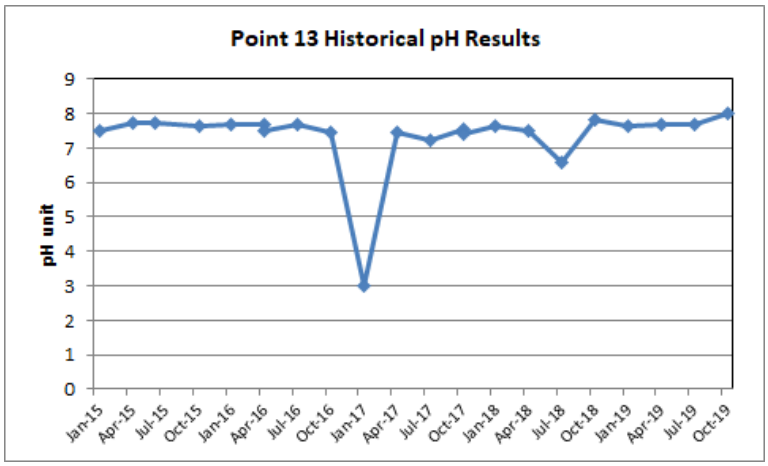

Figure 5-2: Point 13 pH Results

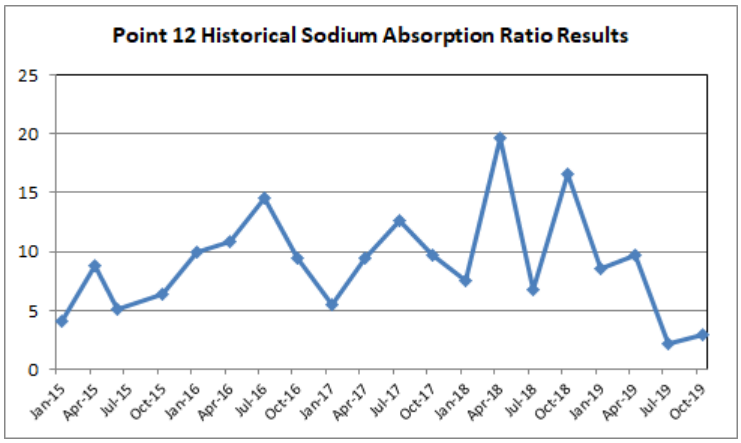

Figure 5-3: Point 12 Sodium Absorption Ratio Results

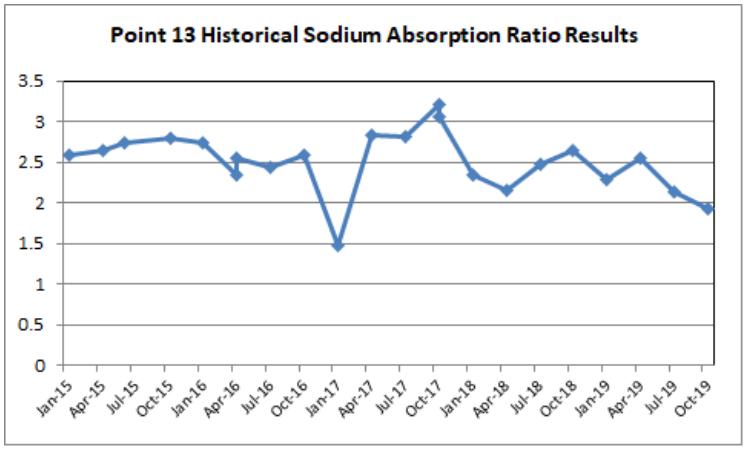

Figure 5-4: Point 13 Sodium Absorption Ratio Results

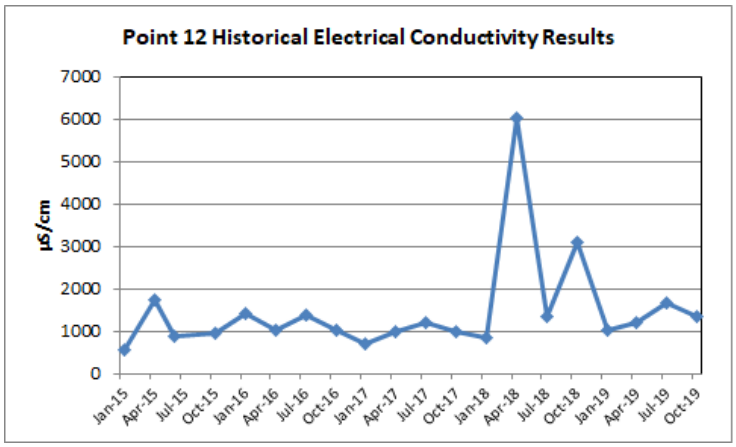

Figure 5-5: Point 12 Electrical Conductivity Results

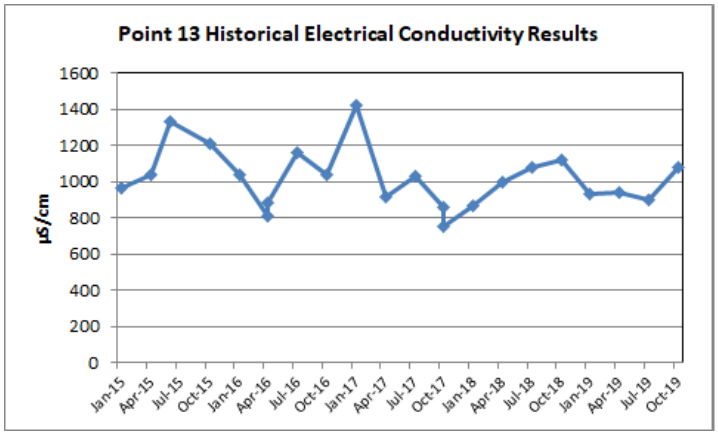

