ANALYTICAL REPORT

Accreditation No. 2562

CLIENT DETAILS		LABORATORY DETAILS	
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Project	**Wathagar Discharge Even Monitoring**	SGS Reference	**SE212258 R0**
Order Number	(Not specified)	Date Received	13 Oct 2020
Samples	1	Date Reported	20 Oct 2020

COMMENTS

Accredited for compliance with ISO/IEC 17025 - Testing. NATA accredited laboratory 2562(4354).

SIGNATORIES

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Metals/Inorganics Team Leader

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Parameter	Units	LOR	Sample Number: SE212258.001 Sample Matrix: Water Sample Date: 12 Oct 2020 Sample Name: W Site 13 Regulator NW Levee
OC Pesticides in Water Method: AN420 Tested: 16/10/2020			
Hexachlorobenzene (HCB)	µg/L	0.1	<0.1
Alpha BHC	µg/L	0.1	<0.1
Lindane (gamma BHC)	µg/L	0.1	<0.1
Heptachlor	µg/L	0.1	<0.1
Aldrin	µg/L	0.1	<0.1
Beta BHC	µg/L	0.1	<0.1
Delta BHC	µg/L	0.1	<0.1
Heptachlor epoxide	µg/L	0.1	<0.1
o,p'-DDE	µg/L	0.1	<0.1
Alpha Endosulfan	µg/L	0.1	<0.1
Gamma Chlordane	µg/L	0.1	<0.1
Alpha Chlordane	µg/L	0.1	<0.1
trans-Nonachlor	µg/L	0.1	<0.1
p,p'-DDE	µg/L	0.1	<0.1
Dieldrin	µg/L	0.1	<0.1
Endrin	µg/L	0.1	<0.1
o,p'-DDD	µg/L	0.1	<0.1
o,p'-DDT	µg/L	0.1	<0.1
Beta Endosulfan	µg/L	0.1	<0.1
p,p'-DDD	µg/L	0.1	<0.1
p,p'-DDT	µg/L	0.1	<0.1
Endosulfan sulphate	µg/L	0.1	<0.1
Endrin aldehyde	µg/L	0.1	<0.1
Methoxychlor	µg/L	0.1	<0.1
Endrin ketone	µg/L	0.1	<0.1
Isodrin	µg/L	0.1	<0.1
Mirex	µg/L	0.1	<0.1
Surrogates			
Tetrachloro-m-xylene (TCMX) (Surrogate)	%	-	**76**
OP Pesticides in Water Method: AN420 Tested: 16/10/2020			
Dichlorvos	µg/L	0.5	<0.5
Dimethoate	µg/L	0.5	<0.5
Diazinon (Dimpylate)	µg/L	0.5	<0.5
Fenitrothion	µg/L	0.2	<0.2
Malathion	µg/L	0.2	<0.2
Chlorpyrifos (Chlorpyrifos Ethyl)	µg/L	0.2	<0.2
Parathion-ethyl (Parathion)	µg/L	0.2	<0.2
Bromophos Ethyl	µg/L	0.2	<0.2
Methidathion	µg/L	0.5	<0.5
Ethion	µg/L	0.2	<0.2
Azinphos-methyl	µg/L	0.2	<0.2

