

CLIENT DETAILS

LABORATORY DETAILS

Contact N Bainbridge
 Client COOL OFF PTY LTD T/A STAUGHTON GROUP
 Address 271 JUDE ROAD
 HOWLONG NSW 2643

Manager Adam Atkinson
 Laboratory SGS Melbourne EH&S
 Address 10/585 Blackburn Road
 Notting Hill Victoria 3168

Telephone 61 2 60524029
 Facsimile (Not specified)
 Email nbainbridge@staughtongroup.com.au

Telephone +61395743200
 Facsimile +61395743399
 Email Au.SampleReceipt.Melbourne@sgs.com

Project **Waste Water Sample**
 Order Number **TBA**
 Samples 1

SGS Reference **ME322357 R0**
 Date Received 01 Sep 2021
 Date Reported 21 Sep 2021

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(14420).

BOD, TP, Oil and Grease, TKN subcontracted to SGS Sydney, Unit 16 33 Maddox St Alexandria NSW 2015, NATA Accreditation Number: 2562, Site Number: 4354,SE223503.

Sampling was done on 14/9/21 for BOD, TP, Oil and Grease, & TKN

SIGNATORIES



Christopher BENNETT
 Laboratory Technician



Ryan ZHANG
 Inorganics Team Leader

Sample Number ME322357.001
 Sample Matrix Water
 Sample Date 31 Aug 2021
 Sample Name 6003

Parameter Units LOR

pH in water Method: AN101 Tested: 6/9/2021

pH**	pH Units	0.1	6.3
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Conductivity and TDS by Calculation - Water Method: AN106 Tested: 2/9/2021

Conductivity @ 25 C	µS/cm	2	1610
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Total Dissolved Solids (TDS) in water Method: AN113 Tested: 3/9/2021

Total Dissolved Solids Dried at 175-185°C	mg/L	10	1300
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Total and Volatile Suspended Solids (TSS / VSS) Method: AN114 Tested: 3/9/2021

Total Suspended Solids Dried at 103-105°C	mg/L	5	1300
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Acidity and Free CO2 Method: AN140 Tested: 8/9/2021

Acidity to pH 8.3	mg CaCO3/L	5	210
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Alkalinity Method: AN135 Tested: 6/9/2021

Bicarbonate Alkalinity as CaCO3	mg/L	5	430
Carbonate Alkalinity as CaCO3	mg/L	5	<5
Hydroxide Alkalinity as CaCO3	mg/L	5	<5
Total Alkalinity as CaCO3	mg/L	5	430

	Sample Number	ME322357.001
	Sample Matrix	Water
	Sample Date	31 Aug 2021
	Sample Name	6003
Parameter	Units	LOR

Chloride by Discrete Analyser in Water Method: AN274 Tested: 7/9/2021

Chloride, Cl	mg/L	1	160
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Sulfate in water Method: AN275 Tested: 2/9/2021

Sulfate, SO4	mg/L	1	66
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Fluoride in Water by FIA Method: MA1127-02 Tested: 6/9/2021

Fluoride, F	mg/L	0.1	<0.1
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Dissolved Metals in Water by ICPMS Method: MA-1400.WW.09 Tested: 2/9/2021

Calcium	mg/L	0.01	20
Magnesium	mg/L	0.01	5.9
Potassium	mg/L	0.01	100
Sodium	mg/L	0.01	140

Trace Metals (Total) in Water by ICPMS Method: MA-1400.WW.10 Tested: 2/9/2021

Total Calcium	mg/L	0.01	28
Total Magnesium	mg/L	0.01	7.1
Total Potassium	mg/L	0.01	110
Total Sodium	mg/L	0.01	150

Sample Number ME322357.001
 Sample Matrix Water
 Sample Date 31 Aug 2021
 Sample Name 6003

Parameter Units LOR

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: MA-1127-04 Tested: 2/9/2021

Parameter	Units	LOR	Value
Nitrate/Nitrite Nitrogen, NOx as N	mg/L	0.01	0.08
Nitrite Nitrogen, NO ₂ as N	mg/L	0.01	0.03
Nitrate Nitrogen, NO ₃ as N	mg/L	0.01	0.05

Ammonia Nitrogen by Discrete Analyser Method: AN280 Tested: 2/9/2021

Parameter	Units	LOR	Value
Ammonia Nitrogen, NH ₃ as N	mg/L	0.01	14
Ammonia, NH ₃	mg/L	0.02	17

Filterable Reactive Phosphorus (FRP) Method: AN278 Tested: 2/9/2021

Parameter	Units	LOR	Value
Filterable Reactive Phosphorus as P	mg/L	0.005	24

Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 20/9/2021

Parameter	Units	LOR	Value
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	19