Figure 5-6: Point 13 Electrical Conductivity Results

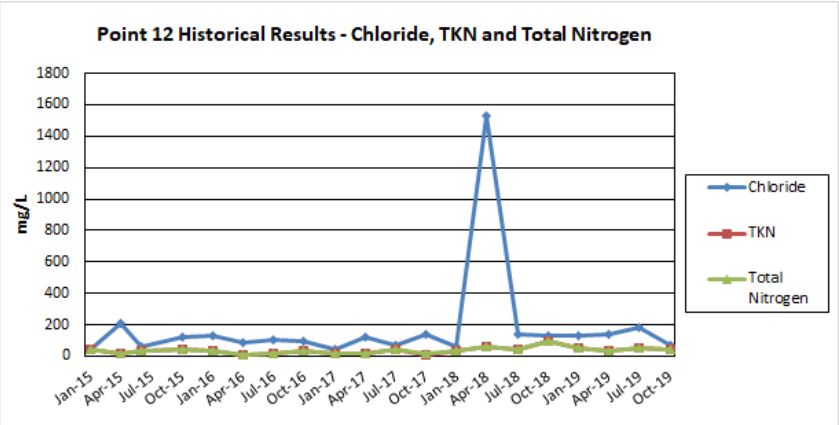

Figure 5-7: Point 12 Chloride, TKN and Total Nitrogen Results

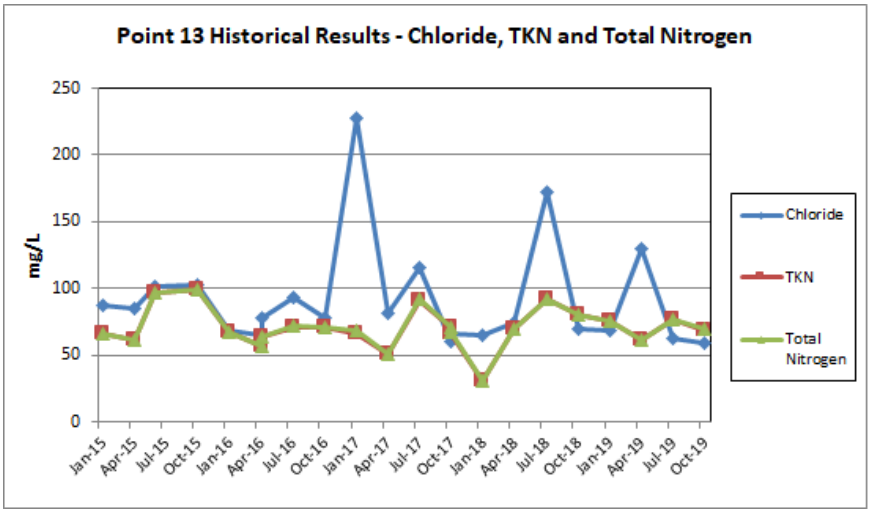

Figure 5-8: Point 13 Chloride, TKN and Total Nitrogen Results

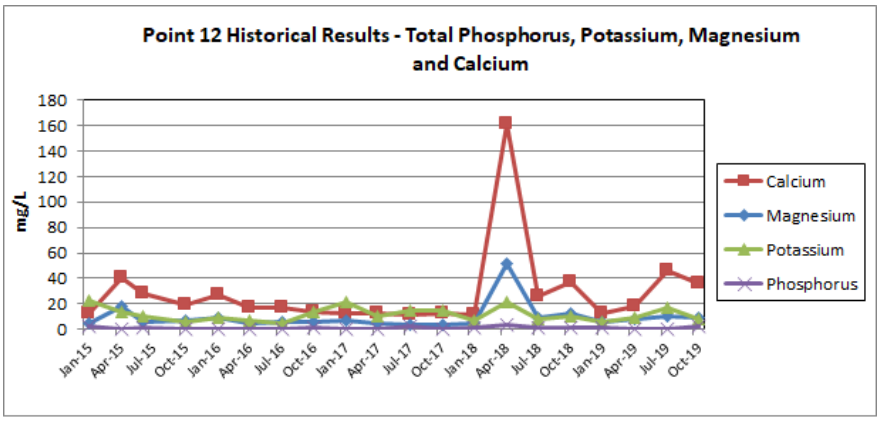

Figure 5-9: Point 12 Total Phosphorus, Potassium, Magnesium and Calcium Results

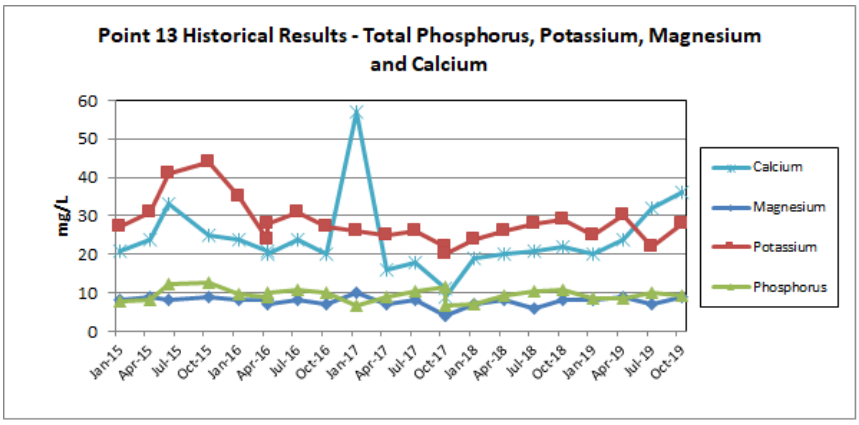

