Annual Environmental Monitoring Report No.11

Reporting Period: 1 May 2020 – 30 April 2021 Version A - Final 25 June 2021

Project:

MP07_0086 – Tomago Road, Tomago

Client:

Northbank Enterprise Hub Pty Limited

Consultant:

Torque Projects Pty Limited

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1.0 Title Block

Torque Projects Pty Limited has been engaged by Northbank Enterprise Hub Pty Limited (NEH), formerly WEPL Investments Pty Limited, to complete the Annual Environmental Management Report (AEMR) for the period of 1 May 2020 to 30 April 2021 (Reporting Period) for MP 07_0086 project site at Tomago Road, Tomago. This is AEMR No. 11 completed for the project site. **Table 1.1** provides the summarised Annual Review details. **Table 1.2** is confirmation of the annual EPBC submission. **Table 1.3** indicates the government agencies receiving the AEMR submission.

Table 1.1 – Annual Review

Item	Description
Project Approval No.	MP07_0086
Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act) Approval No.	2007/3343
Project Approval Area:	Lot 210 DP 1174939 - NEH Lot 211 & 212 DP 1174939 - Industria Company No. 2 P/L, leased by WesTrac P/L
Annual Review Start Date	1 May 2020
Annual Review Finish Date	30 April 2021
Due Date	30 June 2021

Statement – Lot 210 DP 1174939

I, [INSERT AUTHORISED REPORTING OFFICER NAME], certify that this audit report is a true and accurate record of the compliance status of MP07_0086 for the period 1 May 2020 - 30 April 2021 and that I am authorised to make this statement on behalf of Northbank Enterprise Hub Pty Limited.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/ information/ documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised reporting officer: Bryant M Stokes

Title of authorised reporting officer: Property Development Executive

Signature of authorised reporting officer:

Date: 22/06/2021

Statement – Lot 211 & 212 DP 1174939

I,Gareth John Hughes, certify that this audit report is a true and accurate record of the compliance status of MP07_0086 for the period 1 May 2020 - 30 April 2021 and that I am authorised to make this statement on behalf of WesTrac Pty Limited.

Note.

a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.

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Name of authorised reporting officer: GARETH HUGHES

Title of authorised reporting officer: GENERAL MANAGER WESTRAC

Signature of authorised reporting officer:

Date: 22-6-21

Table 1.2 – Distribution of Report for EPBC 2007/3343

Government Agency	Email address	Date Sent
Department of Agriculture, Water and the Environment (DAWE)	EPBCmonitoring@environment.gov.au & compliance@environment.gov.au Attention: EPBC Compliance Monitoring Team	14 May 2021

Table 1.3 – Distribution of AEMR No. 11

Government Agency	Email address	Date Sent
NSW Department of Planning, Industry and Environment (NSW DPIE)	Via the Planning Portal	25 June 2021
NSW National Parks and Wildlife Service (NPWS)	Doug.Beckers@environment.nsw.gov.au Attention: Mr Doug Beckers	25 June 2021

2.0 Statement of Compliance

The compliance status of the approvals applying to the project site, Lots 210-212 DP 1174939 for this Reporting Period are summarised below in **Table 2.1**.

Table 2.1 – Statement of Compliance

Were all conditions of the relevant approval(s) complied with?	
MP07_0086	Yes
MOD 1 (as amended by MOD 2)	Yes
MOD 2	No
EPBC Act Approval 2007/3343	Yes

The convention for non-compliances recorded during the Reporting Period is to categorise these according to the risk matrix of **Table 2.2**.

Table 2.2 - Non-Compliance Risk Matrix

Risk Level	Risk Level	Description
High	**High**	Non-compliance with potential for significant environmental consequences, regardless of the likelihood of occurrence
Medium	**Medium**	Non-compliance with: • potential for serious environmental consequences, but is unlikely to occur; or • potential for moderate environmental consequences, but is likely to occur
Low	**Low**	Non-compliance with: • potential for moderate environmental consequences, but is unlikely to occur; or • potential for low environmental consequences, but is likely to occur
Administrative non-compliance	**Administrative non-compliance**	Only to be applied where the non-compliance does not result in any risk of environmental harm (e.g. submitting a report to government later than required under approval conditions).

Source: "Annual Review Guideline, Post-Approval requirements for State significant mining developments (NSW DPE 2015)"

Table 2.3 Non-Compliance

Relevant Approval	Condition No.	Condition Description	Non-Compliance Status	Comment	Section Reference
MP07_0086 Mod 2	12A Part b)	Volume Monitoring of Spillway Flows	**Administrative Non-Compliance**	Monitoring Equipment Failure, however the failure was mitigated with observations and a conservative estimate was made for uncollected data.	**Section 6.3.2 & 6.3.4**

3.0 Introduction

3.1 Site Description

The Project Approval area for MP07_0086 (the project site) is located along Tomago Road between Williamtown and Hexham, north of Newcastle NSW, refer to **Figure 3.1**.

Figure 3.1 – Site Location

The location of matters referred to in this report are represented in **Figure 3.2**.

The project site approval for subdivision of business and industrial development was issued 7 August 2009 by then Minister for Planning Kristina Keneally MP. Approved Stage 1 bulk earthworks were commenced February 2010. Stage 1, WesTrac operations commenced July 2012.

The following notations are made on **Figure 3.2**:

- Existing industrial development to the north west;
- Lot 313 - Existing property and shed owned by NEH to the north;
- Nearest residences:
    - 1 resident to the north west, adjacent to the existing industrial;
    - 1 resident to the north along Graham Drive; and
    - 3 residences to the east along Tomago Rd.
- Lot 1001 DP 1127780 to the south owned by NEH.
- Lot 22 DP 1150980 (NPWS Estate) to the south was dedicated by NEH as Conservation Area (CA) during the Project Approval process. Lot 22 is managed by NPWS.
- Tomago Sandbeds to the north operated by Hunter Water Corporation.
- Lot 210 – undeveloped, owned by NEH.
- Lot 211 – undeveloped, owned by Industria Company No. 2, leased by WesTrac.
- Lot 212 – Stage 1* of the Project Approval, owned by Industria Company No. 2, leased by WesTrac.
- The centrally located signalised intersection of Tomago Road and Westrac Drive (dedicated to Port Stephens Council as public road), were both completed by NEH during Stage 1 of the project.

*Stage 1 definition for approval and management plans having some land inclusions outside of Lot 212, within Lot 210 and Lot 211.

Refer to **Appendix A** for Deposited Plan.

3.2 Purpose of this Report

This report has been prepared in accordance with the "Annual Review Guideline, Post-Approval requirements for State significant mining developments (NSW DPE 2015)" as requested by NSW DPIE. Together with this guideline, the Project Approval annual reporting requirements are as shown below in **Table 3.1**.

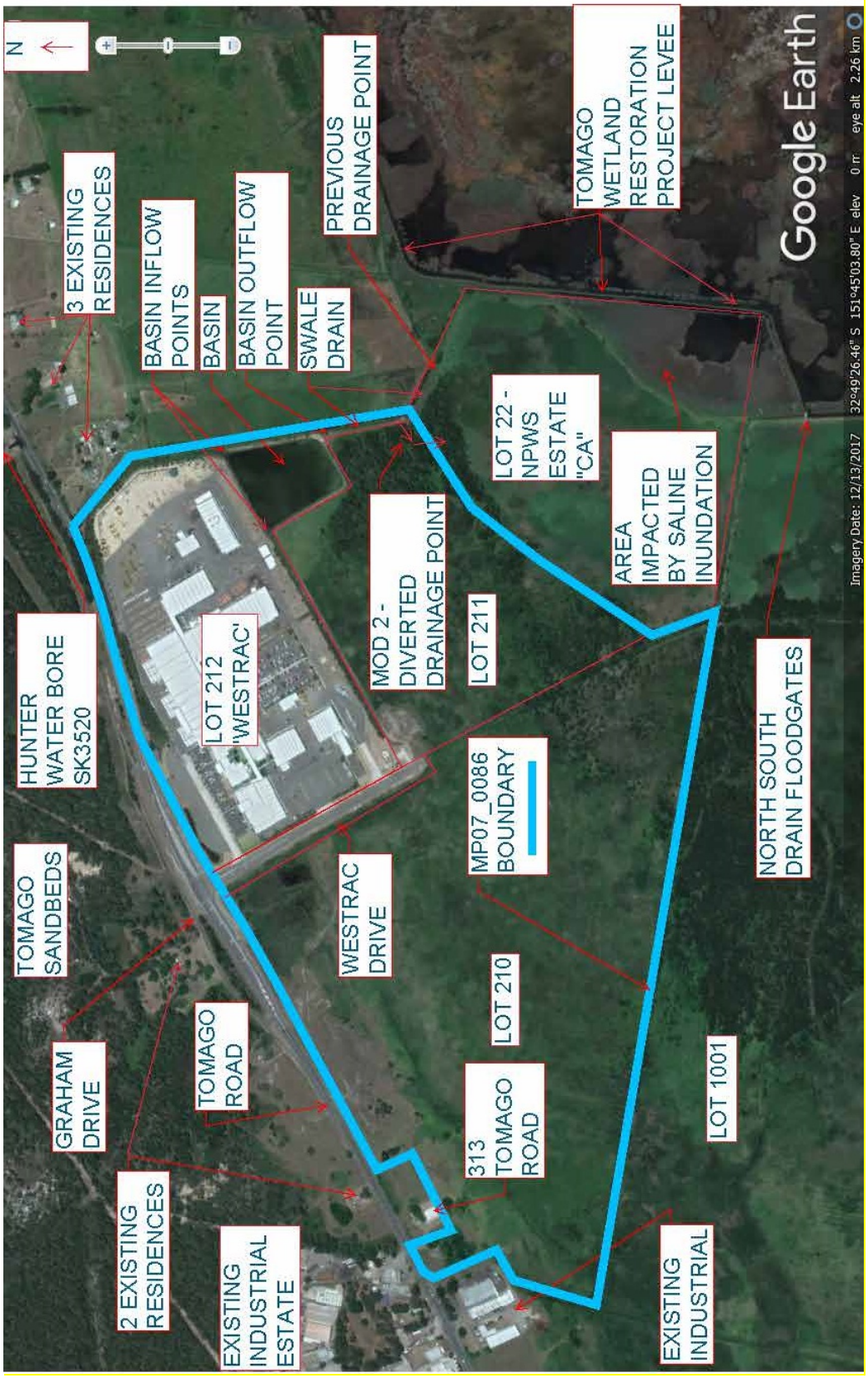

Figure 3.2 – Layout of Report Matters

Table 3.1 – Project Approval Annual Reporting requirements

Condition	Section Reference
Condition 44	
a) Identify the standards and performance measures that apply to the project.	4.1
b) Describe the works carried out in the last twelve months	4.2
c) Describe the works that will be carried out in the next twelve months	4.3
d) Include a summary of the complaints received during the past year, and compare this to the complaints received in previous years	7.0
e) Include a summary of the monitoring results for the project during the past year	6.0-6.5
f) Include an analysis of these monitoring results against the relevant: • Impact assessment criteria/limits; • Monitoring results from previous years; and • Predictions in the EA.	6.0-6.5
g) Identify any trends in the monitoring results* over the life of the project * Refer to Mod2 – Condition 7 below for amendment	6.0-6.5
h) Identify any non-compliance during the previous year	6.3.2
i) Describe what actions were, or are being, taken to ensure compliance	6.0, 6.3.2 & 9.0
Condition 9 – Site Water Balance	
c) (the Site Water Balance must) be reviewed and recalculated each year in light of the most recent water monitoring data	6.3
Mod 1 – Condition 9	
d) compare measured surface water discharges and groundwater inflows, outflows and infiltration, relative to pre-development conditions.	6.3
Mod 2 – Condition 4B	
The Proponent must describe the contingency measures to be implemented, including but not limited to, restoring drainage flows to the existing drainage channel to the south-east, if the alterations to drainage implemented in accordance with Mod 1 are resulting in adverse impacts, as agreed to by the Secretary. The contingency measures must be approved by the Secretary and implemented in a timeframe agreed with the Secretary. For the purpose of this condition, adverse impacts are considered to occur when there is a decline in Phragmites Rushland vegetation cover of greater than 20% in extent and Swamp Oak Sedge Forest greater than 10% in	6.4

Condition	Section Reference
extent on the 22 hectare NPWS reserve to the south of the site, when compared against the Kleinfelder April 2010 baseline report.	
Mod 2 – Condition 12A	
b) report the results of spillway flow monitoring in the Annual Report required under Condition 44 in Schedule 4, including: i. discharge rates and volumes exiting the basin (ie total via the pipe and spillway); ii. a comparison of the rates and volumes described in point i) above with those that would have occurred under pre-development conditions; iii. the rates and volumes for any significant events or when concerns are raised about downstream impacts; iv. annual volumes; and	6.3
c) monitor standing water levels in the sediment basin and drain on the eastern site boundary and report the results in the Annual Report required under Condition 44 in Schedule 4.	6.3
Mod 2 – Condition 7 (italics below)	
44e) Include a summary of the monitoring results *(including groundwater levels data from the Hunter Water Corporation bore SK3520)* for the project during the past year	6.3

4.0 Approvals

The overall site approvals are:

- MP07_0086 -Project Approval signed 7 August 2009
  -MOD1 signed 26 November 2015
  -MOD2 signed 20 June 2017
- EPBC Act Approval 2007/3343.

4.1 Standards and Performance Measures

In addition to the Project Approval, Modifications and EPBC Act Approval, the project works are required to meet the standards and performance measures contained in the following documents:

- Statement of Commitments – November 2007;
- Management Plans approved for the site including:
  - Construction Environmental Management Plan;
  - Stormwater Management Scheme;
  - Soil and Water Management Plan;
  - Site Water Balance;
  - Erosion and Sediment Control Plan;
  - Groundwater Monitoring Management Plan;
  - Acid Sulphate Soils Management Plan;
  - Aboriginal Heritage Management Plan;
  - Wastewater Management Plan;
  - Landscape Management Plan;
  - Management and Monitoring Plan for Wetland;
  - Vector Management Plan;
  - Acoustic Management Plan;
  - Air Quality & Odour Management Plan; and
  - Pre-Clearing Survey.

These management plans were approved by NSW DPIE, noting that the Wastewater Management Plan and associated conditions of the Project Approval were made redundant by connection of Stage 1 to the Hunter Water Corporation regional wastewater network.

4.2 Operations/Summary

WesTrac operated for the full Reporting Period.

In addition to the regular inspections of the basin and embankment made by WesTrac personnel, Torque Projects personnel also completed eight (8) site inspections of monitoring the basin or downstream area during the Reporting Period as follows:

- May 2020;
- June 2020;
- August 2020;
- December 2020; and
- February 2021 (twice); and
- March 2021 (twice).

WesTrac received Development Application (DA) approval from Port Stephens Council for a Proposed Workshop extension being an alteration and addition to Building A – CAT Institute. Construction commenced late 2020. The approval is governed by DA-16-2020-291-2 and this was checked with NSW DPIE.

NEH has corresponded with NSW DPIE during this Reporting Period in relation to completing the pre-commencement conditions of the Project Approval for potential works within Lot 210 adjacent to Westrac Drive. There was no commencement of these potential works on Lot 210 during the reporting period.

WesTrac lodged information with NSW DPIE in April 2021 regarding proposed Machine Test & Demonstration Area in the south west corner of Stage 1.

4.3 Next Reporting Period

WesTrac will continue to operate in the next reporting period. WesTrac's building contractor will complete the alteration and addition to Building A – CAT Institute July/August 2021. WesTrac is proposing a minor modification for the Machine Test & Demonstration Area activity to include the south west corner of Stage 1. Subject to NSW DPIE approval, WesTrac will be aiming to complete the proposed Machine Test & Demonstration Area in the south west corner of Stage 1.

Whilst there has been correspondence with NSW DPIE in relation to future stage requirements and approvals under MP07_0086, there are no confirmed project applications, approvals or certificates obtained for the undeveloped land portions of the site at the time of writing.

5.0 Actions required from previous Annual Review

The previous annual review, AEMR No. 10 for the period 1 May 2019 – 30 April 2020 dated 26 June 2020 prepared by Torque Projects Pty Limited, was accepted by NSW DPIE in their letter dated 9 September 2020 as generally satisfying the reporting requirements of the approval with no further actions required.

6.0 Environmental Performance

The environmental outcomes of the reporting period are shown below in **Table 6.1**.

Table 6.1 – Environmental Performance Summary

Aspect	Approval Criteria/EA prediction	Performance during the Reporting Period	Trend/Key management implications	Implemented proposed management actions
Noise • Operation – Inventory Area • Operation – All other areas • Project Noise Limits	All days – 7am-10pm All days – all times Day, Evening & Night – L_{Aeq} (15min) – 35dB L_{Aeq} (1min) or L_{Amax} – 60dB	No issues.	In July 2019, WesTrac installed sound attenuation mufflers on spray booth extraction fans (as recommended from sound power testing).	Continue management practices, refer to **Section 6.1** for further details.
Water Quality	Compare to natural water quality	Erosion and Sediment Control for workshop extension works observed to be well managed. Water Quality monitoring round was completed. Groundwater quality levels fluctuated, however retesting by Ramboll indicated these were naturally occurring.	Nil	Observed Nitrogen levels in groundwater to be revised for range of background, natural water quality levels. Continue monitoring, refer to **Section 6.2** for further details.

Aspect	Approval Criteria/EA prediction	Performance during the Reporting Period	Trend/Key management implications	Implemented proposed management actions
Water Balance	Record volumes and compare to pre-development conditions for 12 months. Predicted surface water discharge of 197.5ML leaving site during an average rainfall year. Post Approval this was extrapolated for dry and wet years, up to 557ML for a "wet" year.	A conservative assumption was made for estimating flow volumes after spillway sensor failure. The estimated flow quantity of ~323ML, discharged from basin was well within the range of post EA predictions.	Consider increasing the range of regional groundwater component of the water balance, relative to the observed levels.	Continue monitoring, refer to **Section 6.3** for further details.
Discharge Limits	Record and determine flow rates and compare to pre-development conditions	Measured flow rates were satisfactory for significant design storm events.	Nil	Continue monitoring, refer to **Section 6.3** for further details.
Weed in basin	Nil	No issues.	Weeds have on occasion been an issue to the basin outlet. Inspections and the monitoring of both spillway and flow meter water levels can assist to identify accumulation.	Continue monitoring

Aspect	Approval Criteria/EA prediction	Performance during the Reporting Period	Trend/Key management implications	Implemented proposed management actions
Noxious Weeds	General NSW Legislative requirements	No issues, except as reported by Kleinfelder.	Nil	Engage weed eradication as required, in consultation with Council.
Flow Monitor communications	Nil	Pipe Flow Meter -Good. Spillway Flow Meter - Poor	Spillway Sensor performance was almost faultless August 2017-May 2020. Many parts of the overall sensor failed and have now been replaced.	Alternative Contractor being considered. Continue Monitoring.
Lighting	• Comply with AS4282 control of Obtrusive Effects of Outdoor Lighting • No nuisance to surround properties, conservation area or wetlands	No issues No issues	Nil Nil	Continue monitoring Continue Monitoring
Air Quality & Odour	• Dust Control – Construction • Dust Control - Operation	Workshop extension works has been observed to be managed effectively to date. No issues	Nil Nil	Continue monitoring, refer to **Section 6.5** for details Continue monitoring, refer to **Section 6.5** for details.