BOD5 Method: AN183 Tested: 20/9/2021

Parameter	Units	LOR	Value
Biochemical Oxygen Demand (BOD5)	mg/L	5	1300

Oil and Grease in Water Method: AN185 Tested: 20/9/2021

Parameter	Units	LOR	Value
Oil and Grease	mg/L	5	160

	Sample Number	ME322357.001
	Sample Matrix	Water
	Sample Date	31 Aug 2021
	Sample Name	6003
Parameter	Units	LOR

TKN Kjeldahl Digestion by Discrete Analyser Method: AN292 Tested: 20/9/2021

Total Kjeldahl Nitrogen	mg/L	0.05	190
Total Nitrogen (calc)	mg/L	0.05	190
Organic Nitrogen (calc)	mg/L	0.05	180

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Alkalinity Method: ME-(AU)-[ENV]JAN135

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Bicarbonate Alkalinity as CaCO3	LB044181	mg/L	5	<5	0 - 4%	NA
Carbonate Alkalinity as CaCO3	LB044181	mg/L	5	<5	17 - 18%	NA
Hydroxide Alkalinity as CaCO3	LB044181	mg/L	5	<5	0%	NA
Total Alkalinity as CaCO3	LB044181	mg/L	5	<5	2 - 3%	93%

Ammonia Nitrogen by Discrete Analyser Method: ME-(AU)-[ENV]JAN280

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery	MSD %RPD
Ammonia Nitrogen, NH3 as N	LB044105	mg/L	0.01	1%	106%	NA
Ammonia, NH3	LB044105	mg/L	0.02	1%	NA	NA

Chloride by Discrete Analyser in Water Method: ME-(AU)-[ENV]JAN274

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Chloride, Cl	LB044212	mg/L	1	<1	0 - 1%	96%	94%	NA

Conductivity and TDS by Calculation - Water Method: ME-(AU)-[ENV]JAN106

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB044115	µS/cm	2	<2	0 - 12%	93%

Dissolved Metals in Water by ICPMS Method: MA-1400.WW.09

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Calcium	LB044094	mg/L	0.01	<0.01	3%	NA
Magnesium	LB044094	mg/L	0.01	<0.01	2%	NA
Potassium	LB044094	mg/L	0.01	<0.01	5%	NA
Sodium	LB044094	mg/L	0.01	<0.01	4%	NA

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Filterable Reactive Phosphorus (FRP) Method: ME-(AU)-[ENV]AN278

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Filterable Reactive Phosphorus as P	LB044103	mg/L	0.005	<0.005	2%	94%	96%	NA

Fluoride in Water by FIA Method: MA1127-02

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Fluoride, F	LB044186	mg/L	0.1	<0.1	0%	106%	101%	0%

Nitrate Nitrogen and Nitrite Nitrogen (NOx) by FIA Method: MA-1127-04

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Nitrate/Nitrite Nitrogen, NOx as N	LB044104	mg/L	0.01	<0.01	1 - 2%	NA	NA	NA
Nitrite Nitrogen, NO ₂ as N	LB044104	mg/L	0.01	<0.01	2 - 3%			
Nitrate Nitrogen, NO ₃ as N	LB044104	mg/L	0.01	<0.01				

pH in water Method: ME-(AU)-[ENV]AN101

Parameter	QC Reference	Units	LOR	DUP %RPD
pH**	LB044183	pH Units	0.1	0%

Sulfate in water Method: ME-(AU)-[ENV]AN275

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery	MSD %RPD
Sulfate, SO ₄	LB044107	mg/L	1	<1	8%	100%	100%	NA

Total and Volatile Suspended Solids (TSS / VSS) Method: ME-(AU)-[ENV]AN114

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Suspended Solids Dried at 103-105°C	LB044156	mg/L	5	<5	11%	94%

MB blank results are compared to the Limit of Reporting

LCS and MS spike recoveries are measured as the percentage of analyte recovered from the sample compared the the amount of analyte spiked into the sample.

DUP and MSD relative percent differences are measured against their original counterpart samples according to the formula : *the absolute difference of the two results divided by the average of the two results as a percentage*. Where the DUP RPD is 'NA' , the results are less than the LOR and thus the RPD is not applicable.