Figure 5-10: Point 13 Total Phosphorus, Potassium, Magnesium and Calcium Results

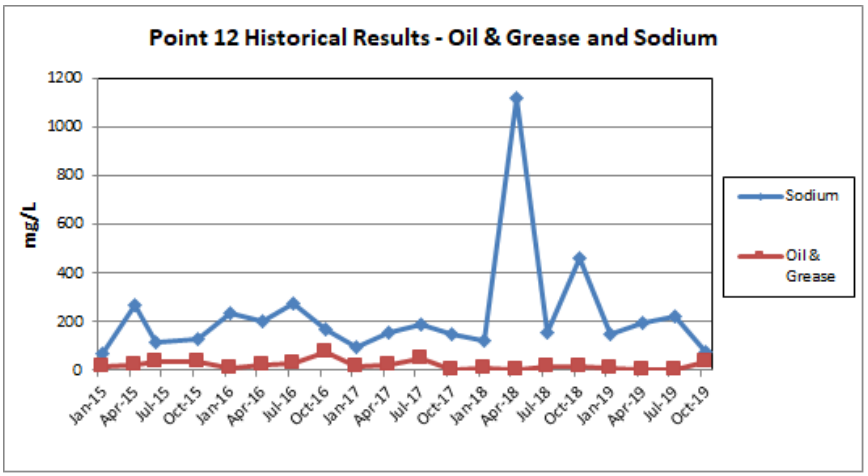

Figure 5-11: Point 12 Oil & Grease and Sodium Results

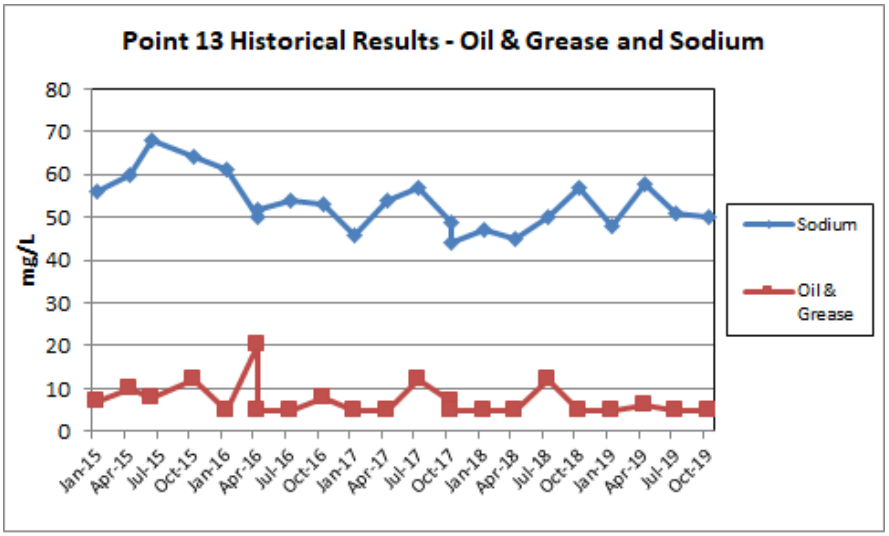

Figure 5-12: Point 13 Oil & Grease and Sodium Results

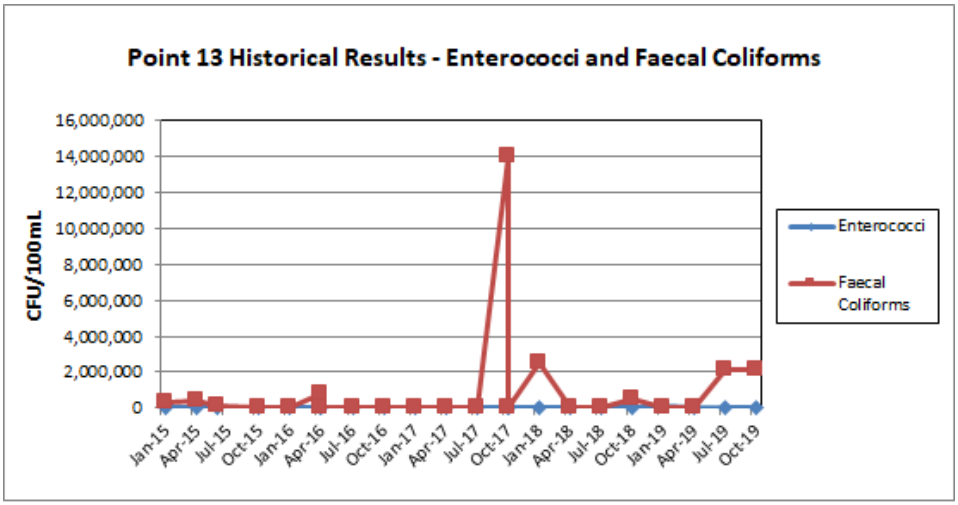

Figure 5-13: Point 13 Enterococci and Faecal Coliforms Results

6 Discussion

Wastewater sampling was carried out on 2 October 2019. Sampling of Point 12 and Point 13 was performed as stipulated under condition P1.3 of EPL 5810. Quarterly water quality analytes were analysed for the sampling event.

Cargill's EPL does not specify wastewater quality limits. The wastewater monitoring was required by the licence to ensure that the groundwater quality is not adversely affected by the operations of the plant. The monitoring is intended to highlight changes in trends.