Aspect	Approval Criteria/EA prediction	Performance during the Reporting Period	Trend/Key management implications	Implemented proposed management actions
	• Odour – Operation (redundant)	No issues	Nil	Nil
MODS 1&2				
Hunter Water Groundwater Monitoring Bore-SK3520	Nil	Background monitoring well data provided by Hunter Water 3 March & 30 April 2021	New minimum regional groundwater level recorded during project site tenure in May 2020, escalated to one of the highest levels by April 2021.	Nil
MOD 2 works • Drain diversion	• Complete diversion works	Completed	Nil	Continue monitoring
• Spillway sensor	• Complete installation within basin	Completed in 2017. Poor performance during this reporting period.	Sensor performance was almost faultless August 2017-May 2020. Many parts failed and have now been replaced.	Alternative Contractor being considered. Continue Monitoring. Refer to **Section 6.3.2 & 6.3.4.**
• Spillway	• Discharge rates and volumes exiting the basin (ie total via the pipe and spillway) including pre-development;	Completed	Nil	Continue monitoring, refer to **Section 6.3** for details.

Aspect	Approval Criteria/EA prediction	Performance during the Reporting Period	Trend/Key management implications	Implemented proposed management actions
• Vegetation Monitoring	• Monitor and compare to limit of impact (decreases) to Freshwater Wetland area >20% and Forested Wetland area >10%	Completed by Kleinfelder, +0.7% Freshwater Wetland area, +3% Forested Wetland compared to baseline	Nil	Continue monitoring, refer to **Section 6.4** for details.

6.1 Noise

Management and Monitoring

WesTrac with it's consultant Global Acoustics, completed sound power testing and acoustic modelling for design of acoustic attenuation mufflers to the targeted source being the spray booth ventilation fans. The mufflers were installed July 2019, with associated monitoring undertaken 30 July 2019.

Results, Comparison and Further Actions

There are no further actions required and no acoustic complaints have been received for this Reporting Period. WesTrac maintains on-site, acoustic management practices.

6.2 Water Quality

Management and Monitoring

Existing environmental management controls within Stage 1 for water quality improvement and protection are as follows:

- Network of groundwater monitoring wells;
- Sixteen (16) Gross Pollutant Traps around the hardstand;
- Spill kits around the hardstand;
- A refined fuels/oils sensor at the basin outlet which:
    - Records level readings every 10 minutes; and
    - Contains an alarm, which if triggered by a high level reading, immediately sends notification to WesTrac and Torque Projects Pty Limited for response.
- Water Level control structure on basin which can be shutdown the pipe outlet in the event of a water quality emergency.

There have been no detection levels in the refined fuels sensor sufficient to raise the alarm since operating. If in the event an alarm at this point is triggered the process is as follows:

- Notify NSW DPIE and National Parks immediately; and
- Install boards in water level control structure at basin outlet; and
- Assess the matter for clean up with spill kit and consultant as required.

Ramboll Pty Ltd (Ramboll) conducted Groundwater Monitoring Event 12 (GME 12) on 12 March 2021 for the project area. GME 12 comprised of laboratory testing for the complete suite of groundwater and surface water analytes. Their report is attached as **Appendix C**.

Sample coverage, for the water monitoring locations shown in **Figure 6.1**, was as follows:

- Four (4) surface water samples were collected located down-gradient of the Industrial facility (SW1), Existing Drain adjacent to Westrac Drive (SW2), adjacent to the Tomago Rd/Westrac Drive intersection (SW3a) and Graham Drive.
- Six (6) groundwater samples (MW2, MW4, MW6, MW8, MW10 and MW11) located down-gradient from the industrial facility and one sample located up-gradient at well MW8.

Resampling of MW2 was completed 15 April 2021. This was owing to results identified by Ramboll in the first round of sampling.

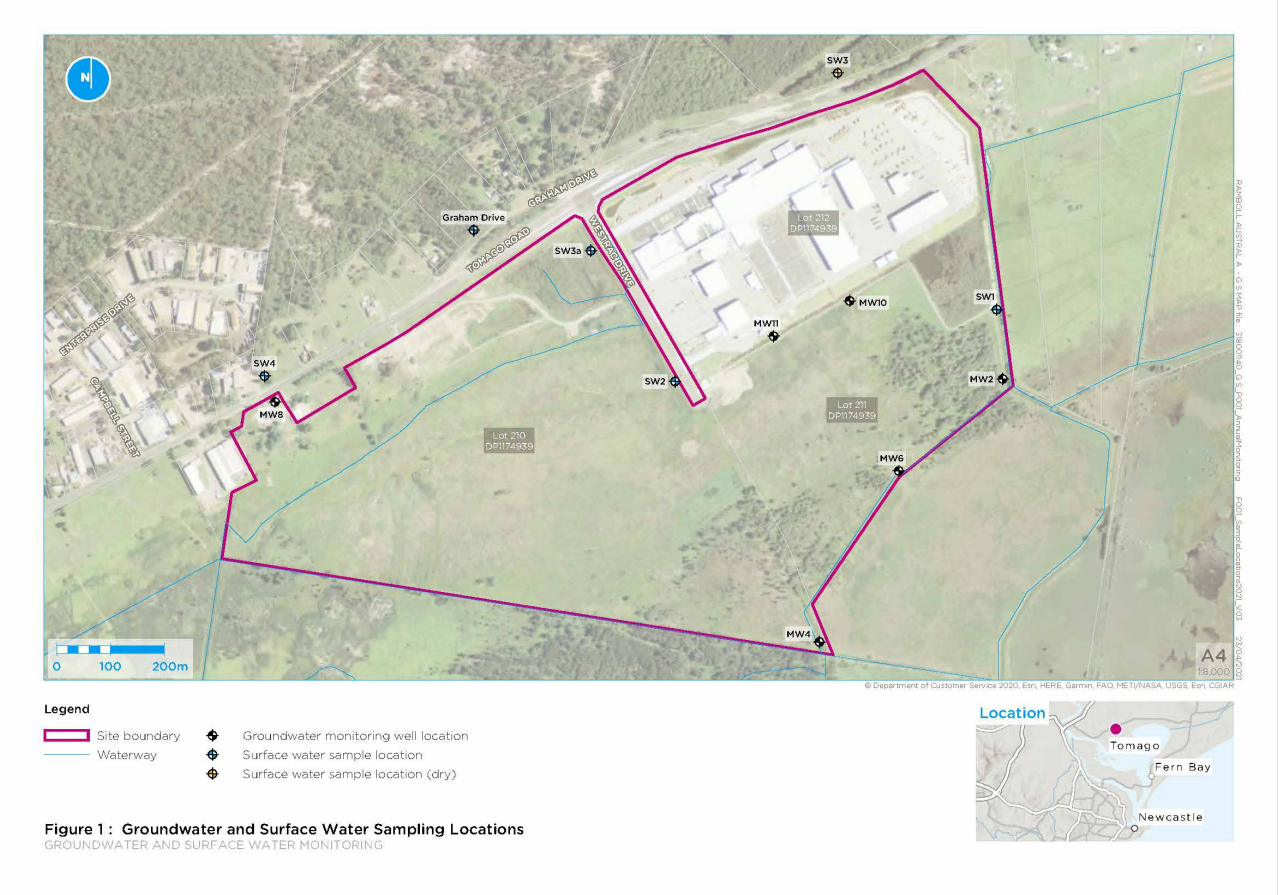

Figure 1 : Groundwater and Surface Water Sampling Locations
GROUNDWATER AND SURFACE WATER MONITORING

Figure 6.1 – Water Quality Monitoring locations (Courtesy of Ramboll 2021)

Background data of the natural water quality for the site and the immediate surrounds is extensive and the sources include:

- Monitoring rounds of the MP07_0086 project adjacent by Coffey Geotechnics (2007), Enviropacific (2010-2011);
- Monitoring round from September 2011 by Douglas Partners on Lot 1001;
- NPWS (2008-2011);
- Hunter Water (1987-2006) (requested only from the same side of the Tomago Sandbeds groundwater divide); and
- Tomago Aluminium (2010-2012).

Results, Comparison and Further Actions

A summary of the monitoring results for location SW1, basin outlet, and previous Monitoring Events are summarised below in **Table 6.2**.

Table 6.2 – Comparison to previous levels at SW1

Event	TDS (ppm)	TKN (mg/L)	TP (mg/L)	pH
GME 12	84	2.3	0.19	6.57
GME 11 (2020)	44	1.2	0.16	7.08
GME 1-10	0-463	0.4-1.8	0.01-0.16	5.8-8.85
Comparison	Within range	**Above range***	**Above range***	Within range

*-these results are marginally above range of SW1 and within the range of previous site and background monitoring results.

A summary of the Groundwater Monitoring Events for all locations are summarised below in **Table 6.3**.

Table 6.3 – Comparison to previous levels for all locations

Event	DO range (ppm)	pH range	Redox Potential (mV)	Total Suspended Solids (mg/L)	Elec. Conductivity (uS/cm)
GME 12	0.0 – 3.47	5.31-7.51	-189 - +76	8-1,720	130-3,410
Background, GME 1-11	0.06-102.1	4.6-9.34	-215 - +179	0-25,200	6.1-50,900
Comparison	**Below range**	Within range	Within range	Within range	Within range

The following presents a summary of results directly from the Ramboll Report:

- *Low pH levels were reported in the groundwater samples, MW10, MW11 and background well MW8 which is consistent with the last sampling round.*
- *TSS was above the human health criteria at SW2 and SW3a, collected from the creek. These samples were highly turbid.*
- *Concentrations of ammonia, total phosphorous, total cadmium, chromium, copper, lead, manganese, zinc and iron were reported for one or more surface water samples above the ecological and/or human health criteria. This is the first time since 2018 that all surface water samples were analysed. The results are higher than 2018, the higher metals concentrations correlate with the highly turbid samples reported at SW2 and SW3a.*
- *Concentrations of sulphate, chloride, ammonia, total phosphorous, dissolved chromium, manganese and iron were reported for two or more groundwater samples above the ecological and/or human health criteria; however results were consistent with results from the previous sampling round.*

- *Several LORs were above the ecological and/or human health criteria for mercury, OCP/OPP/PCBs, phenols and PAHs.*
- *Detectable concentrations of phenol, 3- & 4-Methylphenol and toluene were reported in MW2, however were below the guideline value for phenol and toluene and no guideline value is currently available for 3- & 4-Methylphenol. MW2 was resampled on 15 April 2021 and reported PAHs and phenols below the LOR and a lower toluene concentration of 23µg/L.*
- *Detectable concentrations of all TRH compounds were reported for MW2. TRH with Silica Gel Cleanup was undertaken to obtain a better representation of the 'petroleum hydrocarbons' in the sample. The results reported concentrations below the LOR for >C10 - C16 Fraction, >C16 - C34 Fraction and >C34 - C40 Fraction indicating significant levels of non-petroleum hydrocarbon interferences in the original sample. Resampling of MW2 reported a concentration of 20µg/L was reported for C6 - C10 Fraction and 230µg/L was reported for >C16 - C34 Fraction.*
- *Detectable concentration of >C16 - C34 Fraction was reported for Graham Drive. TRH with Silica Gel Cleanup was undertaken to obtain a better representation of the 'petroleum hydrocarbons' in the sample. The results reported concentrations below the LOR for >C10 - C16 Fraction, >C16 - C34 Fraction and >C34 - C40 Fraction indicating significant levels of non-petroleum hydrocarbon interferences in the original sample.*
- *All remaining samples reported concentrations of BTEXN, PAH, OCP/OPP, PCB and phenols were all below the limit of reporting.*
- *All other analytes were below the ecological and human health criteria at the groundwater wells.*
- *The elevated concentrations above the ecological and human health criteria are not of concern as they likely represent the natural existing conditions in the low-lying swampy marshland of the site and results were consistent with results from the previous sampling round.*

The Ammonia level recorded in the groundwater sample of MW2 was found to be 55.6mg/L, much higher than previous records. Ramboll advised this was due to natural occurrences, providing the following explanation:

Nitrogen concentrations can vary over time in relation to seasonal phenomena and with episodic events. Background information on the different forms of nitrogen in response to environmental conditions is provided in Appendix 5 (Ramboll Report).

Large precipitation events occurred the month prior to sampling, with higher than average rainfall for the months of February and March. During the sampling event, it was noted that the ground was extremely wet and waterlogged, and the creek was higher than observed in previous years. The water clarity was extremely low, black/ brown in colour and a strong organic Nicole was noted. Water quality results showed increased TSS, ammonia, TKN, TN, TP and decreased nitrate and nitrite concentrations. The higher concentrations of TSS, ammonia, TKN, TN and TP during this sampling event is a response to the increased rainfall. This is typically associated with increased inputs of suspended particulate matter which carry attached TP and TN. The groundwater reported reducing conditions (-155mV) and had low dissolved oxygen (0.18mg/L). This is due to an influx of oxygen demanding sediment, dissolved

organic material and decay of natural organic material. The increased TN, TP and ammonia from decaying natural organic material is further supported by the TRH with silica gel clean up results which reported non-petroleum hydrocarbons of likely biologic origin at MW2. The notably higher TSS is indicative of an increase in sediment and algae particles that are floating in the water column from the increased rainfall. Lower concentrations of TN, TKN, TP and TSS have been reported in the past as sampling was undertaken during relatively dry periods. The high concentrations of TSS, ammonia, TKN, TN and TP are due to high rainfall and decay of natural organic materials under suitable environmental conditions. It is unlikely to be due to anthropogenic activities based on surrounding sample locations, site use, and previous sampling results. For further details, the full report by Ramboll is contained in **Appendix C**.

Beyond individual results, concentrations of a range of heavy metals have been found previously to be higher than the adopted assessment criteria (Combination of Drinking- NHMRC Health based and ANZECC guidelines – Lowest of 95% Marine and Fresh criteria). Elevated metal readings have been common through previous GME's, being a regional water quality characteristic and considered likely to be naturally occurring.

Wildlife continue to be observed using the basin remaining as a good indicator of environmentally acceptable water quality.

6.3 Water Balance

Management and Monitoring

6.3.1 Rainfall & Regional Groundwater

Williamtown RAAF, Bureau of Meteorology Station No. 061078 (Williamtown), located approximately 7km from the site has been used for records of daily rainfall since project inception. **Figure 6.2** below details individual monthly breakdowns for rainfall at Williamtown.

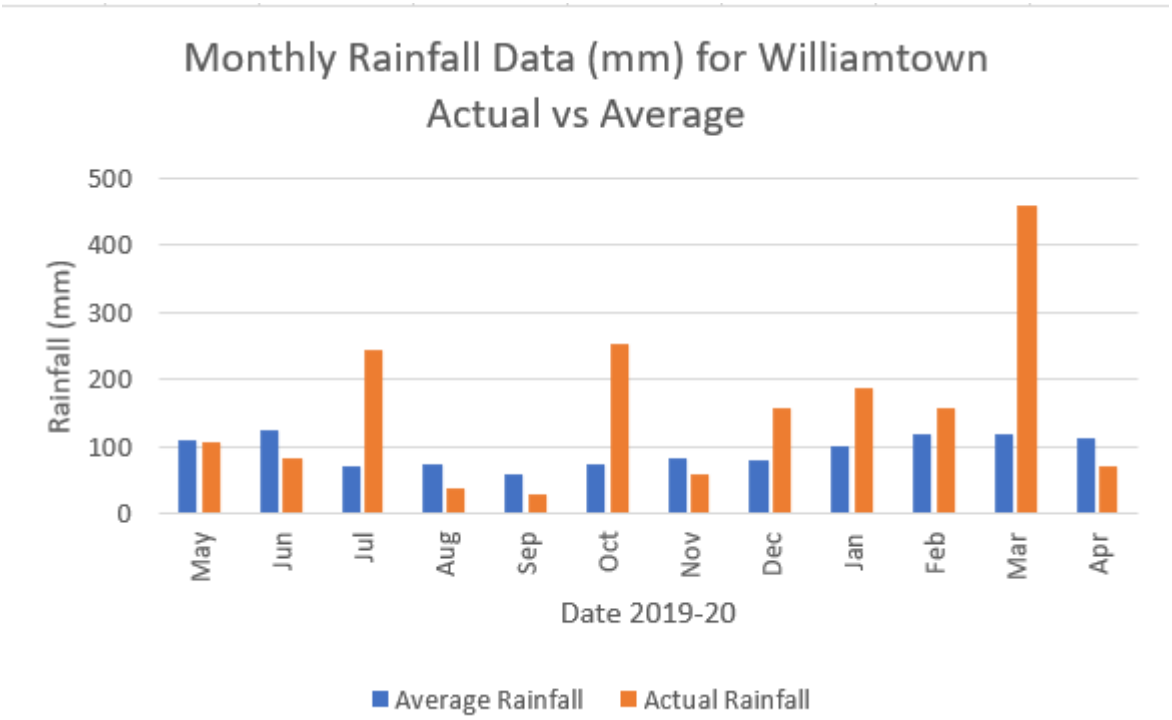

Figure 6.2 – Williamtown Monthly Rainfall (mm) Actual vs Average

This reporting period was a record rainfall level for Williamtown, since record keeping of daily rainfall commenced in 1942. The annual total for this reporting period was 1836.8mm, far exceeding the average annual rainfall level for Williamtown of 1123.2mm. The previous highest total was 1793mm in 1963. Both 1963 and this reporting period greatly exceed the Decile 9 rainfall level for Williamtown of 1466mm.