Parameter	Units	LOR	Sample Number: SE212258.001 Sample Matrix: Water Sample Date: 12 Oct 2020 Sample Name: W Site 13 Regulator NW Levee
OP Pesticides in Water Method: AN420 Tested: 16/10/2020 (continued)			
Surrogates			
2-fluorobiphenyl (Surrogate)	%	-	**60**
d14-p-terphenyl (Surrogate)	%	-	**74**
Anions by Ion Chromatography in Water Method: AN245 Tested: 16/10/2020			
Nitrate Nitrogen, NO3-N	mg/L	0.005	**0.026**
Nitrite in Water Method: AN277 Tested: 14/10/2020			
Nitrite Nitrogen, NO2 as N	mg/L	0.005	<0.005
Total Oxidised Nitrogen, NOx-N	mg/L	0.005	**0.026**
TKN Kjeldahl Digestion by Discrete Analyser Method: AN292 Tested: 14/10/2020			
Total Kjeldahl Nitrogen	mg/L	0.05	**3.1**
Total Nitrogen (calc)	mg/L	0.05	**3.1**
Total Phosphorus by Kjeldahl Digestion DA in Water Method: AN279/AN293(Sydney only) Tested: 14/10/2020			
Total Phosphorus (Kjeldahl Digestion) as P	mg/L	0.02	**1.8**
Total and Volatile Suspended Solids (TSS / VSS) Method: AN114 Tested: 20/10/2020			
Total Suspended Solids Dried at 103-105°C	mg/L	5	**540**

Parameter	Units	LOR	Sample Number: SE212258.001 Sample Matrix: Water Sample Date: 12 Oct 2020 Sample Name: W Site 13 Regulator NW Levee
pH in water Method: AN101 Tested: 14/10/2020			
pH**	No unit	-	**6.2**
Conductivity and TDS by Calculation - Water Method: AN106 Tested: 14/10/2020			
Conductivity @ 25 C	µS/cm	2	**50**

QC SUMMARY

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.

Anions by Ion Chromatography in Water Method: ME-(AU)-[ENV]AN245

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Nitrate Nitrogen, NO3-N	LB211370	mg/L	0.005	<0.005	4%	100%	100%

Conductivity and TDS by Calculation - Water Method: ME-(AU)-[ENV]AN106

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery
Conductivity @ 25 C	LB211204	µS/cm	2	<2	0%	100 - 105%

Nitrite in Water Method: ME-(AU)-[ENV]AN277

Parameter	QC Reference	Units	LOR	MB	DUP %RPD	LCS %Recovery	MS %Recovery
Nitrite Nitrogen, NO2 as N	LB211195	mg/L	0.005	<0.005	0%	104%	97%
Total Oxidised Nitrogen, NOx-N	LB211195	mg/L	0.005	<0.005			

OC Pesticides in Water Method: ME-(AU)-[ENV]AN420

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Hexachlorobenzene (HCB)	LB211371	µg/L	0.1	<0.1	NA
Alpha BHC	LB211371	µg/L	0.1	<0.1	NA
Lindane (gamma BHC)	LB211371	µg/L	0.1	<0.1	NA
Heptachlor	LB211371	µg/L	0.1	<0.1	84%
Aldrin	LB211371	µg/L	0.1	<0.1	82%
Beta BHC	LB211371	µg/L	0.1	<0.1	NA
Delta BHC	LB211371	µg/L	0.1	<0.1	74%
Heptachlor epoxide	LB211371	µg/L	0.1	<0.1	NA
o,p'-DDE	LB211371	µg/L	0.1	<0.1	NA
Alpha Endosulfan	LB211371	µg/L	0.1	<0.1	NA
Gamma Chlordane	LB211371	µg/L	0.1	<0.1	NA
Alpha Chlordane	LB211371	µg/L	0.1	<0.1	NA
trans-Nonachlor	LB211371	µg/L	0.1	<0.1	NA
p,p'-DDE	LB211371	µg/L	0.1	<0.1	NA
Dieldrin	LB211371	µg/L	0.1	<0.1	82%
Endrin	LB211371	µg/L	0.1	<0.1	84%
o,p'-DDD	LB211371	µg/L	0.1	<0.1	NA
o,p'-DDT	LB211371	µg/L	0.1	<0.1	NA
Beta Endosulfan	LB211371	µg/L	0.1	<0.1	NA
p,p'-DDD	LB211371	µg/L	0.1	<0.1	NA
p,p'-DDT	LB211371	µg/L	0.1	<0.1	67%
Endosulfan sulphate	LB211371	µg/L	0.1	<0.1	NA
Endrin aldehyde	LB211371	µg/L	0.1	<0.1	NA
Methoxychlor	LB211371	µg/L	0.1	<0.1	NA
Endrin ketone	LB211371	µg/L	0.1	<0.1	NA
Isodrin	LB211371	µg/L	0.1	<0.1	NA
Mirex	LB211371	µg/L	0.1	<0.1	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Tetrachloro-m-xylene (TCMX) (Surrogate)	LB211371	%	-	79%	85%

QC SUMMARY

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.