Appendix A – NATA Laboratory Results

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES1932190**	Page	: 1 of 3
Client	: **MJM ENVIRONMENTAL PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS BRIGID KELLY	Contact	: Customer Services ES
Address	: OFFICE 1, 335 WHARF ROAD NEWCASTLE NSW, AUSTRALIA 2300	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 49264222	Telephone	: +61-2-8784 8555
Project	: 036 2054	Date Samples Received	: 02-Oct-2019 14:31
Order number	: 036 0254	Date Analysis Commenced	: 02-Oct-2019
C-O-C number	: ----	Issue Date	: 09-Oct-2019 16:51
Sampler	: JC		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 2		
No. of samples analysed	: 2		

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	*Position*	*Accreditation Category*
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Neil Martin	Team Leader - Chemistry	Chemistry, Newcastle West, NSW
Somlok Chai	Microbiologist	Sydney Microbiology, Smithfield, NSW

General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- MF = membrane filtration
- CFU = colony forming unit
- Microbiological Comment: In accordance with ALS work instruction QWI-MIC/04, membrane filtration result is reported an approximate (~) when the count of colonies on the filtered membrane is outside the range of 10 - 100cfu.
- MW023 is ALS's internal code and is equivalent to AS4276.9.
- MW006 is ALS's internal code and is equivalent to AS4276.7.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Client sample ID	Point 12	Point 13	----	----	----
			Client sampling date / time	02-Oct-2019 00:00	02-Oct-2019 00:00	----	----	----
Compound	CAS Number	LOR	Unit	ES1932190-001	ES1932190-002	--------	--------	--------
				Result	Result	----	----	----
EA005: pH								
pH Value	----	0.01	pH Unit	3.05	7.99	----	----	----
EA006: Sodium Adsorption Ratio (SAR)								
^ Sodium Adsorption Ratio	----	0.01	-	2.90	1.93	----	----	----
EA010P: Conductivity by PC Titrator								
Electrical Conductivity @ 25°C	----	1	µS/cm	1340	1080	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	73	59	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	36	36	----	----	----
Magnesium	7439-95-4	1	mg/L	9	9	----	----	----
Sodium	7440-23-5	1	mg/L	75	50	----	----	----
Potassium	7440-09-7	1	mg/L	8	28	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.15	1.62	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	39.3	68.7	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	39.4	70.3	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	2.38	9.29	----	----	----
EP020: Oil and Grease (O&G)								
Oil & Grease	----	5	mg/L	36	<5	----	----	----
MW006: Faecal Coliforms & E.coli by MF								
Faecal Coliforms	----	1	CFU/100mL	----	2100000	----	----	----
MW023: Enterococci by Membrane Filtration								
Enterococci	----	1	CFU/100mL	----	28000	----	----	----

Appendix B – Sampling Field Notes

WATER SAMPLING FORM

Client Name: Cargill Newcastle

Date 2 10 2019 Time 10:10

Day Month Year

Reasons for sampling: Licence Variation Water Sampling

Location of sampling point: Point 12

Nature of sampling point [ ] Groundwater [ ] Tradewaste sump [ ] Surface water

[ ] Stormwater [X] Other Please specify

Effluent Water Sampling

Tap at wastewater treament plant

Sample ID: Point 12

Depth sample taken: At tap

Sample appearance Cloudy, foamy

Water Level in BH -

Volume of sample taken 1L

Name of Sampler JC

Method of sampling grab sample

Nature of sample point Wastewater Treatment Plant

COC Reference No. 036 2054

Number of Bottles 4

Other comments:

Process odour

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT

WATER SAMPLING FORM

Client Name: Cargill Newcastle

Date 2 10 2019 Time 9:58

Day Month Year

Reasons for sampling: Licence Variation Water Sampling

Location of sampling point: Point 13

Nature of sampling point [ ] Groundwater [ ] Tradewaste sump [ ] Surface water

[ ] Stormwater [X] Other Please specify

Sewage Treatment Plant tank chamber

Sample ID: Point 13

Depth sample taken: Surface (mm)

Sample appearance murky

Volume of sample taken 1L

Name of Sampler JC

Method of sampling Bailer

Nature of sample point Tank

COC Reference No. 036 2054

Number of Bottles

Other comments:

Sewage odour

NOTE: ONE WATER SAMPLING FORM TO BE COMPLETED FOR EACH SAMPLE POINT