From **Figure 6.2**, the month of March 2021 received a significant level of rainfall recording 459.2mm. This data captures the March storm event which brought significant damage at many locations along the entire NSW Coast. This also followed a very wet summer with December, January and February combining to a total of 500mm of rainfall, which is well above the average rainfall of 297mm for the summer season. The overall, cumulative total of rainfall depicts the rainfall total more accurately. Actual rainfall was only marginally above average until September, after which point the monthly rainfall totals

then escalated to the record cumulative total for the reporting period. High monthly totals were also recorded in July and October 2020. Refer to **Figure 6.3**.

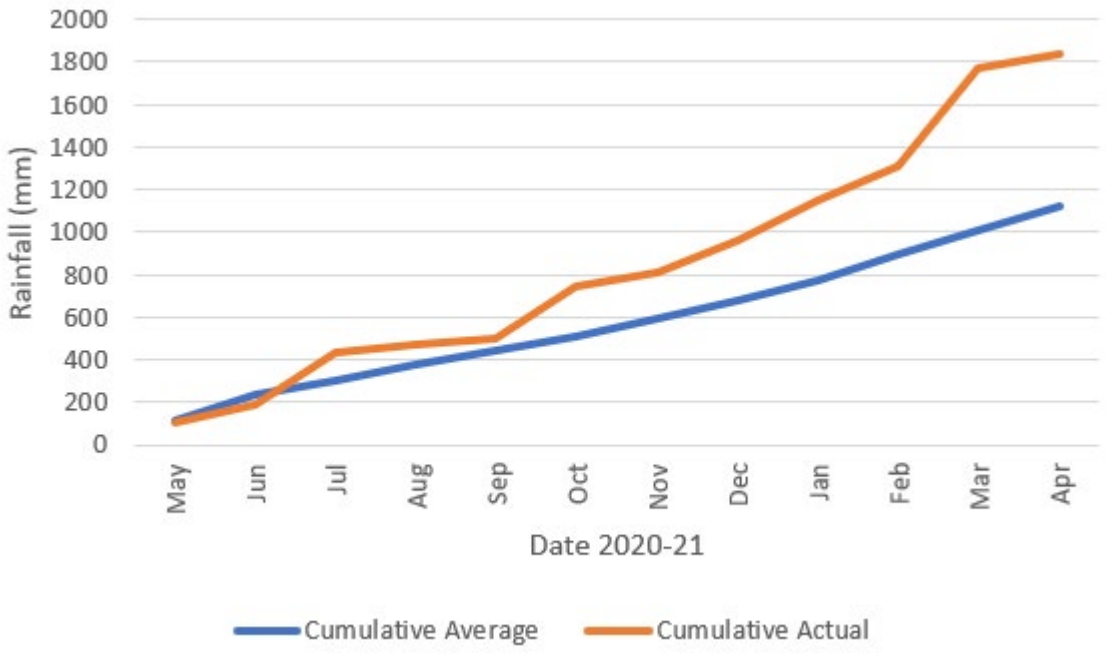

Figure 6.3 – Cumulative Rainfall for Williamtown over the Reporting Period

The Hunter Water bore data for SK3520 is an existing groundwater bore north east and upgradient of the project site, refer to **Figure 3.2** for the location of the bore. Levels have been consistently recorded monthly by Hunter Water for SK3520 since April 1976, representing approximately 45 years of data collected. Hunter Water bore data for SK3520 reflects the rainfall conditions and accumulation of rainfall infiltration as a nearby measure of the regional groundwater levels in the Tomago Sandbeds.

The monitored regional groundwater levels for this Reporting Period were initially dominated by the level from the previous dry year. The recorded level of 1.1mAHD on 2 May 2020 was the lowest experienced during project tenure. More recently Hunter Water officers advised there was significant pumping of the Tomago Sandbeds for water supply owing to the drought, also potentially reducing the level too – no other details have been provided. The rainfall took time to top up the regional groundwater level. However by April 2021, this level had reached 2.8mAHD which is in the vicinity of the maximum groundwater levels recorded, noting that this one off reading for April was likely to have been exceeded in late March. The monthly regional groundwater levels for this Reporting Period are shown below in **Figure 6.4**.

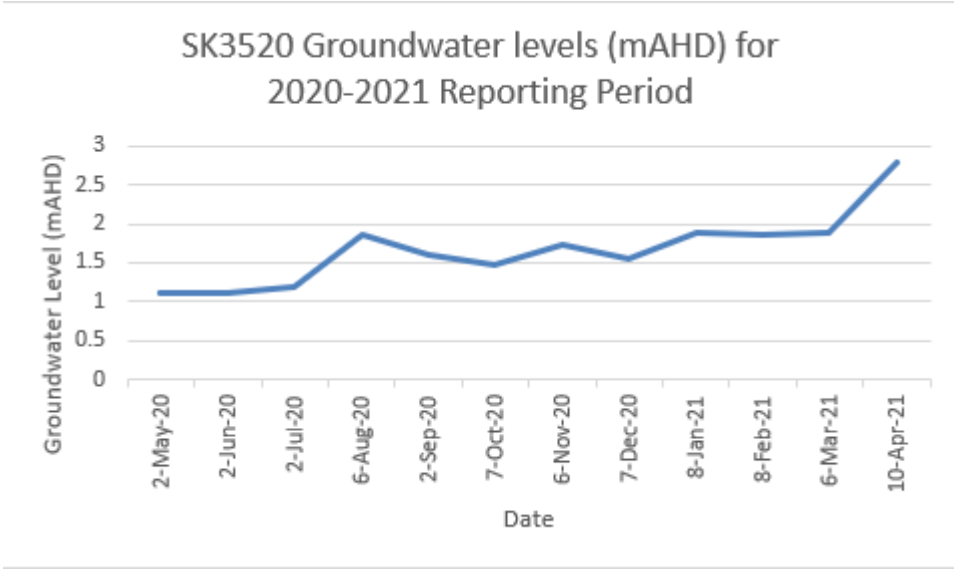

Figure 6.4 – Groundwater Levels (mAHD) for Bore SK3520 during the Reporting Period

In **Table 6.4** below, the average, maximum and minimum regional groundwater levels for this Reporting Period are compared to the results for different time periods prior to this Reporting Period.

Table 6.4 – Comparison of Regional Groundwater Levels Statistics

Regional Groundwater Level – SK3520	Long Term (all records) 1976 - April 2021	Since Construction Commencement Feb 2010-April 2021	This Reporting Period May 2020-April 2021
Average Level (mAHD)	1.94	2.07	1.67
Minimum Level (mAHD)	0.57	1.10	1.10
Maximum Peak Level (mAHD)	3.37	3.37	2.80

From **Figure 6.4,** it can be seen that the regional groundwater level in the previous year was impacted by the lack of rainfall and potentially the pumping as advised by Hunter Water. The following observations are made:

- The groundwater levels generally showed an increase in level with increasing rainfall throughout the reporting period, coming off a low level base in May 2020.
- The minimum level at the beginning of the reporting period in May 2020 was 1.1mAHD, which was the lowest level experienced upslope of the site since project inception in February 2010. Although the minimum recorded level has dropped another 530mm lower to 0.57mAHD previously in February 1994.
- The measured groundwater levels from March 2021 to April 2021 were 1.88mAHD to 2.8mAHD respectively, a sharp increase of level commensurate with the high level of rainfall in March 2021.

Statistics for SK3520, adjusted for inclusion of the levels recorded during the Reporting Period are as follows:

- The long-term average level, including the results for this Reporting Period up to April 2021 is now ~1.94mAHD.
- The average level for February 2010 (construction commencement on site) to April 2021 is ~2.07mAHD.
- The average level during this Reporting Period was ~1.67mAHD, 270mm below the long term average.
- The low base level of regional groundwater remained affected by the previous low rainfall conditions.

Note that because readings are taken only once per month, actual peaks of water level will fluctuate between readings.

6.3.2 Basin Monitoring Equipment

Xylem established the water monitoring systems on site at the inception of operations in July 2012. The basin spillway sensor was installed 11 August 2017.
The reliability in previous years has been exemplary. In summary,

- AEMR 2018 – Downtime of ~3 weeks
- AEMR 2019 – Continuous, no downtime.
- AEMR 2020 – Continuous, no downtime.

The pipe flow sensor continued to provide reliable coverage of flow monitoring, ~10 weeks' downtime and some of this time was during periods of no flow. However, unfortunately, we have been let down in this reporting period with the spillway monitoring equipment. The decision was made to replace it. During the replacement, Xylem progressively advised us of a number of different components associated with the spillway monitor, as failing. Supply of new components were delayed and the brand new spillway monitoring device also failed on installation.

In addition to the equipment failure and delays, we have also observed Xylem having increasing difficulty with their service levels owing to a Williamtown PFAS monitoring contract as we understand it. The environmental monitoring setup is highly customised and specialised unable to be addressed by general trades people. The drop in service levels by Xylem, reached the point that WesTrac is highly likely to proceed with another competent and experienced company, Cbased Environmental, following completion of the Xylem contract of works. Cbased Environmental has provided pricing of both new equipment as well as pricing ongoing support and maintenance. A summary of the Flow Meter reliability for both pipe flow and spillway is shown below in **Table 6.5**.

Table 6.5 – Flow Meter Reliability for AEMR 2021

Date	Pipe Flow Meter Working?	Spillway Flow Meter Working?	Comment
1-31 May 2020	Yes	Yes	• 29 June 2020 Xylem inspected and advised that the Solar Regulator had failed for the spillway monitor had to be left disconnected. • 24 July Xylem visited site with new Solar Regulator, however sensor was unable to be restarted. • 9 August 2020 – Xylem provided a quote for replacement of the spillway sensor and a new type of apparatus for same. • 10 August 2020 WesTrac authorised Xylem's quote. • Xylem installed the apparatus but was experiencing a delay in the supply of the spillway sensor. • 10 February 2021 Xylem advised us of a different failure – SDI-12 Circuit Board. • 1 March 2021 – Xylem advised "out of box failure" on the new sensor – a warranty replacement. • 30 March 2021 – Site visit with Cbased Environmental for quoting maintenance & support, including replacement monitoring equipment.
31 May – 30 June 2020	No	No	
30 June 2020 – 4 February 2021	Yes	No	
4 February 2021 – 28 February 2021	No	No	
28 February 2021 – 19 March 2021	Yes	No	
19 March 2021 – 7 April 2021	No	No	
8 April 2021- 30 April 2021	Yes	No	

The mitigative measures undertaken to compensate for the equipment not functioning were as follows:

- Increased number of site inspections – following peak rainfall events and during times when both pipe and spillway flow meters were down;
- Increased observations of pipe flow readings for potential spillway flows occurring based on the level of flow;
- Inspections were undertaken of the peak flow debris line remaining on the concrete spillway to record peak levels following rainfall; and
- For the purposes of reporting, a conservative estimate of annual flow volume was also calculated for the times when the spillway flows may have occurred without the spillway meter functioning or when both meters were not functioning (Refer to **Section 6.3.4**).

We remain confident that the spillway performed to design despite the basin spillway monitoring equipment being down. The mitigative responses to record events during this reporting period and the previous records continue to confirm that the performance of the basin remains to design. In AEMR

2018, a design storm event of almost 20 year design levels was monitored and recorded to design levels. The spillway has also managed the storm events of April 2015 and July 2016 which were 1:50 year design storm levels at Williamtown.

6.3.3 Significant Rainfall Events

There were a few significant rainfall events during this reporting period.

26 July 2020

On 26 July 2020, 106.2mm of rainfall was recorded at Williamtown in 4.5hr. This event was greater than 20 year, and almost a 50 year, design storm intensity for this duration. This was following 23.4mm rainfall commencing the night before. Spillway flows occurred with monitoring equipment not functioning. The peak level over the spillway was observed to be a depth of 240mm, based on debris, refer to **Plate 6.1**. The combined peak flow of pipe and spillway for this storm duration was measured and calculated to be 490L/s, which is less than the 1:20 year design storm existing flow rate of 3.73m^3/s.

Plate 6.1 – Debris on Spillway from 26 July 2020

24-26 October 2020

On 26 October 2020, 186.6mm of rainfall was recorded at Williamtown in 12 hours. This event exceeded a 100 year design storm intensity for this duration. The total event was ~228mm of rainfall over 3-4 days. This storm event occurred on the base of a low regional groundwater level at commencement and following a dry September of only 28mm rainfall. The monitoring indicates that ~35-40mm of rainfall of the event was absorbed before pipe flows commenced from the basin. Furthermore, depleted rainwater tank storage and the continuing high infiltration rate maintained via low groundwater levels will all have contributed to reducing the runoff volume entering the basin. The peak flow through the pipe suggests that perhaps the runoff from this event was managed via pipe only. However if there were any pipe entry blockages, then potentially there was some minor level of spillway flows during

this event. For these reasons and based on past basin performance during significant design storms, it is highly unlikely that any spillway peak flow was close to the peak design storm flows for this duration, 1.57m^3/s or 3.68m^3/s in the predicted post development and pre-development states respectively.

March 2021 Event

The March 2021 event was 459.2mm of rainfall recorded at Williamtown was significant occurring on the back of 500mm of rainfall over summer. The March 2021 event for Williamtown didn't surpass the monthly total rainfall record of 599.6mm which occurred in February 1990. The records for Williamtown indicate that the March 2021 event had no great intensity of rainfall, rather it was the long duration of consistent moderate rainfall which was significant. From 13 March – 25 March, approximately 13 days, a total rainfall level of 423.8mm was recorded at Williamtown.

There was no obvious debris line for this event on the spillway concrete at 22 March 2021. Trickle flows were observed at ~10mm depths over the spillway on 22 March 2021 and no scour was observed at the basin outlet surrounds. In terms of water quality, during the construction period of the workshop extension works, water quality was observed to be very clear not carrying any visible sediment levels from the workshop extension works, refer to **Plates 6.3 & 6.4**.

At the 22 March 2021 inspection, Cabbage Tree Road near Newcastle Airport was experiencing road hazard flooding, refer to **Plate 6.2**. There was no such flooding in the vicinity of Westrac Drive, Graham Drive or Tomago Road of the Project boundaries. The existing drainage has appeared to have coped very well. The basin spillway was inspected at this time, refer to **Plates 6.3 & 6.4**.

Plate 6.2 – Cabbage Tree Road flooding near Airport during March 2021 event

Plates 6.3 & 6.4 – Spillway at 22 March 2021. 330mm of rainfall in 5 days prior, ~10mm depth over spillway – umbrella used for water depth perspective. Clear water quality.

The Hunter River was monitored via the Department's online tracking system of peak flood heights. There was no Hunter River inundation of the site. Drone photography of the site 31 March 2021, refer to **Plates 6.5 & 6.6**.

Plate 6.5 – Drone shot facing east, from southern boundary of Lot 210 facing the south east corner of Lot 210 & all of Lot 22, 31 March 2021

Plate 6.6 – Drone shot facing north west toward 313 Tomago Road & Campbell Street from southern boundary of Lot 210, 31 March 2021

The drone shots taken 31 March 2021 after a record 1836.8mm for 12 month reporting period, well above average rainfall during summer and 459mm in March 2021, showed the site to have performed very well in terms of drainage.

6.3.4 Calculations

The basin water level typically reflects the levels recorded for SK3520 and there were extensive periods of no flow from the basin during this Reporting Period. Regionally, elevated groundwater inflows from Tomago Sandbeds into the basin are both identifiable as basin outflows continuing long after a storm event, or unidentifiable as permanent water level top up of the starting storage of the basin. This groundwater, is regarded as base flows through the basin, and has previously been observed in the approximate range of 0.1-3L/s as confirmed by elevated regional groundwater levels at SK3520 upslope of the site. Apart from rainfall accumulation, starting levels and lag/response times, the base flow rates are also influenced through the site by:

- Downstream water levels off site;
- Evaporation rates off the basin surface area occurring in winter or summer; and
- Drain maintenance on adjoining property.

Hunter Water officers have advised their own pumping of the Tomago Sandbeds was potentially reducing regional groundwater levels during the drought too.

The magnitude of the base flows in terms of volume contributing to the water balance can be substantial over time. The calculated volume range for 6 months duration (180 days) is shown below in **Table 6.6**.

Table 6.6 – Typical Base Flow Rate Contribution to Water Balance

Flow rate (L/s)	Duration (no. of days)	Volume (ML)
0.1	180	1.5
0.5	180	8.0
1.0	180	15.5
2.0	180	31.0
3.0	180	46.5

In the first 10 months of this Reporting Period, the peak regional groundwater level did not reach the long term average water level. Therefore it has been assumed that there were no contributing baseflows to the water balance volume calculations. In the remaining 2 months – March and April 2021, the Hunter Water data for SK3520 indicates regional groundwater levels rose significantly to 2.80mAHD at 10 April 2021. After consideration of basin lag times for the slow drawdown following rainfall, this level has corresponded to a considerably higher base flow through April and based on actual data, potentially 6-7L/s. Potentially this equates to 5-10ML of base flows observed contributing to the site discharge volume calculation result following flow meter reinstatement from 8 April 2021.

In lieu of no monitored spillway volume data, a conservative approach was taken to estimate flow volumes and water balance for this reporting. Where no monitoring recorded data exists and there were potential or actual spillway flows, 100% of the rainfall during these larger storms was assumed to have discharged from the site. The usual reductions of runoff quantity from observed rainfall quantity from the basin, such as infiltration and rainwater tank storage were neglected for the purpose of this conservative calculation. Similarly this estimation was done for times when both meters were down, for an annualised estimate of runoff discharged from the site. Although this is an overestimate, the quantity by how much is undetermined. The result however still provides a useful comparison of annual flow volume.

- The total rainfall for the reporting period was 1836.8mm, a total of 457.4ML over the catchment.
- With no corresponding discharge measured, the rainfall was deducted for June – 81.6mm, 4-28 February 136mm and 19 March to 8 April – 211mm, a total of 428.6mm (Refer to **Table 6.5**).
- Furthermore, there were either observed or potential spillway flows 26 July 2020, 26 October 2020 and 18 March 2021. The rainfall total for these periods was 307.6mm.
- The remaining rainfall having occurred on site for which pipe flow data was collected is 1,100mm. This is an inflow of 273.9ML.
- The measured pipe outflow data for this corresponding rainfall, 273.9ML, is 145ML, potentially including 5-10ML of base flows for April 2021.
- The remainder of rainfall, 273.9ML - 145ML = 128.9ML having been either infiltrated, evaporated or stored and re-used in the rainwater tank storage and possibly some basin lag time.
- With the addition of 100% rainfall over the catchment for the times of missing data = 428.6mm + 307.6mm = 736.2mm, an assumption of 100% discharge of this rainfall as runoff volume is 183.3ML. The assumed conservative discharge total is then estimated to be 145ML+183.3ML = 328.3ML.