OP Pesticides in Water **Method: ME-(AU)-[ENV]AN420**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Dichlorvos	LB211371	µg/L	0.5	<0.5	83%
Dimethoate	LB211371	µg/L	0.5	<0.5	NA
Diazinon (Dimpylate)	LB211371	µg/L	0.5	<0.5	92%
Fenitrothion	LB211371	µg/L	0.2	<0.2	NA
Malathion	LB211371	µg/L	0.2	<0.2	NA
Chlorpyrifos (Chlorpyrifos Ethyl)	LB211371	µg/L	0.2	<0.2	91%
Parathion-ethyl (Parathion)	LB211371	µg/L	0.2	<0.2	NA
Bromophos Ethyl	LB211371	µg/L	0.2	<0.2	NA
Methidathion	LB211371	µg/L	0.5	<0.5	NA
Ethion	LB211371	µg/L	0.2	<0.2	90%
Azinphos-methyl	LB211371	µg/L	0.2	<0.2	NA

Surrogates

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
2-fluorobiphenyl (Surrogate)	LB211371	%	-	60%	62%
d14-p-terphenyl (Surrogate)	LB211371	%	-	74%	72%

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

Parameter	QC Reference	Units	LOR	DUP %RPD	LCS %Recovery
pH**	LB211204	No unit	-	0 - 1%	100 - 101%

TKN Kjeldahl Digestion by Discrete Analyser **Method: ME-(AU)-[ENV]AN292**

Parameter	QC Reference	Units	LOR	DUP %RPD	MS %Recovery
Total Kjeldahl Nitrogen	LB211189	mg/L	0.05	1 - 3%	95%

QC SUMMARY

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 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	LB211594	mg/L	5	<5	0%	93%

Total Phosphorus by Kjeldahl Digestion DA in Water **Method: ME-(AU)-[ENV]AN279/AN293(Sydney only)**

Parameter	QC Reference	Units	LOR	MB	LCS %Recovery
Total Phosphorus (Kjeldahl Digestion) as P	LB211189	mg/L	0.02	<0.02	90%

METHOD SUMMARY

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 µmhos/cm or µS/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.
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
AN245	Anions by Ion Chromatography: A water sample is injected into an eluent stream that passes through the ion chromatographic system where the anions of interest ie Br, Cl, NO2, NO3 and SO4 are separated on their relative affinities for the active sites on the column packing material. Changes to the conductivity and the UV-visible absorbance of the eluent enable identification and quantitation of the anions based on their retention time and peak height or area. APHA 4110 B
AN277/WC250.312	Nitrite ions, when reacted with a reagent containing sulphanilamide and N-(1-naphthyl)-ethylenediamine dihydrochloride produce a highly coloured azo dye that is measured photometrically at 540nm.
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.
AN281	An unfiltered water or soil sample is first digested in a block digestor 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.
AN420	SVOC Compounds: Semi-Volatile Organic Compounds (SVOCs) including OC, OP, PCB, Herbicides, PAH, Phthalates and Speciated Phenols in soils, sediments and waters are determined by GCMS/ECD technique following appropriate solvent extraction process (Based on USEPA 3500C and 8270D).

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
		QFL	QC result is below the lower tolerance
**	Indicative data, theoretical holding time exceeded.	-	The sample was not analysed for this analyte
***	Indicates that both * and ** apply.	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 calcuated 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.