Total Dissolved Solids (TDS) in water Method: ME-(AU)-[ENV]AN113

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Total Dissolved Solids Dried at 175-185°C	LB044162	mg/L	10	<10	2 - 8%	85%

Trace Metals (Total) in Water by ICPMS Method: MA-1400.WW.10

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Total Calcium	LB044093	mg/L	0.01	<0.01		NA	
Total Magnesium	LB044093	mg/L	0.01	<0.01		NA	
Total Potassium	LB044093	mg/L	0.01	<0.01		NA	
Total Sodium	LB044093	mg/L	0.01	<0.01	0%	NA	NA

METHOD

METHODOLOGY SUMMARY

AN101	pH in Soil Sludge Sediment and Water: pH is measured electrometrically using a combination electrode (glass plus reference electrode) and is calibrated against 3 buffers purchased commercially. For soils, an extract with water is made at a ratio of 1:5 and the pH determined and reported on the extract. Reference APHA 4500-H+.
AN106	Conductivity and TDS by Calculation: Conductivity is measured by meter with temperature compensation and is calibrated against a standard solution of potassium chloride. Conductivity is generally reported as $\mu\text{mhos/cm}$ or $\mu\text{S/cm}$ @ 25°C. For soils, an extract with water is made at a ratio of 1:5 and the EC determined and reported on the extract, or calculated back to the as-received sample. Total Dissolved Salts can be estimated from conductivity using a conversion factor, which for natural waters, is in the range 0.55 to 0.75. SGS use 0.6. Reference APHA 2510 B.
AN106	Salinity may be calculated in terms of NaCl from the sample conductivity. This assumes all soluble salts present, measured by the conductivity, are present as NaCl.
AN113	Total Dissolved Solids: A well-mixed filtered sample of known volume is evaporated to dryness at 180°C and the residue weighed. Approximate methods for correlating chemical analysis with dissolved solids are available. Reference APHA 2540 C.
AN113	The Total Dissolved Solids residue may also be ignited at 550 C and volatile TDS (Organic TDS) and non-volatile TDS (Inorganic) can be determined.
AN114	Total Suspended and Volatile Suspended Solids: The sample is homogenised by shaking and a known volume is filtered through a pre-weighed GF/C filter paper and washed well with deionised water. The filter paper is dried and reweighed. The TSS is the residue retained by the filter per unit volume of sample. Reference APHA 2540 D. Internal Reference AN114
AN135	Alkalinity (and forms of) by Titration: The sample is titrated with standard acid to pH 8.3 (P titre) and pH 4.5 (T titre) and permanent and/or total alkalinity calculated. The results are expressed as equivalents of calcium carbonate or recalculated as bicarbonate, carbonate and hydroxide. Reference APHA 2320. Internal Reference AN135
AN140	Acidity by Titration: The water sample is titrated with sodium hydroxide to designated pH end point. In a sample containing only carbon dioxide, bicarbonates and carbonates, titration to pH 8.3 at 25°C corresponds to stoichiometric neutralisation of carbonic acid to bicarbonate. Method reference APHA 2310 B.
AN183	BOD: Serial dilutions of the sample are firstly combined with various reagents to aid bacterial growth and the sample is incubated for 5 days at 20°C. The difference between the initial and final oxygen contents of the sample is the amount of oxygen consumed by the bacteria. This is related to the organic loading of the sample therefore cBOD is the measure of the digestibility or bioavailability of organic matter in the sample. Reference APHA 5210 B. Internal Reference AN183
AN185	Gravimetric Oil & Grease and Hydrocarbons: A known volume of sample is extracted using an organic solvent and the solvent layer with dissolved oils and greases is transferred to a pre-weighed beaker. The solvent is evaporated over low heating and the beaker reweighed. The concentration of oil and grease is determined by the increase in mass of the collection beaker per volume of sample extracted. O&G is suitable for lubricating oils and other high boiling point products but is not suitable for volatiles. Reference to APHA 5520 B and USEPA 1664 Revision B.. Internal Reference AN185
AN274	Chloride by Discrete Analyse: Chloride reacts with mercuric thiocyanate forming a mercuric chloride complex. In the presence of ferric iron, highly coloured ferric thiocyanate is formed which is proportional to the chloride concentration. Reference APHA 4500Cl-