The flow meter installed at the basin outlet in June 2012 measures the flow level at ten minute intervals across a v-notch weir for which a discharge volume can be calculated for water balance purposes. Records from the flow measure unit for pipe and spillway sensor monitored levels are both sent daily to WesTrac and Torque Projects.

The peak flows leaving site measured throughout the year are very low for a 24.9 hectare developed site, attesting to the water reuses and basin's continued capacity to attenuate flow in accordance with its design. There was no damage to the spillway and swale drainage throughout the year, having satisfactorily controlled discharge in compliance with design objectives.

A condition of Mod 2 requires the annual water balance to be compared to those occurring under pre-development conditions. The Soil and Water Management Plan water balance contains only the balance for an average rainfall year. There was no environmental assessment or management plan prediction made for either wetter or drier than average rainfall conditions. Elevated regional groundwater levels and their accumulated lag time from rainfall are integral to groundwater contributing to surface water

drains upgradient of the site. This makes pre-development flow volumes highly variable, when annual rainfall varies from average.

Standing water levels on the eastern boundary within the site are represented by a level measured at 10min intervals at the v-notch plate by the flow meter other than during large storms. This drain is a trapezoidal channel shape constructed as part of Stage 1 for conveyance of basin outflows containing vegetation and diverted as part of the Mod 2 works onto Lot 22.

However this year, being the second successive year of dry conditions and reduced rainfall and the confirmed regional groundwater levels for SK3520 confirmed that there was a range of little to no baseflows contributing to inflows.

In summary, the water balance is shown below in **Table 6.7**.

Table 6.7 – Water Balance

Actual Rainfall Quantity (ML)	**Estimated Above Average Groundwater Inflow Range (ML)**	**Pipe Flow + Spillway Flow (ML)**	**Infiltration, Evaporation and Water Collection for Reuse Range (ML)**	**Actual Surface Flow Leaving Site (ML)**
Inflows		Outflows		
457.4	5	Actual Pipe Flow – 145ML plus 183.3ML*	128.9	**323.3***

*- conservative estimate of 100% rainfall as discharge from site during times of missing data due to equipment failure.

The estimated water volume for the site post development was ~323.3ML for the full year from a rainfall volume of 457.4ML. The recorded actual surface flow leaving site was less than predicted for the record rainfall, due to months of less than average regional groundwater levels. The groundwater level was recovering from the low base level at the end of the previous reporting period in April. A very high level of water uses within WesTrac operations has been maintained.

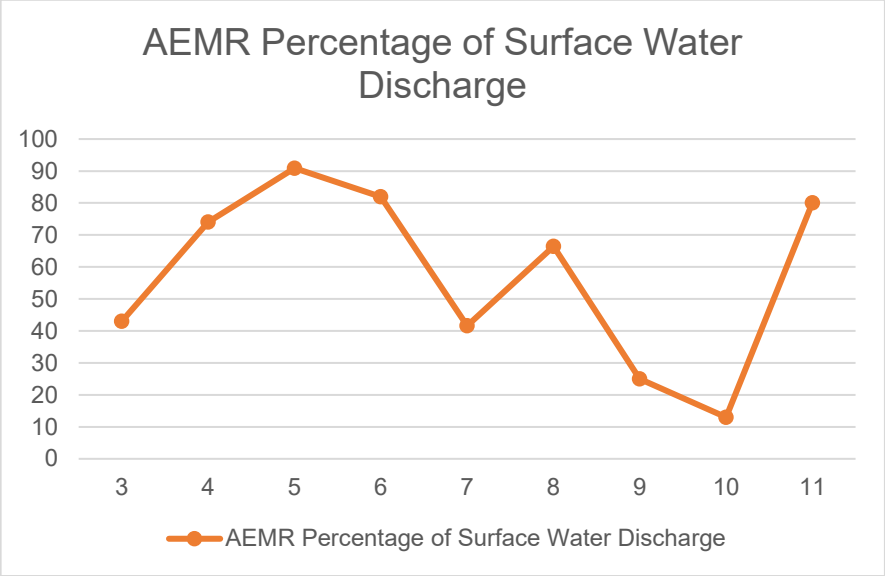

Figure 6.5 – Graph of Actual Surface Water Discharge* leaving site as a Percentage of Predicted Discharge

*AEMR 8-11 are full year

AEMR 11 – 323.3ML/407ML = 80% (Table 6.8)

Water balance analysis indicates that actual flows have remained less than predicted surface water discharge during Stage 1 operations. The average water balance prediction from the Environmental Assessment was calculated to be 197.5ML. Rainfall conditions of this reporting period were well in excess of average conditions. In accordance with previous NSW DPIE requirements, the long-term annual rainfall statistics for Williamtown have been used for Dry, Average and Wet scenarios of:

- Dry, Decile 1 – 844.2mm
- Average - 1123.2mm
- Wet, Decile 9 – 1473.5mm

The Dry, Average and Wet Rainfall scenarios are shown below in **Table 6.8**.

Table 6.8 – Dry, Average and Wet Scenarios

Scenario	Actual Rainfall Quantity (ML)	Above Average, Groundwater Inflow Range (ML)	Infiltration, Evaporation and Water Collection for Reuse Range (ML)	Predicted Surface Flow Leaving Site (ML)
Dry	210	0-40	190-70	20-180
Average	280	0-100	100-40	180-340
Wet	367	100-200	60-10	407-557

The actual rainfall quantity calculated for this reporting period was 457.4ML well in excess of the "Wet" scenario of 367ML rainfall in **Table 6.8**. This is owing to the record rainfall level of 1836.8mm, significantly more rainfall than the Decile 9 rainfall total of 1473.5mm used to generate the "Wet" scenario. However it would be incorrect to assume a predicted discharge from the site as being higher than the Wet scenario due to other factors, even though rainfall was significantly higher.

In summary, we had the wettest 12 months rainfall period on record, occurring mostly over below average regional groundwater levels. Results indicate there was a natural offsetting of the high rainfall infiltrating due to the low regional groundwater level, reducing the discharge volume occurring as runoff. Additionally the Hunter Water officer's advice of Sandbed pumping may also be contributing to the lower regional level. The conservatively estimated, predicted discharge from the site for the reporting period was within the range predicted for an "Average" to "Wet" rainfall year. It was not a typical set of weather conditions to pick from **Table 6.8**, during this reporting period, however this is probably the most appropriate outcome comparison.

We're satisfied this result has the same consistency with previous years, that there is a continuing reduction of rainfall volumes over the site discharged as runoff. Whilst there are on site storages and uses, the amount of basin discharge volumes remain dependent on the regional groundwater level which is a larger factor in the volumes. The observations this year possibly indicate a consideration of increasing the range of groundwater base flow assumptions from those in **Table 6.6** for both higher contributing baseflows and lower flows absorption of more rainfall prior to discharge as runoff.

Results are dependent on several external influences which includes, but not limited to, the following:

- Predominantly the accumulation levels in the Tomago Sandbeds and the corresponding starting level of the regional groundwater level prior to or corresponding with a major rainfall event occurring;
- Meteorological conditions;
- Season of rainfall;
- Downstream water levels external to the site;
- Open drain maintenance on adjoining property; and
- The variability of rainfall occurring in terms of significant intensity and duration.

The continuing landscape observations, surface flow monitoring and Hunter Water bore data for each AEMR provides a gauge of the stormwater system responses to variable and significant conditions.

The performance of the basin will continue to be monitored and assessed throughout the next reporting period. The above measured monitoring results and comparison to the post development site water balance of the approval document demonstrate that the objectives for the site water balance; to maximise water reuse on site and minimise freshwater discharge downstream are continuing to be achieved in accordance with approval. The stormwater system and predicted water balance are operating as predicted and peak flows from the basin are remaining less than pre-development peak flows. It remains unnecessary to change the site water balance as provided for in the conditions of the project approval.

6.4 Vegetation Monitoring

Management and Monitoring

Vegetation monitoring in accordance with the Wetland Management and Monitoring Plan has been undertaken by Kleinfelder Australia Pty Ltd, report attached as **Appendix D**. The report specifically relates to the adjoining wetland Conservation Area of Lot 22 DP 1150980 (CA), refer to **Figure 3.2**. The CA is approximately 22ha of land previously dedicated by NEH and is managed by NPWS, refer to **Figure 6.6**.

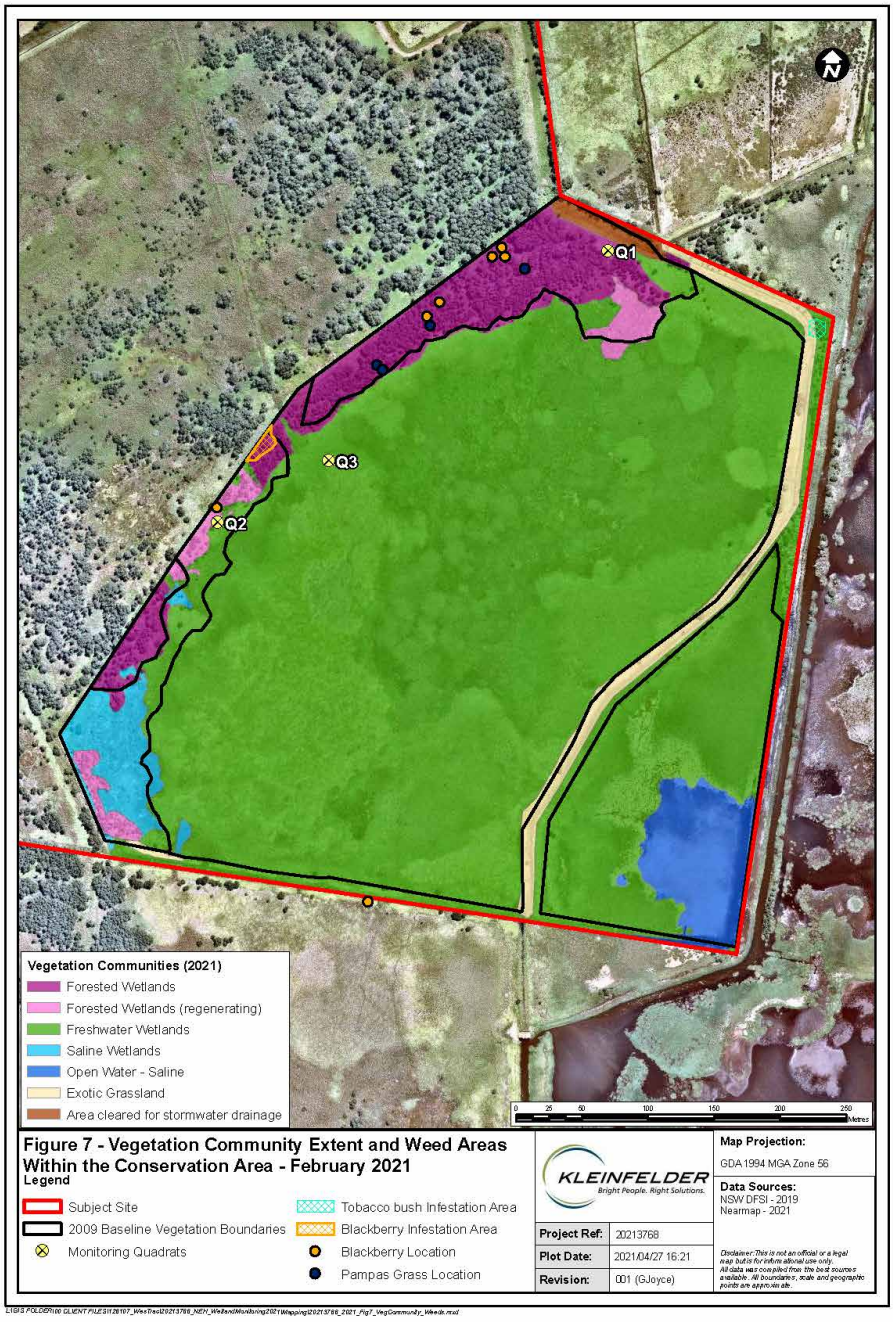

Figure 6.6 – Vegetation Community Extents in CA February 2021 (Courtesy of Kleinfelder 2021)

This annual vegetation monitoring event was undertaken 23 February 2021. February is the preferred period for annual monitoring (between December and April). This period has been selected to allow for annual weed growth and infestation identification and is considered a suitable seasonal period to identify the majority of plant species inside the CA. Data was collected using methods outlined in the Wetland Management and Monitoring Plan (ecobiological 2009).

The vegetation mapping of the south east corner of Lot 22 indicates open saline water in **Figure 6.6.** The area of the CA impacted was previously Freshwater Wetland vegetation, although this is an adverse impact from a past breach of the levee to the Tomago Wetland Restoration Project, not an impact from the MP07_0086 project site. In August 2019, NPWS advised that the levee had been repaired and water quality testing conducted.

Results, Compliance and Further Actions

Kleinfelder advised that boundaries for all vegetation communities within the CA were mapped and updated in February 2020, representing a positive change in vegetation classification. During the 2020 survey, it was observed that areas which had been classified as exotic in previous years more closely resembled freshwater wetland areas. This led to a significant update of the freshwater wetland and exotic vegetation boundary based on recent Nearmap aerial imagery. The main changes occurred along the southern boundary, and along the internal levee and track running through the east of the site.

Additionally, Mod 2 describes a trigger limit for the measure of adverse impact to be a 20% reduction of Phragmites Rushland (Freshwater Wetland) and 10% reduction of Swamp Oak Sedge Forest (Forested Wetland). Vegetation extents compliance is reproduced in **Table 6.9** below.

Table 6.9 – Vegetation Extents Compliance (Kleinfelder)

	Forested Wetland (ha)	Freshwater Wetland (ha)
2009/10 Baseline	1.99	17.86
2021	2.05	17.99
% Change	+3%	+0.7%
Trigger Level % Change (Combined)	-10%	-20%

Kleinfelder comment that the Forested Wetland is continuing to regenerate and the Freshwater Wetland remaining stable. Kleinfelder report that the results indicate increasing difference from the trigger level extents, of a combined decline in Phragmites Rushland vegetation cover of greater than 20% in extent, and Swamp Oak Sedge Forest greater than 10% in extent. As such, the contingency measures outlined in Condition 4B of MP 07_0086 are not required to be implemented.

The graph of vegetation communities comparing the current monitoring results to the previous monitoring events is shown below in **Figure 6.7**.

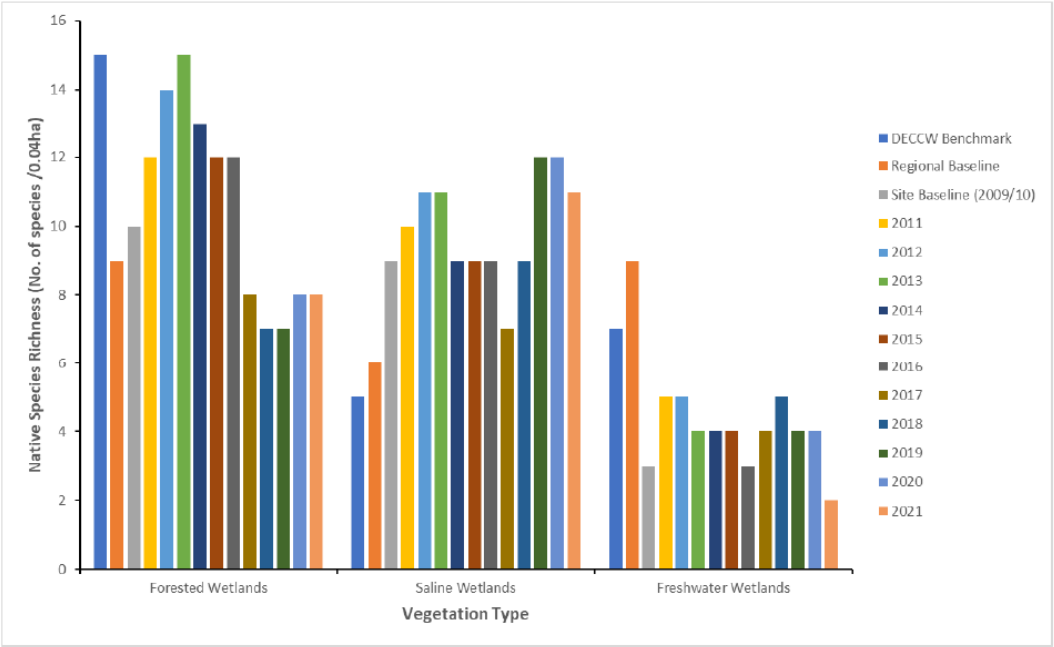

Figure 5 Observed native species richness within each monitoring quadrat (0.04 ha) and vegetation community across all years of monitoring. DECCW Benchmark and Regional Baseline data also included.

Figure 6.7 – Graph of Vegetation Communities Graph in CA February 2021 (Courtesy of Kleinfelder 2021)

Kleinfelder indicates that: *the cover and abundance of exotic species has decreased substantially since the baseline surveys and up until 2020, where areas mapped as exotic where re-mapped as freshwater wetland community, based on groundtruthed data. As such, this re-mapping of the exotic and freshwater wetland boundaries accounts or the significant decrease in total exotic area. Regardless, exotic species such as Blackberry and Pampas Grass are still present within the CA. Additionally, new observations of exotic species, such as Tobacco bush, were recorded along the eastern boundary. While these exotic areas along the eastern boundary are not extensive, it is recommended that weed control rounds are undertaken to prevent further spread throughout the CA.*

A management issue to be actioned by NPWS has been recommended by Kleinfelder; the control of isolated Pampas Grass and Blackberry plants refer to **Figure 6.6**, to ensure that these weed species do not spread and become established in other parts of the CA or adjacent lands. It is noted that Pampas Grass and Blackberry were identified in the CA and similarly discussed in previous annual reports (Kleinfelder 2015-2020).

A further recommendation has also been made by Kleinfelder to shift Quadrat 2, to the south-western portion of the CA to align with the saline wetland community. This will allow for a more accurate collection of cover and abundance of species within that community and therefore, more accurate monitoring data in subsequent monitoring events.

In summary, the site remains in compliance for the vegetation in the CA. Refer to **Appendix D**.

6.5 Air Quality & Odour

Management and Monitoring

There are three (3) sections to the Air Quality & Odour Management Plan are:

- Air Quality – Construction;
- Air Quality – Operation; and
- Odour – Operation.

The CAT Institute workshop extension works have been commenced. The works are being progressively staged to minimise exposed surfaces, minimising air quality issues during construction. Clean air quality is a priority to WesTrac operations and the extended rainfall has also been significant, naturally assisting with dust control strategies for Air Quality management.

The Air Quality during operation is managed within the WesTrac Facility by monthly sweeping over the paver hardstand areas. Area used for testing of equipment contains seed and regularly grasses over between uses. Landscaped irrigation was reduced prior to Hunter Water imposing water restrictions. The reduction led to some isolated instances of the landscaped areas drying out and occasionally generating some minor dust around the edges of the facility, however this is being managed by WesTrac.

The Odour requirements for operations during creation of the Management Plan was specifically focused on the odours typically associated with the proposed on-site sewer system at the time of the approval. The on-site sewer system was never built and was replaced with a Hunter Water Pump Station built to service Stage 1 for sewer authority network connection from WesTrac. Rising Main connection was completed from the pump station to the Hunter Water network as part of the Williamtown Wastewater Transfer Scheme. Therefore this is a redundant requirement of the approval.

Hunter Water upgrade works were undertaken to the Hunter Water Pump Station on Westrac Drive during this reporting period.

Results, Compliance and Further Actions

WesTrac to continue monthly sweeping of pavements/hardstand areas. Landscaped areas not irrigated to be monitored during dry conditions.

7.0 Community

No complaints were received during this Reporting Period.

No Community Meetings have been necessary as a result of no significant project proposed, therefore not triggered in this Reporting Period. The Number of Complaints and Complaint type are shown below in **Figure 7.1**.

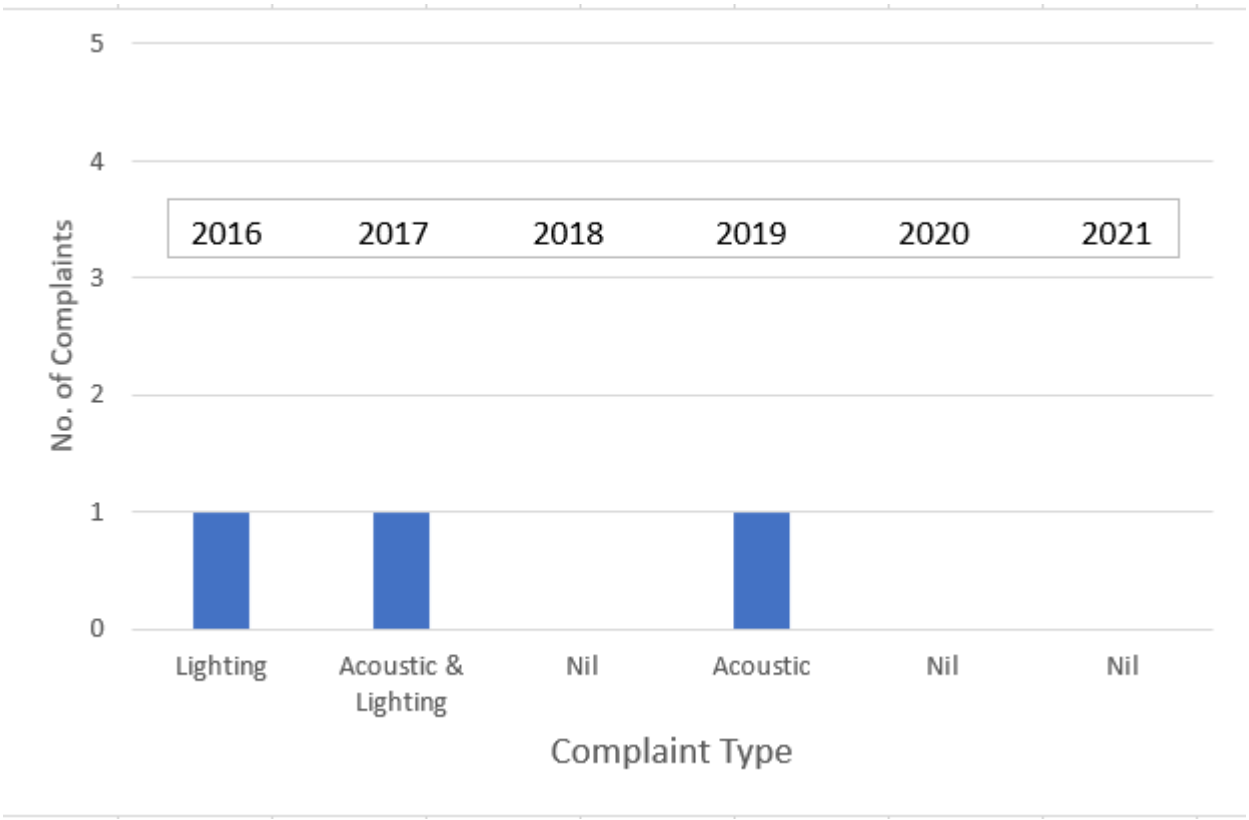

Figure 7.1 – Number of Complaints & Complaint Type over the previous 5 Reporting Periods

WesTrac makes an annual donation to the Newcastle Variety Bash; is the industry sponsor for innovation at the Hunter Safety Awards; and is also sponsor and partner with Mates in Construction (a charity established in 2008 to reduce the high level of suicide among Australian construction workers).

WesTrac regularly hosted community groups at its Tomago site up until Covid-19 restrictions. These include visits from Scone Grammar School, Rotary, Lions Club, and the Raymond Terrace and Maitland Mens' Sheds. The Westpac Helicopter Service, NSW Police and Fire and Rescue have also been hosted at Tomago. WesTrac also hosted a number of events this year to support charities including The National Breast Cancer Foundation, Bloody Long Walk and Shave for a Cure.

WesTrac is an active participant on a number of committees, including the Hunter Valley Safety Group, aiGroup Industry Safety Forum and Central Hunter Safety Networking Group.

8.0 Incidents and non-compliances during this Reporting Period

There have been no notifiable environmental incidences during this Reporting Period. The Refined Fuels sensor raised no alarm during the Reporting Period.

Minor environmental incident reporting from WesTrac, including within buildings has been reviewed. Primarily the minor incidents are oil leaks of variable nature, requiring clean up with spill kits. Spill kits are located around the site. Incidences are recorded, including resolution and any actions arising for improvement. Refer to **Figure 8.1**.

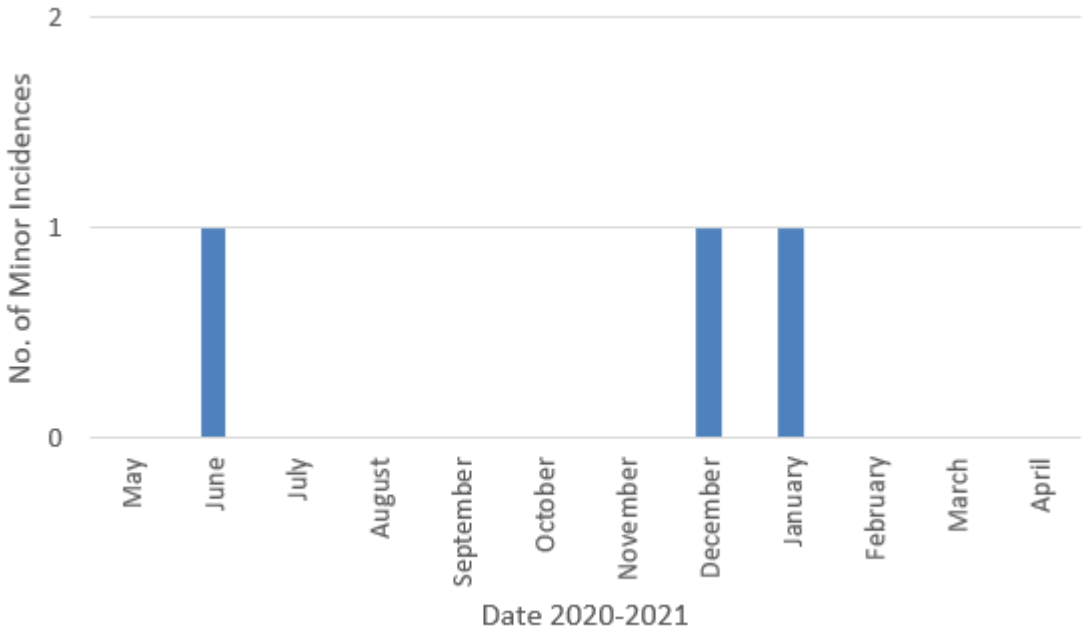

Figure 8.1 – Minor Environmental Incidences over Reporting Period

A 'pollution incident' includes a leak, spill or escape of a substance, or circumstances in which material harm to the environmental harm is likely to occur. Material harm to the environment includes on-site harm, as well as harm to the environment beyond the premises where the pollution incident occurred. No notification to OEH/EPA was required as the events were minor, contained and cleaned up. The increasing extent of waste on adjoining property to the east remains concerning.

The Non-Compliance of monitoring equipment failure is described in detail in **Section 6.3.2** and the mitigation in **Section 6.3.4** in conjunction with the return on Water Balance.

9.0 Activities to be completed in the next Reporting Period

A summary of the activities to be completed in the next reporting period are provided below in **Table 9.1**.

Table 9.1 – Proposed Environmental Management Activities and Actions

Issue	Proposed Action	Section Reference
Operation	WesTrac will continue operations	Nil
Noise	Continue to manage operational noise.	6.1
Stormwater	Basin levels and discharge events will continue to be monitored. Lot 22 will be monitored for stormwater diversion. Water Quality will be monitored Regular maintenance regime for GPT's will be continued. Berm to be monitored. Monitoring equipment and contract to be reviewed.	6.2 & 6.3
Groundwater	Water quality will continue to be monitored. Water level data for Bore SK3520 will be assessed as provided by HWC	6.2 & 6.3
Vegetation Monitoring	Vegetation monitoring of Lot 22 will continue for identification of any potential adverse impacts.	6.4
Air Quality & Odour	Erosion controls for workshop extension works to be maintained. Regular pavement surface maintenance to continue with operations. Monitor landscaped areas not irrigated during dry periods.	6.5
Weeds	Weeds will be monitored within the site and basin.	6.0
Complaints Management	Mr Gareth Hughes - WesTrac General Manager Safety, Security and Risk Phone: 0249 645000 Email: Gareth.Hughes@westrac.com.au	7.0

10.0 EPBC Act Approval 2007/3343

On 18 November 2009, EPBC Act Approval 2007/3343 was granted for the proposed action of developing 111 hectares of land for industrial use, having expiry 19 November 2039. The EPBC Approval boundary contains the MP07_0086 land. Apart from email dated 8 May 2020 which confirmed receipt of the EPBC Report, no other correspondence has been received from Department of Agriculture, Water and the Environment (DAWE) for the EPBC Act Approval 2007/3343. The Annual Compliance Report was submitted 14 May 2021 in accordance with environmental reporting requirements which confirmed the status of all compliances to be satisfactory. DAWE's receipt of the submission was confirmed by return email dated 14 May 2021 and acknowledged 24 June 2021 that reporting requirements have been met.

11.0 Limitations of Report

Torque Projects Pty Limited has prepared this report based on site observations, discussions with appropriate staff and a review of available documentation. In our opinion the potential critical environmental issues associated with the site and operations are those discussed in this report, however we cannot dismiss the possibility that parts of the site or adjacent properties have further environmental issues not documented in this report. This report does not purport to give legal advice on the actual or potential environmental liabilities of any individual or organisation, constituting a breach of relevant legislation.

Appendix A – Deposited Plan

MGA NORTH

(A) EASEMENT FOR TRANSMISSION LINE 30.48 WIDE (GOV. GAZ. 13-03-1964 FOL. 861)
(B) EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 17.2, 30, 30.48, 31.2 WIDE & VAR. (DP.1170271)
(C) EASEMENT FOR DRAINAGE OF WATER 10, 15, 20 WIDE & VAR. (DP.1150980)
(E) EASEMENT TO DRAIN WATER 3 WIDE & VARIABLE WIDTH (E.884146)
(F) EASEMENT TO DRAIN WATER 4 WIDE (DP 577334)
(G) EASEMENT TO DRAIN WATER 10 WIDE (BOOK 3887 NO.834)
(J) EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 5.3 WIDE (DP.1170561)
(K) EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 5.3 WIDE (DP.1170561)
(N) EASEMENT FOR DRAINAGE OF WATER 17.5, 26 WIDE & VAR.(D.P.1173821)
(P) EASEMENT FOR ELECTRICITY AND OTHER PURPOSES 17.5 & 30 WIDE (D.P.1173821)
(R) EASEMENT FOR WASTE WATER PUMP STATION 25 WIDE
(X) COVENANT BOOK 3598 NO.852
(Y) BENEFITED BY EASEMENT TO DRAIN WATER 4 WIDE (DP 577334)

P.M.27763 FD. (ESTABLISHED)
72°29'13" - 1349.780 MGA GND
72°29'24" - 1349.782 SURVEY (N.T.S.)
P.M.27765 FD. (ESTABLISHED) "X"
258° 32' 20" - 369.92
R.M.G.I.P. FD. 314°55'-1.0 (D.P.594191)
MAIN ROAD No. 302
59° 05' 07" - 689.762 (N.T.S.)
49° 56' 56" - 310.627
P.M.58650 FD. (NOT EST.)
239° 51' 02" - 1392.171 MGA GROUND
239° 51' 02" - 1392.16 SURVEY (N.T.S.)
ROAD (VARIABLE WIDTH)
TOMAGO
RECENT METAL POST FENCE
RECENT 'CYCLONE' 134°54'40"
R.M.G.I.P. FD. 314°55'-1.0 (D.P.594191)
3
2
1
D. P. 5 9 4 1 9 1
P & W MESH FCE
NAIL IN FP FD. R.M.G.I.P. FD. 82°02'-2.0 (D.P.594191)
30 YO POST AND WIRE FENCE
SEE SHEET 2 DIAGRAM B
212
25.37 ha
S.S.M.172517 FD. (NOT EST'D)
WESTRAC DRIVE (175 WIDE)
NO OCCUPATIONS
S.S.M.172518 FD. (NOT EST'D)
RECENT 'CYCLONE' P & W MESH FENCE
NO OCC'S
OCCUPATIONS
S.S.M.172518 TO P.M.27766 259°37'03" - 1151.763
P.M.27766 FD. (ESTABLISHED) "Y"
69° 07' 20" - 302.33
PEG & R.M.G.I.P. FD. 188°52'-1.0 (D.P.577334)
R.M.G.I.P. FD. 154°44'-1.5 (D.P.833855)
R.M.G.I.P. FD. 154°03'50"-19.8 (D.P.598139)
R.M.C.B. FD. 154°50'-0.455 (R.30551-1603)
R.M.G.I.P. FD. 152°04'-1.0 (D.P.1170271)
SEE SHEET 2 DIAGRAM B&C
211
17.54 ha
1
D.P.1155307
210
50.13 ha
2
D.P.833855
PEG & R.M.G.I.P. FD. 152°04'-1.0 (D.P.577334)
R.M.G.I.P. FD. 152°04'-1.0 (D.P.833855)
SEE SHEET 2 DIAGRAM A
22
D.P. 1150980
2
D.P.225382
SEE SHEET 2 DIAGRAM D
CH.153°59'25"-65.6 R.500 A.65.645
PEG FD. (DP.1150980)
R.M.G.I.P. FD. 8°52'-5.0 (DP.1150980)
R.M. STEEL PIN FD. 348°13'-1.77 (D.P.774440)
REMAINS
V.O.
FENCE
1153.7
50'
PEG FD. (DP.1127780) R.M.G.I.P. FD. 280°52'-6.76 (D.P.1150980)
1001
D.P.1127780
PT. 10
D.P.753191
18
D.P.753191

SHORT LINE AND ARC TABLE		
LINE	BEARING	DISTANCE
1	60°13'45"	35
2	63°08'55"	43.9
3	97°19'	16.39
4	118°00'	22.2

CLAUSE 35 (1) (b) AND CLAUSE 61 (2) OF THE SURVEYING AND SPATIAL INFORMATION REGULATION 2006

MARK	EASTING	NORTHING	CLASS	ORDER	METHOD	ORIGIN
P.M.27763	384 477.821	6 368 405.719	C	3	FROM SCIMS	SCIMS
P.M.27765	383 190.906	6 367 999.633	C	3	FROM SCIMS	SCIMS
P.M.27766	381 987.347	6 367 300.569	C	3	FROM SCIMS	SCIMS
P.M.58650	382 599.275	6 367 645.335	U	U	TRAVERSE	D.P.1170561
S.S.M.172517	382 953.185	6 367 799.800	U	U	TRAVERSE	D.P.1170561
S.S.M.172518	383 119.987	6 367 508.120	U	U	TRAVERSE	D.P.1170561

MGA CO-ORDINATES ADOPTED FROM SCIMS AS AT 14TH MARCH 2012
COMBINED SCALE FACTOR = 0.999769. ZONE 56.

10 20 30 40 50 Table of mm 90 100 110 120 130 140 150

Surveyor: MURRAY PAUL EDWARDS Date of Survey: 19 APRIL 2012 Surveyor's Ref: 11886-DP-009-D	PLAN OF SUBDIVISION OF LOT 51 D.P.1173821	LGA: PORT STEPHENS Locality: TOMAGO Subdivision No: 2012/32 Lengths are in metres. Reduction Ratio 1:4000	Registered 27.6.2012	DP1174939

Appendix B – Workshop Extension

Proposed Workshop Extension

SITE PLAN AND LANDSCAPE PLAN

Scale 1:1000

EJE ARCHITECTURE
ACN 002 912 843 | ABN 82 644 649 849
Nominated Architect - Bernard Collins NSW Architects Registration No: 4438
P +61 2 4929 2353 | F +61 2 4926 3069 | E mail@eje.com.au | W www.eje.com.au
A 412 KING STREET, NEWCASTLE, NSW 2300

0 25mm 100mm 200mm ON ORIGINAL B1

REV	DATE	COMMENTS
A	24.04.20	PRE DA ISSUE
A	29.04.2020	DA ISSUE
A	6.05.2020	DA ISSUE

DRN	CHKD	VRFD
BD	KG	
BD	KG	
BD	KG	

PROJECT : WESTRAC TOMAGO
MACHINE SHOP EXPANSION
AND CENTRE OF EXCELLENCE

SITE : 1 WESTRAC DRIVE
TOMAGO, NSW 2322

CLIENT : WESTRAC PTY LTD

DRAWING : SITE PLAN

WORK IN FIGURED DIMENSIONS IN PREFERENCE TO SCALE. CHECK DIMENSIONS AND LEVELS ON SITE PRIOR TO THE ORDERING OF MATERIALS OR THE COMPLETION OF WORKSHOP DRAWINGS. IF IN DOUBT ASK. REPORT ALL ERRORS AND OMISSIONS.