METHOD

METHODOLOGY SUMMARY

AN275	sulfate by Discrete Analyse: sulfate is precipitated in an acidic medium with barium chloride. The resulting turbidity is measured photometrically at 405nm and compared with standard calibration solutions to determine the sulfate concentration in the sample. Reference APHA 4500-SO42-. Internal reference AN275.
AN278	Filterable Reactive Phosphorus by DA (determined on filtered sample): Orthophosphate reacts with ammonium molybdate (Mo VI) and potassium antimonyl tartrate (Sb III) in acid medium to form an antimony-phosphomolybdate complex. This complex is subsequently reduced with ascorbic acid to form a blue colour and the absorbance is read at 880 nm. The sensitivity of the automated method is 10-20 times that of the macro method. Reference APHA 4500-P F
AN279/AN293(Sydney)	The sample is digested with Sulphuric acid, K2SO4 and CuSO4. All forms of phosphorus are converted into orthophosphate. The digest is cooled and placed on the discrete analyser for colorimetric analysis.
AN280	A filtered water sample containing ammonia (NH3) or ammonium cations (NH4+) is reacted with alkaline phenol and hypochlorite in a buffered solution to form the blue indophenol colour . The absorbance is measured at 630nm and compared with calibration standards to obtain the concentration of ammonia in the sample.
AN281	An unfiltered water or soil sample is first digested in a block digester with sulfuric acid, K2SO4 and CuSO4. The ammonia produced following digestion is then measured colourimetrically using the Aquakem 250 Discrete Analyser. A portion of the digested sample is buffered to an alkaline pH , and interfering cations are complexed. The ammonia then reacts with salicylate and hypochlorite to give a blue colour whose absorbance is measured at 660nm and compared with calibration standards. This is proportional to the concentration of Total Kjeldahl Nitrogen in the original sample.
Calculation	Free and Total Carbon Dioxide may be calculated using alkalinity forms only when the samples TDS is <500mg/L. If TDS is >500mg/L free or total carbon dioxide cannot be reported . APHA4500CO2 D.
MA1127-02	This method covers the determination of fluoride by Flow Injection Analysis (FIA). Fluoride is determined potentiometrically using a combination of the fluoride electrode and the Lachat QuickChem Flow Injection Analyser. The fluoride electrode consists of a lanthanum fluoride crystal across which a potential is developed by fluoride ions. The reference cell is an Ag/AgCl/Cl- cell. The reference junction is of the annular liquid-junction type and encloses the fluoride sensitive crystal.
MA1127-04	Determination of nitrate/nitrite by Flow Injection Analysis (FIA). The method is based on reactions that are specific for the nitrite (NO2-) ion. Nitrate is quantitatively reduced to nitrite by passage of the sample through a copperised cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotisation with sulphanilamide under acidic conditions to form a diazonium ion. The diazonium ion is then coupled with N-(1-naphthyl)ethylenediamine dihydrochloride. The resulting pink dye absorbs at 540 nm. Nitrate concentrations are obtained by subtracting nitrite values, which have been previously analysed
MA-1400.09	Filtered sample is acidified and analysed by ICP-MS.
MA-1400.WW.10	Unfiltered sample is extracted in concentrated acid using microwave heating by the Microwave Digestion system. The sample and acid are placed in a microwave vessel (TFM), which is then capped and heated in the microwave unit. After cooling, the vessel contents are diluted with DI water, then filtered, centrifuged, or allowed to settle and analysed by ICP-MS.

FOOTNOTES

IS	Insufficient sample for analysis.	LOR	Limit of Reporting
LNR	Sample listed, but not received.	↑↓	Raised or Lowered Limit of Reporting
*	NATA accreditation does not cover the performance of this service.	QFH	QC result is above the upper tolerance
**	Indicative data, theoretical holding time exceeded.	QFL	QC result is below the lower tolerance
***	Indicates that both * and ** apply.	-	The sample was not analysed for this analyte
		NVL	Not Validated

Unless it is reported that sampling has been performed by SGS, the samples have been analysed as received.
Solid samples expressed on a dry weight basis.

Where "Total" analyte groups are reported (for example, Total PAHs, Total OC Pesticides) the total will be calculated as the sum of the individual analytes, with those analytes that are reported as <LOR being assumed to be zero. The summed (Total) limit of reporting is calculated by summing the individual analyte LORs and dividing by two. For example, where 16 individual analytes are being summed and each has an LOR of 0.1 mg/kg, the "Totals" LOR will be 1.6 / 2 (0.8 mg/kg). Where only 2 analytes are being summed, the "Total" LOR will be the sum of those two LORs.

Some totals may not appear to add up because the total is rounded after adding up the raw values.

If reported, measurement uncertainty follow the ± sign after the analytical result and is expressed as the expanded uncertainty calculated using a coverage factor of 2, providing a level of confidence of approximately 95%, unless stated otherwise in the comments section of this report.

Results reported for samples tested under test methods with codes starting with ARS-SOP, radionuclide or gross radioactivity concentrations are expressed in becquerel (Bq) per unit of mass or volume or per wipe as stated on the report. Becquerel is the SI unit for activity and equals one nuclear transformation per second.

Note that in terms of units of radioactivity:

- a. 1 Bq is equivalent to 27 pCi
- b. 37 MBq is equivalent to 1 mCi

For results reported for samples tested under test methods with codes starting with ARS-SOP, less than (<) values indicate the detection limit for each radionuclide or parameter for the measurement system used. The respective detection limits have been calculated in accordance with ISO 11929.

The QC and MU criteria are subject to internal review according to the SGS QAQC plan and may be provided on request or alternatively can be found here: www.sgs.com.au/en-gb/environment-health-and-safety.

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