DRAWN :	DATE :	SCALES :
BD	APRIL 2020	1:1000@B1

PROJECT No :	PHASE :	DRAWING No :	REV :
12472	DA	A-001	A

PORT STEPHENS COUNCIL
This plan relates to
Development Consent No.

16-2020-291-1

and is subject to conditions
as shown on that Consent

Appendix C – Water Quality Report

Intended for

Northbank Enterprise Hub Pty Ltd C/- Torque Projects Pty Ltd

Document type

Final Report

Date

May 2021

2021 GROUNDWATER AND SURFACE WATER MONITORING

318001140

RAMBOLL Bright ideas. Sustainable change.

2021 GROUNDWATER AND SURFACE WATER MONITORING
318001140

Project name	**2021 Groundwater and Surface Water Monitoring**
Project no.	**318001140**
Recipient	**NEH c/o Torque Projects**
Document type	**Final Report**
Version	**[1]**
Date	**07/05/2021**
Prepared by	**N. Gilbert**
Checked by	**S. Cadman**
Approved by	**F. Robinson**
Description	**Provide a brief factual report on the sampling and analysis undertaken, evaluation of data reliability and comparison of analytical results to existing guidelines.**

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ABN 49 095 437 442

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ACRONYMS AND ABBREVIATIONS

ANZG	Australian and New Zealand Guidelines for Fresh and Marine Water Quality
B(a)P	Benzo(a)pyrene
bgs	Below Ground Surface
BTEXN	Benzene, Toluene, Ethylbenzene & Xylenes (Monocyclic aromatic Hydrocarbons) and Naphthalene
CN	Cyanide (total or free)
Mercury	Inorganic mercury unless noted otherwise
Metals	As: Arsenic, Cd: Cadmium, Cr: Chromium, Cu: Copper, Fe: Iron, Ni: Nickel, Pb: Lead, Zn: Zinc, Hg: Mercury, Mn: Manganese, Mo: Molybdenum
mg/L	Milligrams per Litre
m bgl	Metres below ground level
µg/L	Micrograms per Litre
LOR	Limit of Reporting
NEH	Northbank Enterprise Hub
NEPM	National Environment Protection Measure
NHMRC	National Health and Medical Research Council
OCPs	Organochlorine Pesticides
OH&S	Occupational Health & Safety
OPPs	Organophosphorus Pesticides
PAHs	Polycyclic Aromatic Hydrocarbons
PCBs	Polychlorinated Biphenyls
pH	a measure of acidity, hydrogen ion activity
QA/QC	Quality Assurance/Quality Control
RPD	Relative Percent Difference
SVOCs	Semi Volatile Organic Compounds
TDS	Total Dissolved Solids
TSS	Total Suspended Solids
TPHs	Total Petroleum Hydrocarbons
TP	Total Phosphorous
TRHs	Total Recoverable Hydrocarbons
VOCs	Volatile Organic Compounds
-	On tables is "not calculated", "no criteria" or "not applicable”

1. INTRODUCTION

Ramboll Australia Pty Ltd (Ramboll) was engaged by Northbank Enterprise Hub (NEH) Australia, (c/- Torque Projects Pty Ltd), to undertake surface water and groundwater monitoring as part of the Annual Environmental Monitoring Report for the Major Project Approval site – MP07_0086. NEH is located on Tomago Road, Tomago, New South Wales, Australia, as shown in **Figure 1, Appendix 1.**

1.1 Objective

The objective was to provide a factual report presenting sampling and analysis results of the site's surface water and groundwater to be included as part of the site's Annual Return.

1.2 Scope of Works

To meet the project objective, Ramboll, undertook the following:

- Prepared a site-specific Health and Safety Plan.
- Mobilised to and from site and conducted surface water and groundwater sampling, based on the list of specified locations.
- Re-sampled MW2 due to detectable concentrations of hydrocarbons, toluene and phenols.
- Submission of groundwater and surface water samples for laboratory analysis.
- Evaluated quality control and quality assurance.
- Compared analytical results to relevant site assessment criteria.
- Completed this report.

2. SITE DETAILS

2.1 Site Description and Location

The Major Project Approval site MP07_0086 (the site) is located along Tomago Road, comprising Lots 210-212, DP1174939. The site covers approximately 115 ha and is zoned IN1 General Industrial under the Major Projects SEPP (Asquith & DeWitt, 2007). The site comprises the WesTrac Facility located in the north-east portion which is situated at the intersection of WesTrac Drive and Tomago Road (refer to **Figure 1, Appendix 1**). The WesTrac Facility covers an approximate area of 25 ha and comprises 12 major purpose-built buildings housing a training centre, sales and administration building, a large parts warehouse, highway trucks centre, component rebuild/assembly centre, cafeteria and change rooms (Asquith & DeWitt, 2007). The buildings are located on concrete with connecting internal roads and parking.

Two open swales are situated along the eastern and southern boundaries of the WesTrac Facility which connect to a pond to the south of the WesTrac Facility. This pond discharges to a creek which flows in a south and south west direction towards the biodiversity offset land (Lot 22, DP1150980). A small creek is located west of WesTrac Drive which discharges public road water from Tomago Road and surface water runoff from WesTrac Drive and flows in a southerly direction towards NEH owned Lot 1001, DP1127780. The remaining areas of the site, located to the west and south of the WesTrac Facility comprises marsh land, consisting of low-lying swamp areas and densely vegetated bushland.

To the west of the site, there are several industrial facilities located along Tomago Road. To the north of the site the land use mainly comprises open grass bushland with some rural residential properties, further to the north-east is the Hunter Water Tomago Sandbeds Depot. To the east of the site, the land use comprises rural residential properties used for hobby farming. To the south of the site is the Hunter Estuary National Park, which includes Tomago and Fullerton Cove Wetlands and the internationally listed (Ramsar) Hunter Estuary Wetlands. The wetlands are separated from the site by a 22 ha biodiversity offset (Lot 22, DP1150980) that formed part of the project approval, which was transferred to the National Parks and Wildlife Service (NPWS) Estate approximately 10 years ago (Department of Planning and Environment, 2017).

3. SAMPLING, ANALYSIS AND QUALITY PLAN

3.1 Sampling Locations

The proposed surface water sampling locations are shown on **Figure 1, Appendix 1** and comprised:

- SW1 - located in the creek down-gradient from the WesTrac Facility. This sampling location represents a portion of discharged water (surface water runoff) from the pond of the WesTrac Facility.
- SW2 – located in a creek to the south-west of the WesTrac Facility (west of WesTrac Drive) and represents a portion of discharged water (surface water runoff) from Tomago Road and WesTrac Drive, which are both public roads.
- SW3 – located upgradient of the site, north of Tomago Road, in the north-east.
- SW4 – located upgradient of the site, north of Tomago Road, in the north-west.

Sampling locations SW3 and SW4 were observed to be dry during the March 2021 sampling events. These locations have been noted to be dry by Ramboll during all sampling events since 2015 sampling event.

Alternative locations for SW3 included collecting a sample known as "Graham Drive", located to the north of Tomago Road and Graham Drive. During this sampling round, SW3a located in the creek, down-gradient of Tomago Road and west of WesTrac Drive was also sampled.

The chosen alternative location for SW4 is groundwater well MW8 which is in the north-western portion of the site. This groundwater well has been sampled since 2015 sampling event.

Groundwater sampling locations:

- MW2 – located in the creek down-gradient from the WesTrac Facility.
- MW4 – located on the southern boundary of the site, to the south-west of the WesTrac Facility.
- MW6 - located on the southern boundary of the site, to the south of the WesTrac Facility.
- MW8 – located in the north-west portion of the site, near Tomago Road.
- MW10 – located immediately south of the WesTrac Facility.
- MW11 – located within the southern boundary of the WesTrac Facility.

3.2 Sampling Methodology

Two experienced environmental practitioners undertook the fieldwork on 12 March 2021 and 15 April 2021[1] and completed the following:

- Four surface water samples and six groundwater samples were collected from the locations shown in **Figure 1, Appendix 1**
- At each surface water sampling location, surface water was collected using a clean container and decanted into laboratory supplied bottles. Field physico-chemical parameters were measured for temperature, pH, electrical conductivity (EC), dissolved oxygen (DO), oxidation reduction potential (ORP) and total dissolved solids (TDS).
- At each groundwater sampling location water levels were gauged prior to sampling. The depth to the standing water level (SWL) was measured from the top of the inner casing.

[1] Re-sampled MW2 for TRH, BTEXN, PAH and phenols.

- Each well was purged using a low flow peristaltic pump prior to sampling until the field physico-chemical parameters stabilised to within 10%. Relevant field observations, for example, odour, colour, drawdown, were recorded on the field sheets.
- Samples were collected after stabilisation of physico-chemical parameters. Water levels were gauged throughout sampling to monitor drawdown and confirm laminar flow through the well. The field sheets are attached in **Appendix 2.**
- One duplicate sample and one trip blank and spike (volatile parameters) were submitted to the laboratory for analysis with the sample batch.
- All samples were promptly submitted under chain of custody protocols to Australian Laboratory Services Pty Ltd (ALS), NATA-accredited for the analyses conducted.
- All samples were analysed for:
  - Total Recoverable Hydrocarbons (TRH)
  - Benzene, Toluene, Ethylbenzene, Xylene and Naphthalene (BTEXN)
  - Metals (arsenic, cadmium, copper, chromium, iron, lead, manganese, molybdenum, mercury, nickel and zinc)
  - Cations and anions
  - Total phosphorous, NOx and Kjeldahl N
  - Fluoride, Ammonia and Cyanide
  - Polycyclic aromatic hydrocarbons (PAHs) and phenols
  - Polychlorinated biphenyls (PCBs)
  - OP/OC pesticides
  - Total Suspended Solids (TSS)
  - Ultra-trace for PAHs, OP/OC pesticides and PCBs for lower detection limits at Graham Drive and SW1, which are up gradient and down-gradient from the industrial facility, respectively.

3.3 Quality Assurance / Quality Control

The following quality assurance/quality control (QA/QC) procedures were employed during the sampling program to ensure representative samples were collected:

- All samples were collected by personnel, trained and experienced in the collection of water samples for analysis, using standard industry techniques for sample collection.
- Clean, single-use, sampling equipment was used to collect each sample to minimise the opportunity for cross contamination, equipment that was re-used was washed with Decon90 and rinsed with potable water prior to sampling each well.
- All samples were placed in clean, laboratory-supplied containers.
- All samples were labelled with unique names, identifying location and date.
- All samples were placed in eskies with ice after a short period of time due to the distance from the well.
- Samples were submitted the same day of sampling to the laboratory under chain-of custody protocols.
- All samples were analysed within the recommended holding times.
- The following quality control samples were collected and submitted for analysis:
  - Field duplicate of MW10 (D01_20210312) – analysed for all parameters
  - Trip blank and Trip Spike – analysed for TPH C6-C9 and BTEXN

Field quality control analytical results are summarised in **Table 3, Appendix 3.**

Results for the trip blank found no detectable concentrations. The trip spike was within acceptable limits.

Review of the calculated relative percent difference (RPD) between the primary sample (MW10) and its field duplicate, D01_20210312 found all sample concentrations within the RPD criteria of ±30%, except for:

- Suspended Solids reported RPD values of 93.3%. This is likely due to homogeneity of the sample. Both samples were field filtered, and it is likely the turbidity of the sample may vary.
- Total phosphorous as P reported an RPD value of 40%. This can occur when there are differences between small concentration values, and as such this are not considered to be of concern.

ALS was the primary laboratory used to undertake the analysis. ALS is NATA accredited for the analyses conducted and are experienced in the analytical requirements for potentially contaminated soil and groundwater. As part of the analytical procedures, ALS undertook internal quality assurance testing. Results are contained within the laboratory report sheets, **Appendix 4**.

Internal laboratory review indicated:

- No method blank value outliers occur.
- No duplicate outliers occur.
- For all regular sample matrices, no surrogate recovery outliers occur.
- Laboratory Control Spike (LCS) Recoveries of for Acenaphthene 63.5 % and Acenaphthylene 61.2 % were less than the lower control limit (64.0-122%) and (64.0-126%) respectively.
- Matrix Spike (MS) Recovery not determined for anonymous sample of Sulfate (Turbidimetric) as SO_4^{2-} as background level greater than or equal to 4x spike level.
- No analysis holding times outliers exist.
- Quality control sample frequency outliers exist for PAH/Phenols and semi-volatile TRH from laboratory report ES2113835 as part of the resampling of MW2 and is not considered to be a concern.

Due to the limited number of samples collected, in combination with the other field and laboratory QA/QC, this is not considered to be of significant concern.

Overall, the analytical results are of suitable quality for review.

4. ASSESSMENT CRITERIA

The assessment criteria proposed for the assessment of surface water and groundwater quality are sourced from the following references:

- National Environment Protection Council (Assessment of Site Contamination) Amendment Measure 2013 (No. 1) *Groundwater Investigation Levels for Fresh and Marine Water Quality* (NEPC, 2013)
- Australia and New Zealand Environment and Conservation Council (ANZECC) & Agriculture and Resource Management Council of Australia and New Zealand (ARMCANZ) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC, 2000)
- Australian and New Zealand Governments and Australian state and territory governments, Canberra ACT, *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZG, 2018)
- National Health and Medical Research Council (NHMRC), National Resource Management Ministerial Council (NRMMC) *Australian Drinking Water Guidelines 6 2011 Version 3.5 Updated August 2018* (NHMRC, 2018)
- National Health and Medical Research Council (NHMRC), National Resource Management Ministerial Council (NRMMC) *Guidelines for Managing Risks in Recreational Water* (NHMRC, 2008)
- Department of Environment and Conservation (DEC) *Guidelines for the Assessment and Management of Groundwater Contamination* (Department of Environment and Conservation , 2007)

4.1 Ecological Assessment Criteria

The investigation levels presented in the NEPM (2013) and ANZG (2018) are considered applicable for the protection of aquatic ecosystems of receiving waters.

The Groundwater Investigation Levels (GILs) in the NEPM (2013) have been adopted as the primary ecological assessment criteria. If there are no GILs for certain analytes, ANZG (2018) has been adopted.

ANZG (2018) advocates a site-specific approach to developing guideline values based on such factors as local biological affects data and the current levels of disturbance of the ecosystem. The guidelines present 'low risk guideline values' which are defined as concentrations of key performance parameters below which there is a low risk of adverse biological effects. If these guideline values are exceeded, then further action is required which may include further site-specific investigations to assess ecological risks or management and remedial actions.
Low risk guideline values are presented in Table 3.4.1 of ANZECC (2000) (referred to in ANZG 2018) for the protection of 80-99% of species in fresh waters, with guideline values depending on the health of the receiving waters.

4.2 Human Health Assessment Criteria

Drinking water guidelines have been adopted from the NHMRC 2018 guidelines. The guidelines are adopted based on human health and aesthetic guideline values. If no human health value existed, the aesthetic value was adopted.

4.3 Application of the Assessment Criteria

Ramboll has provided values for the Human Health criteria and the 95% Fresh water criteria to ensure the different receptors (Human Health and Ecological) are reviewed separately.

The assessment criteria are summarised in **Table 4-1**.

Table 4-1: Assessment Criteria

Analytes	95% Fresh	Drinking Water Guidelines[B]
Physico Chemical Parameters		
pH	6.5-8.5	
Total Suspended Solids (TSS) (mg/L)		600
Anions and Non-Metallic Inorganics		
Hydroxide Alkalinity (mg/L)		
Bicarbonate Alkalinity (mg/L)		
Carbonate Alkalinity (mg/L)		
Total Alkalinity (mg/L)		
Sulfate as SO4 - Turbidimetric (mg/L)		500
Chloride (mg/L)		250[C]
Total Cyanide (mg/L)	0.007	0.08
Fluoride (mg/L)		1.5
Ammonia as N (mg/L)	0.9	0.5 [C]
Nutrients		
Nitrite + Nitrate as N (mg/L)		
Nitrite as N (mg/L)		3
Nitrate as N (mg/L)	0.7	50
Total Kjeldahl Nitrogen as N (mg/L)		
Total Phosphorus as P (mg/L)	0.025	
Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene (BTEXN)		
Benzene	950	1
Toluene	*180*	800
Ethylbenzene	*80*	300
meta- & para-Xylene	75	
ortho-Xylene	350	
Total Xylenes		600
Naphthalene	16	
Total Recoverable Hydrocarbons (TRH) - NEPM 2013 Fractions		
C6 - C10 Fraction		
C6 - C10 Fraction minus BTEX (F1)		
>C10 - C16 Fraction		
>C16 - C34 Fraction		
>C34 - C40 Fraction		
>C10 - C40 Fraction (sum)		
>C10 - C16 Fraction minus Naphthalene (F2)		
Polycyclic Aromatic Hydrocarbons (PAH)		
Naphthalene	16	
Acenaphthylene		
Acenaphthene		
Fluorene		
Phenanthrene	**0.6**	
Anthracene	***0.01***	
Fluoranthene	***1***	
Pyrene		
Benz(a)anthracene		
Chrysene		
Benzo(b+j)fluoranthene		

Analytes	95% Fresh	Drinking Water Guidelines[B]
Benzo(k)fluoranthene		
Benzo(a)pyrene	***0.1***	0.01
Indeno(1.2.3.cd)pyrene		
Dibenz(a.h)anthracene		
Benzo(g.h.i)perylene		
Sum of polycyclic aromatic hydrocarbons		
Benzo(a)pyrene TEQ (zero)		
Dissolved/Total Metals		
Arsenic (V)	13	10
Cadmium	0.2	2
Chromium (VI)	1	50
Copper	1.4	2000
Manganese	1900	500
Molybdenum		50
Lead	3.4	10
Nickel	11	20
Zinc	8	3000[C]
Iron	700	300[C]
Mercury	**0.06**	1
Phenols		
Phenol	320	
2-Chlorophenol	**340**	300
2-Methylphenol		
3- & 4-Methylphenol		
2-Nitrophenol	*2*	
2.4-Dimethylphenol	*2*	
2.4-Dichlorophenol	**120**	200
2.6-Dichlorophenol	*34*	
4-Chloro-3-methylphenol		
2.4.6-Trichlorophenol	**3**	20
2.4.5-Trichlorophenol	*0.5*	
Pentachlorophenol	**3.6**	10
Organochlorine Pesticides (OCP)		
alpha-BHC		
Hexachlorobenzene (HCB)	***0.05***	
beta-BHC		
gamma-BHC		
delta-BHC		
Heptachlor	***0.01***	0.3
Aldrin	*0.001*	
Heptachlor epoxide		
trans-Chlordane		
alpha-Endosulfan	*0.0002*	
cis-Chlordane		
Dieldrin	*0.01*	
4.4`-DDE	*0.03*	
Endrin	**0.01**	
beta-Endosulfan	*0.007*	
4.4`-DDD		
Endrin aldehyde		
Endosulfan sulfate	**0.03**	20
4.4`-DDT	**0.006**	9
Endrin ketone		
Methoxychlor	*0.005*	300

Analytes	95% Fresh	Drinking Water Guidelines[B]
^ Total Chlordane (sum)	**0.03**	2
^ Sum of DDD + DDE + DDT		
^ Sum of Aldrin + Dieldrin		0.3
Organophosphorous Pesticides (OPP)		
Dichlorvos		5
Demeton-S-methyl	*4*	
Monocrotophos		
Dimethoate	0.15	7
Diazinon	0.01	4
Chlorpyrifos-methyl		
Parathion-methyl		0.7
Malathion	0.05	70
Fenthion		7
Chlorpyrifos	0.01	10
Parathion	0.004	20
Pirimphos-ethyl		
Chlorfenvinphos		2
Bromophos-ethyl		
Fenamiphos		0.5
Prothiofos		
Ethion		4
Carbophenothion		
Azinphos Methyl	**0.01**	30
Polychlorinated Biphenyls (PCB) - Ultra Trace		
Aroclor 1016	*0.001*	
Aroclor 1221	*1*	
Aroclor 1232	*0.3*	
Aroclor 1242	***0.3***	
Aroclor 1248	*0.03*	
Aroclor 1254	***0.01***	
Aroclor 1260	*25*	

All results are µg/L unless stated.
A ANZECC (2000) and ANZG (2018) % Protection Level for Freshwaters
B NHMRC Australian Drinking Water Guidelines, 2018
C Aesthetic guideline value adopted in replace of no human health value
Default trigger values for TP and TN are for NSW & Vic. east flowing coastal rivers for slightly disturbed ecosystems (ANZECC 2000)
NHMRC arsenic guidelines are based on total arsenic
Guidelines for chromium are based on Cr (VI)
Total Phenolics guideline based on Phenol
Guidelines for mercury are based on inorganic mercury.
NHMRC guideline for TSS are based on TDS in the absence of a TSS value.
NHMRC guidelines for mercury are based on total mercury.
NHMRC guidelines for total cyanide are based on cyanogen chloride (as cyanide).
Guidelines in *italics* are low level reliability guidelines
Guidelines in **bold** indicates the 99% protection level should be adopted for slightly-moderately disturbed ecosystems protection level due to potential for bioaccumulation or acute toxicity to particular species

In addition to the assessment criteria, Ramboll compared all surface water and groundwater results to background monitoring locations established for the site and surrounds.

5. RESULTS

5.1 Meteorological Data

Sampling is undertaken on an annual basis, generally in March/April each year. A review of the meteorological data from Williamtown RAAF Station was undertaken to assess the rainfall prior to and during the two sampling events in March and April 2021 as shown in **Figure 1.**

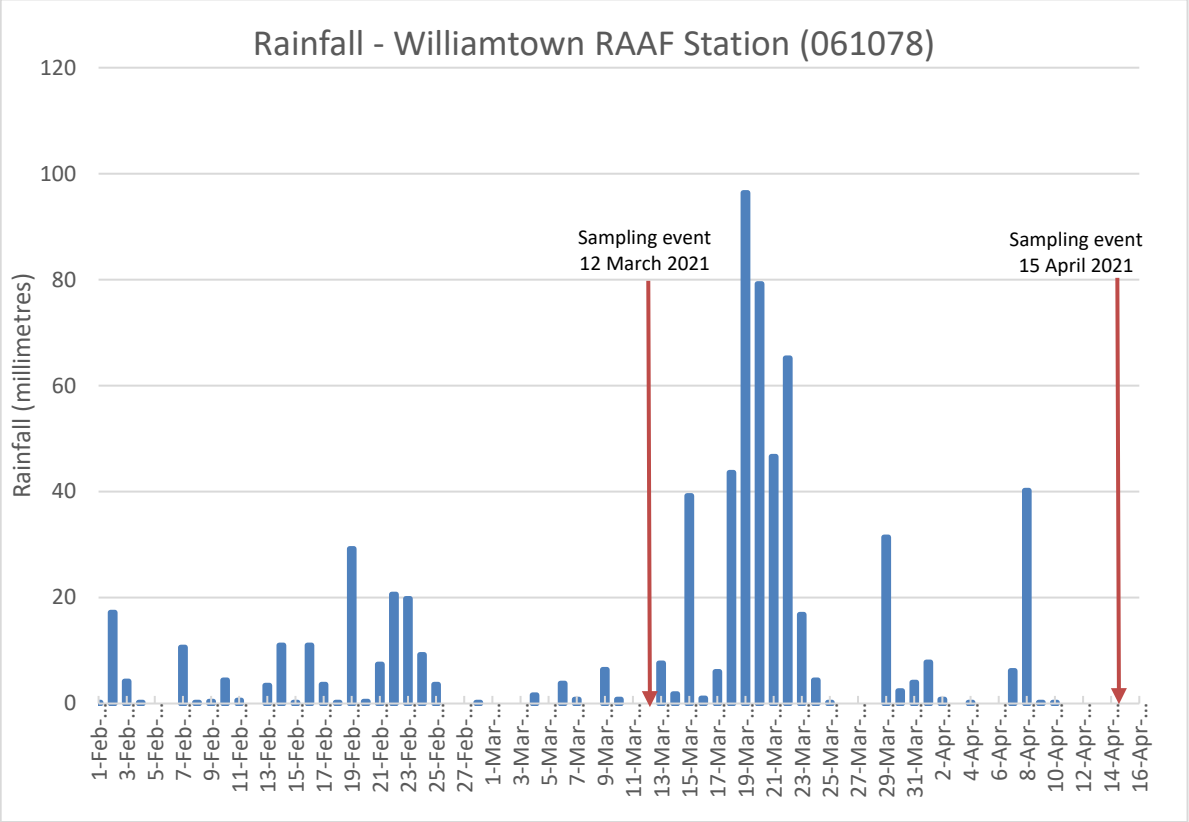


Figure 1: Rainfall at the Williamtown RAAF Station (061078) for the period of 1 February 2021 to 16 April 2021.

Cumulative rainfall for the month of February was 157.8 mm which is 40 mm above the average. Cumulative rainfall for the month of March was 459.2 mm, which is more than three times the average for March. No rainfall was recorded on the day of sampling, however the ground was extremely wet and the creeks were higher than observed in previous years.

5.2 Physico-Chemical Parameters

A summary of the physico-chemical parameters for each sample location are shown in **Table 1, Appendix 3**. The field sheets are attached in **Appendix 2.**

The physico-chemical parameters for the surface water samples generally indicated:

- Slightly acidic pH at all surface water samples except for SW2 which reported neutral pH conditions. The lowest pH was recorded at up-gradient location, Graham Drive.
- Aerobic conditions at all surface water samples ranging from 0.91-3.47mg/L, (dissolved oxygen).

- Fresh water conditions at all surface water samples with electrical conductivity ranging from 130-342µS/cm.
- Oxidising conditions were reported at both up-gradient locations (Graham Drive and SW3a) and reducing conditions were reported at both down-gradient locations (SW1 and SW2).
- High turbidity was reported at SW2 and SW3a, both collected from the creek.

The physico-chemical parameters for the groundwater samples generally indicated:

- Neutral pH conditions at down-gradient wells MW2, MW4 and MW6.
- Acidic pH conditions at up-gradient well MW8 and down gradient wells MW10 and MW11.
- Slightly aerobic conditions in all groundwater wells, ranging from 0.18-0.38mg/L (dissolved oxygen).
- Slightly brackish conditions at down-gradient wells MW2, MW4 and MW6.
- Fresh water conditions at up-gradient well MW8 and down gradient wells MW10 and MW11.
- Reducing conditions at all groundwater wells except for upgradient well MW8, which reported oxidising conditions.
- High turbidity was reported at MW2 and MW10.

5.3 Laboratory Results

Analytical results are compared to the assessment criteria in **Table 2, Appendix 3**, and full laboratory reports are presented in **Appendix 4.** A summary of the results above the assessment criteria are outlined in **Table 5-1.**

Table 5-1: Evaluation of Surface Water and Groundwater Results – Summary Table

Analytes	No. of samples	No. Detections	No. > 95% Fresh	No. > Drinking Water Guidelines
Physico Chemical Parameters				
pH	10	10	**5**	n/a
Total Suspended Solids (TSS) (mg/L)	10	10	n/a	**2**
Anions and Non-Metallic Inorganics				
Sulfate as SO4 - Turbidimetric (mg/L)	10	9	n/a	**2**
Chloride (mg/L)	10	10	n/a	**2**
Total Cyanide (mg/L)	10	0	0	0
Fluoride (mg/L)	10	6	0	0
Ammonia as N (mg/L)	10	8	**3**	**5**
Nutrients				
Nitrite as N (mg/L)	10	0	n/a	0
Nitrate as N (mg/L)	10	3	0	0
Total Phosphorus as P (mg/L)	10	10	**7**	n/a
Benzene, Toluene, Ethylbenzene, Xylene, Naphthalene (BTEXN)				
Benzene	10	0	0	0
Toluene	10	1	0	0
Ethylbenzene	10	0	0	0
meta- & para-Xylene	10	0	0	0
ortho-Xylene	10	0	0	0
Total Xylenes	10	0	0	0

Analytes	No. of samples	No. Detections	No. > 95% Fresh	No. > Drinking Water Guidelines
Naphthalene	10	0	0	0
Total Recoverable Hydrocarbons (TRH) - NEPM 2013 Fractions				
>C10 - C40 Fraction (sum)	10	2	**2**	**2**
Polycyclic Aromatic Hydrocarbons (PAH)				
Naphthalene	10	0	0	0
Phenanthrene	10	0	0	0
Anthracene	10	0	0	0
Fluoranthene	10	0	0	0
Benzo(a)pyrene	10	0	0	0
Dissolved/Total Metals				
Arsenic (V)	10	6	0	0
Cadmium	10	2	**1**	0
Chromium (VI)	10	8	**5**	0
Copper	10	3	**2**	0
Manganese	10	10	**2**	**4**
Molybdenum	10	1	n/a	0
Lead	10	3	**1**	0
Nickel	10	5	0	0
Zinc	10	4	**3**	0
Iron	10	9	**7**	**9**
Mercury	10	0	0	0
Other				
Phenols	10	1	0	0
OCPs	10	0	0	0
OPPs	10	0	0	0
PCBs	10	0	0	0

*results do not include the re-sampling of MW2 and the TRH with silica gel clean of MW2 and Graham Drive.

5.4 Results Summary

The following presents a summary of results:

- Low pH levels were reported in the groundwater samples, MW10, MW11 and background well MW8 which is consistent with the last sampling round.
- TSS was above the human health criteria at SW2 and SW3a, collected from the creek. These samples were highly turbid.
- Concentrations of ammonia, total phosphorous, total cadmium, chromium, copper, lead, manganese, zinc and iron were reported for one or more surface water samples above the ecological and/or human health criteria. This is the first time since 2018 that all surface water samples were analysed. The results are higher than 2018, the higher metals concentrations correlate with the highly turbid samples reported at SW2 and SW3a.
- Concentrations of sulphate, chloride, ammonia, total phosphorous, dissolved chromium, manganese and iron were reported for two or more groundwater samples above the ecological

and/or human health criteria; however results were consistent with results from the previous sampling round.
- Several LORs were above the ecological and/or human health criteria for mercury, OCP/OPP/PCBs, phenols and PAHs.
- Detectable concentrations of phenol, 3- & 4-Methylphenol and toluene were reported in MW2, however were below the guideline value for phenol and toluene and no guideline value is currently available for 3- & 4-Methylphenol. MW2 was resampled on 15 April 2021 and reported PAHs and phenols below the LOR and a lower toluene concentration of 23µg/L.
- Detectable concentrations of all TRH compounds were reported for MW2. TRH with Silica Gel Cleanup was undertaken to obtain a better representation of the 'petroleum hydrocarbons' in the sample. The results reported concentrations below the LOR for >C10 - C16 Fraction, >C16 - C34 Fraction and >C34 - C40 Fraction indicating significant levels of non-petroleum hydrocarbon interferences in the original sample. Resampling of MW2 reported a concentration of 20µg/L was reported for C6 - C10 Fraction and 230µg/L was reported for >C16 - C34 Fraction.
- Detectable concentration of >C16 - C34 Fraction was reported for Graham Drive. TRH with Silica Gel Cleanup was undertaken to obtain a better representation of the 'petroleum hydrocarbons' in the sample. The results reported concentrations below the LOR for >C10 - C16 Fraction, >C16 - C34 Fraction and >C34 - C40 Fraction indicating significant levels of non-petroleum hydrocarbon interferences in the original sample.
- All remaining samples reported concentrations of BTEXN, PAH, OCP/OPP, PCB and phenols were all below the limit of reporting.
- All other analytes were below the ecological and human health criteria at the groundwater wells.
- The elevated concentrations above the ecological and human health criteria are not of concern as they likely represent the natural existing conditions in the low-lying swampy marshland of the site and results were consistent with results from the previous sampling round.

5.4.1 Assessment of Nitrogen Compound Results

Nitrogen concentrations can vary over time in relation to seasonal phenomena and with episodic events. Background information on the different forms of nitrogen in response to environmental conditions is provided in **Appendix 5.**

Large precipitation events occurred the month prior to sampling, with higher than average rainfall for the months of February and March. During the sampling event, it was noted that the ground was extremely wet and waterlogged, and the creek was higher than observed in previous years. The water clarity was extremely low, black/ brown in colour and a strong organic odour was noted. Water quality results showed increased TSS, ammonia, TKN, TN, TP and decreased nitrate and nitrite concentrations.

The higher concentrations of TSS, ammonia, TKN, TN and TP during this sampling event is a response to the increased rainfall. This is typically associated with increased inputs of suspended particulate matter which carry attached TP and TN. The groundwater reported reducing conditions (-155mV) and had low dissolved oxygen (0.18mg/L). This is due to an influx of oxygen demanding sediment, dissolved organic material and decay of natural organic material. The increased TN, TP and ammonia from decaying natural organic material is further supported by the TRH with silica gel clean up results which reported non-petroleum hydrocarbons of likely

biologic origin at MW2. The notably higher TSS is indicative of an increase in sediment and algae particles that are floating in the water column from the increased rainfall. Lower concentrations of TN, TKN, TP and TSS have been reported in the past as sampling was undertaken during relatively dry periods.

The high concentrations of TSS, ammonia, TKN, TN and TP are due to high rainfall and decay of natural organic materials under suitable environmental conditions. It is unlikely to be due to anthropogenic activities based on surrounding sample locations, site use, and previous sampling results.

6. CONCLUSIONS

Ramboll Australia Pty Ltd was commissioned by NEH, c/- Torque Projects, to complete the 2021 annual environmental monitoring for Stage 1 of the NEH Industrial Development site. The objective was to provide a factual report on the sampling and analysis of the site's surface water and groundwater that is to be included as part of the site's Annual Return.

This report presents the factual data for sampling undertaken for the 2021 monitoring event. Concentrations found in surface water and groundwater are generally consistent with the previous sampling rounds.

7. REFERENCES

ANZECC. (2000). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

ANZG. (2018). *Australian and New Zealand Guidelines for Fresh and Marine Water Quality.*

Department of Environment and Conservation . (2007). *Guidelines for the Assessment and Management of Groundwater Contamination.*

NEPC. (2013). *National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended 2013.* National Environment Protection Council (NEPC).

NHMRC. (2008). *National Health and Medical Research Council Guidelines for Managing Risk in Recreational Waters.*

NHMRC. (2018). *National Health and Medical Research Council, Australian Drinking Water Guidelines.*

WHO. (2017). *World Health Organisation (WHO) Guidelines for Drinking-water Quality, Fourth Edition.*

8. LIMITATIONS

Ramboll Australia Pty Ltd prepared this report in accordance with the scope of work as outlined in our proposal to Northbank Enterprise Hub (NEH) Australia, (c/- Torque Projects Pty Ltd) and in accordance with our understanding and interpretation of current regulatory standards.

A representative program of sampling and laboratory analyses was undertaken as part of this investigation, based on past and present known uses of the Site. While every care has been taken, concentrations of contaminants measured may not be representative of conditions between the locations sampled and investigated. We cannot therefore preclude the presence of materials that may be hazardous.

Site conditions may change over time. This report is based on conditions encountered at the Site at the time of the report and Ramboll disclaims responsibility for any changes that may have occurred after this time.

The conclusions presented in this report represent Ramboll's professional judgment based on information made available during the course of this assignment and are true and correct to the best of Ramboll's knowledge as at the date of the assessment.

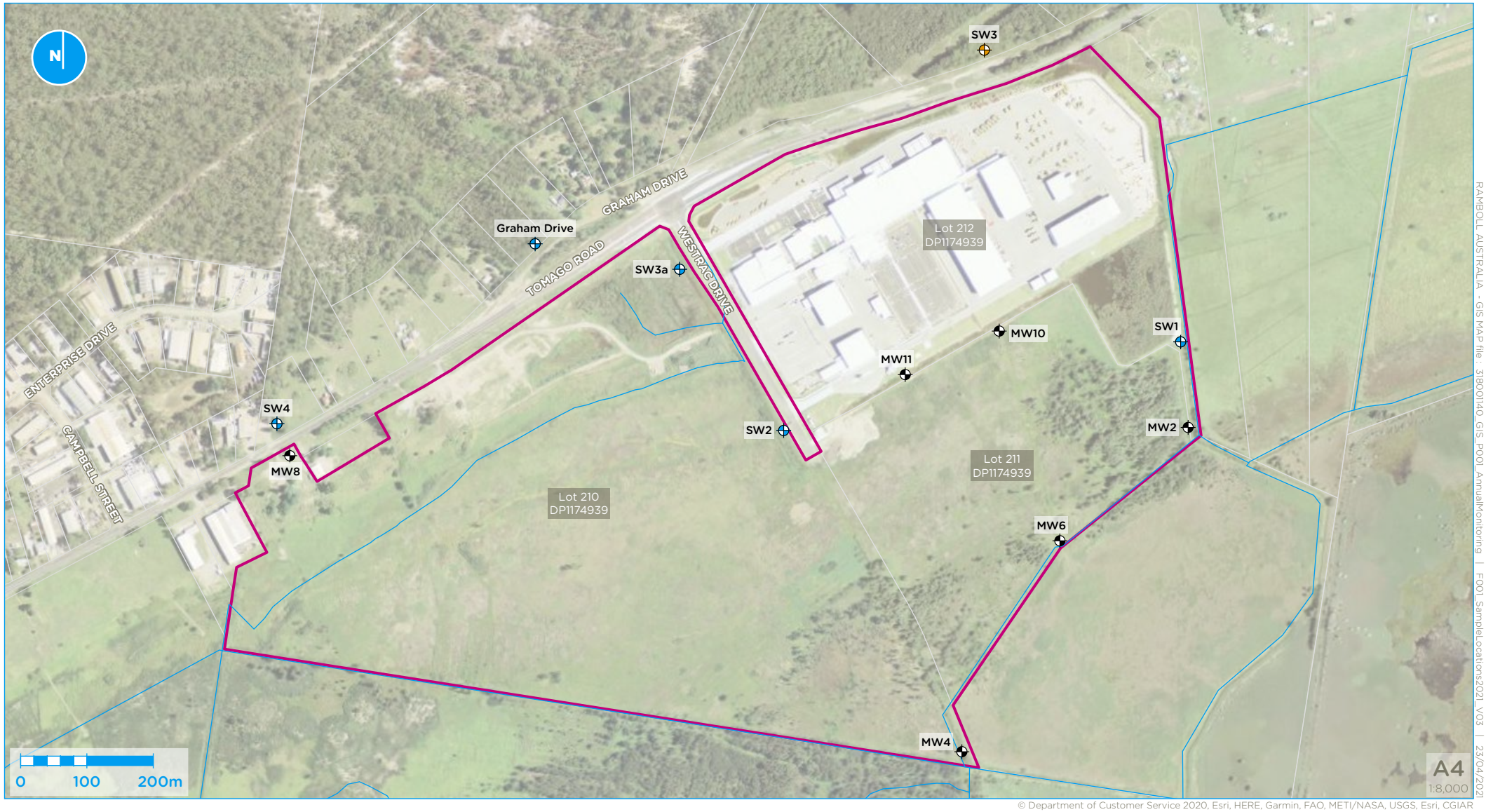
Ramboll did not independently verify all of the written or oral information provided to Ramboll during the course of this investigation. While Ramboll has no reason to doubt the accuracy of the information provided to it, the report is complete and accurate only to the extent that the information provided to Ramboll was itself complete and accurate.

This report does not purport to give legal advice. This advice can only be given by qualified legal advisors.

8.1 User Reliance

This report has been prepared exclusively for Northbank Enterprise Hub (NEH) Australia, (c/- Torque Projects Pty Ltd) and may not be relied upon by any other person or entity without Ramboll's express written permission.

APPENDIX 1
FIGURES



Legend

- Site boundary
- Waterway
- Groundwater monitoring well location
- Surface water sample location
- Surface water sample location (dry)

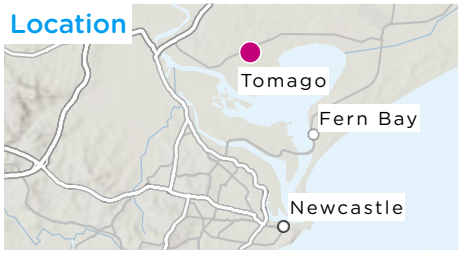


Figure 1 : Groundwater and Surface Water Sampling Locations

GROUNDWATER AND SURFACE WATER MONITORING

APPENDIX 2
FIELD SHEETS

RAMBOLL

Surface Water Sampling Sheet

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:		Subcontractors:	
Finish time:			

Equipment

Water Quality Meter ID:

Water Quality Parameters

Sample ID	SW1	
Sampling Method	grab sample	
Time		
Intake Depth From Surface (mm)	100mm	
Temperature (°C)	21.23	
Dissolved Oxygen (mg/L)	0.91	
pH	6.57	
Oxido Reduction Potential (mV)	-14	
TDS (~~mS/cm~~) g/L	0.084	
Turbidity (NTU)	3.8	
Specific Conductivity	0.13mS/cm	
Comments	clear, no odour, brown flocculants.	
No. of Contrainers used		

QA/QC Checklist

Are air bubbles present in vials?	☐ Y	☑ N	☐ N/A	
Was sample for metals field filtered?	☐ Y	☑ N	☐ N/A	
Duplicate Samples Collected?	☐ Y	☑ N		Duplicate Sample ID:
Rinsate Blank Collected?	☐ Y	☑ N		Primary Sample ID:
				Rinsate Blank ID:

:RTH
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st Perth WA 6004
: 08 9225 5199

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Surface Water Sampling Sheet

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:		Subcontractors:	
Finish time:			

Equipment

Water Quality Meter ID:

Water Quality Parameters

Sample ID	Graham Drive	SW2
Sampling Method	grab	grab
Time	15:26	15:45
Intake Depth From Surface (mm)	0.05m	0.05m
Temperature (°C)	22.97	22.18
Dissolved Oxygen (mg/L)	2.97	3.47
pH	5.31	7.08
Oxido Reduction Potential (mV)	76	-84
TDS (~~mS/cm~~) mg/L	191	223
Turbidity (NTU)	15.1	298
Specific Conductivity (mS/cm)	0.294	0.342
Comments	slightly turbid, brown, strong odour	highly turbid, brown, no odour, needs growing in drainage line
No. of Contrainers used	10	10

QA/QC Checklist

Are air bubbles present in vials?	☐ Y	☑ N	☐ N/A	
Was sample for metals field filtered?	☐ Y	☑ N	☐ N/A	
Duplicate Samples Collected?	☐ Y	☒ N		Duplicate Sample ID:
Rinsate Blank Collected?	☐ Y	☒ N		Primary Sample ID:
				Rinsate Blank ID:

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Surface Water Sampling Sheet

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:		Subcontractors:	
Finish time:			

Equipment

Water Quality Meter ID:

Water Quality Parameters

Sample ID	SW3a	
Sampling Method	grab	
Time	15:58	
Intake Depth From Surface (mm)	0.05m	
Temperature (°C)	22.69	
Dissolved Oxygen (mg/L)	1.07	
pH	6.42	
Oxido Reduction Potential (mV)	30	
TDS (~~mS/cm~~) (mg/L)	110	
Turbidity (NTU)	365	
Specific Conductivity (mS/cm)	0.170	
Comments	highly turbid, brown, no odour, needs grawing in drainage line	
No. of Contrainers used	10	

QA/QC Checklist

Are air bubbles present in vials?	☐ Y	☒ N	☐ N/A	
Was sample for metals field filtered?	☐ Y	☒ N	☐ N/A	
Duplicate Samples Collected?	☐ Y	☒ N		Duplicate Sample ID:
Rinsate Blank Collected?	☐ Y	☒ N		Primary Sample ID:
				Rinsate Blank ID:

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Low Flow Groundwater Sampling Field Parameter Form

Well ID: MW2.

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:	9.44am	Subcontractors:	
Finish time:			

Field Measurements			
Organic Vapours in Well:		ppm	Measurement device:
Depth to Groundwater	0.57m	m	
Correction:	0.41m	m	
Groundwater Elevation:		m	Measurement device:
Depth to Immiscible Layer		m	
Thickness to Immiscible layer:		m	
Well Depth	4.24m	m	Measurement device:
Thickness to Groundwater Column:		m	

Well Sampling

Method: ☐ Micro-Purge ☒ Peristalic ☐ Bailer

Start Sampling: End Sampling:

Sample Appearance:

Stability Parameters			<0.1m	±0.1°C	±0.1 pH unit	±10%	±0.1mg/L	±10%	±10%	±10%	
TIME	Vol (L)	flowrate (L/min)	Drawdown (m)	TEMP (°C)	pH	SPEC. COND. (µS/cm	DO (mg/L)	Redox (mV)	TDS (mg/L)	Turbidity (NTU)	Comments (Appearance, colour and odour)
9.51	0.5		0.75	20.19	7.77	1740	3.68	-127	1120	274	
9.54	0.5		1.30	19.68	7.74	1700	1.57	-139	1080	130	
9.57	0.5		1.47	20.62	8.50	1440	0.84	-131	917	137	
10.00	0.5		1.53	21.10	8.02	1560	0.54	-137	1000	78.2	
10.03	0.5		1.57	21.48	7.61	1590	0.37	-148	1020	65.5	
10.06	0.5		1.60	21.60	7.53	1620	0.24	-157	1040	63.3	High turbid, brown to black, strong 'fow' odour
10.09	0.5		1.64	21.51	7.45	1640	0.18	-155	1070	64.6	

IF Negative Redox and >2mg/L DO. RECALIBRATE and check again.

Miscellaneous Field Comments

Well Head Integrity: Final water level 1.76mbTOC

Samples Filtered: Metals

Weather Conditions: Overcast

Other:

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RAMBOLL

Low Flow Groundwater Sampling Field Parameter Form

Well ID: MW4

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:		Subcontractors:	
Finish time:			

Field Measurements			
Organic Vapours in Well:		ppm	Measurement device:
Depth to Groundwater	0.88m	m	
Correction:	0.50m	m	
Groundwater Elevation:		m	Measurement device:
Depth to Immiscible Layer		m	
Thickness to Immiscible layer:		m	
Well Depth	4.53m	m	Measurement device:
Thickness to Groundwater Column:		m	

Well Sampling

Method: ☐ Micro-Purge ☐ Peristalic ☐ Bailer

Start Sampling: End Sampling:

Sample Appearance:

Stability Parameters			<0.1m	±0.1°C	±0.1 pH unit	±10%	±0.1mg/L	±10%	±10%	±10%	
TIME	Vol (L)	flowrate (L/min)	Drawdown (m)	TEMP (°C)	pH	SPEC. COND. (µS/cm	DO (mg/L)	Redox (mV)	TDS (mS/cm)	Turbidity (NTU)	Comments (Appearance, colour and odour)
11.35	0.4		1.10	22.74	7.33	3320	1.13	-98	20.3	21.7	clear, small bleak
11.38	0.4		1.19	22.56	7.35	3360	0.65	-103	20.5	21.9	flocculent, slight
11.41	0.4		1.21	22.45	7.36	3396	0.51	-105	20.7	21.0	odour
11.44	0.4		1.26	22.31	7.36	3410	0.38	-106	20.8	19.8	

IF Negative Redox and >2mg/L DO. RECALIBRATE and check again.

Miscellaneous Field Comments

Well Head Integrity: 1.58m

Samples Filtered:

Weather Conditions:

Other:

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Low Flow Groundwater Sampling Field Parameter Form

Well ID: MW6

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:	10.44am	Subcontractors:	
Finish time:			

Field Measurements			
Organic Vapours in Well:		ppm	Measurement device:
Depth to Groundwater	0.76m	m	
Correction:	0.62m	m	I.P Dipper
Groundwater Elevation:		m	Measurement device:
Depth to Immiscible Layer		m	
Thickness to Immiscible layer:		m	
Well Depth	8.53m	m	Measurement device:
Thickness to Groundwater Column:		m	

Well Sampling

Method: ☐ Micro-Purge ☐ Peristalic ☐ Bailer

Start Sampling: End Sampling:

Sample Appearance:

Stability Parameters			<0.1m	±0.1°C	±0.1 pH unit	±10%	±0.1mg/L	±10%	±10%	±10%	
TIME	Vol (L)	flowrate (L/min)	Drawdown (m)	TEMP (°C)	pH	SPEC. COND. (µS/cm	DO (mg/L)	Redox (mV)	TDS ~~(mS/cm)~~ S/Z	Turbidity (NTU)	Comments (Appearance, colour and odour)
10:46	0.4	0.133	0.78	22.57	7.73	1280	2.26	-2	7.99	16.6	clear, slight odour
10:49	0.4	0.133	0.79	20.72	7.58	1300	0.95	-15	8.05	13.3	"
10:52	0.4	0.133	0.79	21.35	7.55	1270	0.55	-13	7.87	13.3	"
10:55	0.4	0.133	0.79	21.52	7.51	1280	0.38	-17	8.02	12.6	"

IF Negative Redox and >2mg/L DO. RECALIBRATE and check again.

Miscellaneous Field Comments

Well Head Integrity: 0.77m after sampling

Samples Filtered: Metals

Weather Conditions: Raining

Other:

PERTH
Level 2, 200 Adelaide Terrace
East Perth WA 6004
Ph: 08 9225 5199

SYDNEY
Level 3, 100 Pacific Highway
North Sydney NSW 2060
Ph: 02 9954 8100

HUNTER
Suite 18, 50 Glebe Road
The Junction NSW 2291
Ph: 02 4962 5444

Ramboll Australia Pty Ltd
ACN 095 437 442
ABN 49 095 437 442
www.ramboll.com

RAMBOLL

Low Flow Groundwater Sampling Field Parameter Form

Well ID: MW8

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:		Subcontractors:	
Finish time:			

Field Measurements			
Organic Vapours in Well:		ppm	Measurement device:
Depth to Groundwater	2.65	m	
Correction:	1.05	m	
Groundwater Elevation:		m	Measurement device:
Depth to Immiscible Layer		m	
Thickness to Immiscible layer:		m	
Well Depth	6.35	m	Measurement device:
Thickness to Groundwater Column:		m	

Well Sampling

Method: ☐ Micro-Purge ☒ Peristalic ☐ Bailer

Start Sampling: End Sampling:

Sample Appearance:

Stability Parameters			<0.1m	±0.1°C	±0.1 pH unit	±10%	±0.1mg/L	±10%	±10%	±10%	
TIME	Vol (L)	flowrate (L/min)	Drawdown (m)	TEMP (°C)	pH	SPEC. COND. (µS/cm	DO (mg/L)	Redox (mV)	TDS (mS/cm)	Turbidity (NTU)	Comments (Appearance, colour and odour)
14:47	0.4		2.65	25.40	7.10	222	3.67	3	146	14.6	
14:50	0.4		2.65	20.76	5.61	222	0.73	74	145	7.0	
14:53	0.4		2.65	20.57	5.59	218	0.43	70	141	5.3	
14:56	0.4		2.65	20.49	5.59	217	0.30	66	141	4.6	
14:59	0.4		2.65	20.41	5.60	219	0.19	58	142	4.0	

IF Negative Redox and >2mg/L DO. RECALIBRATE and check again.

Miscellaneous Field Comments

Well Head Integrity: final water level 2.65 mbTOC

Samples Filtered: Metals

Weather Conditions: Overcast

Other:

PERTH
Level 2, 200 Adelaide Terrace
East Perth WA 6004
Ph: 08 9225 5199

SYDNEY
Level 3, 100 Pacific Highway
North Sydney NSW 2060
Ph: 02 9954 8100

HUNTER
Suite 18, 50 Glebe Road
The Junction NSW 2291
Ph: 02 4962 5444

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RAMBOLL

Low Flow Groundwater Sampling Field Parameter Form

Well ID: MW10

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:		Subcontractors:	
Finish time:			

Field Measurements			
Organic Vapours in Well:		ppm	Measurement device:
Depth to Groundwater	1.35 m	m	
Correction:	0.6 m	m	
Groundwater Elevation:		m	Measurement device:
Depth to Immiscible Layer		m	
Thickness to Immiscible layer:		m	
Well Depth	3.02 m	m	Measurement device:
Thickness to Groundwater Column:		m	

Well Sampling

Method: ☐ Micro-Purge ☒ Peristalic ☐ Bailer

Start Sampling: End Sampling:

Sample Appearance:

Stability Parameters			<0.1m	±0.1°C	±0.1 pH unit	±10%	±0.1mg/L	±10%	±10%	±10%	
TIME	Vol (L)	flowrate (L/min)	Drawdown (m)	TEMP (°C)	pH	SPEC. COND. (µS/cm)	DO (mg/L)	Redox (mV)	TDS (mS/cm) g/L	Turbidity (NTU)	Comments (Appearance, colour and odour)
13:13	0.4		1.44	23.16	6.26	0.255	1.91	3	0.164	45.3	
13:16	0.4		1.39	23.88	6.02	0.255	0.82	-39	0.166	79.1	
13:19	0.4		1.37	23.90	5.98	0.248	0.52	-100	0.161	206	
13:22	0.4		1.37	22.86	5.92	0.243	0.38	-102	0.158	202	
13:25	0.4		1.37	22.11	5.90	0.234	0.26	-103	0.150	159	light brown, slightly turbid, sulphide odour

IF Negative Redox and >2mg/L DO. RECALIBRATE and check again.

Miscellaneous Field Comments

Dol - 20210312 - Duplicate.

Well Head Integrity: Final water level 1.37 mbTOC

Samples Filtered: metals

Weather Conditions: overcast.

Other:

PERTH
Level 2, 200 Adelaide Terrace
East Perth WA 6004
Ph: 08 9225 5199

SYDNEY
Level 3, 100 Pacific Highway
North Sydney NSW 2060
Ph: 02 9954 8100

HUNTER
Suite 18, 50 Glebe Road
The Junction NSW 2291
Ph: 02 4962 5444

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RAMBOLL

Low Flow Groundwater Sampling Field Parameter Form

Well ID: MW11

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N Gilbert
Project No:	318001140		
Date:	12/03/2021		
Start time:		Subcontractors:	
Finish time:			

Field Measurements			
Organic Vapours in Well:		ppm	Measurement device:
Depth to Groundwater	1.40m	m	
Correction:	0.81m	m	
Groundwater Elevation:		m	Measurement device:
Depth to Immiscible Layer		m	
Thickness to Immiscible layer:		m	
Well Depth	11.45m	m	Measurement device:
Thickness to Groundwater Column:		m	

Well Sampling

Method: ☐ Micro-Purge ☐ Peristalic ☐ Bailer

Start Sampling: End Sampling:

Sample Appearance:

Stability Parameters			<0.1m	±0.1°C	±0.1 pH unit	±10%	±0.1mg/L	±10%	±10%	±10%	
TIME	Vol (L)	flowrate (L/min)	Drawdown (m)	TEMP (°C)	pH	SPEC. COND. (~~µS/cm~~ mS/cm)	DO (mg/L)	Redox (mV)	TDS (~~mg/L~~ g/L)	Turbidity (NTU)	Comments (Appearance, colour and odour)
14.12	0.4		1.40	24.14	5.67	0.337	4.65	-2	0.210	53.7	slightly turbid, slight
14.15	0.4		1.40	22.65	5.46	0.303	1.09	-23	0.197	44.4	sulphide odour.
14.18	0.4		1.40	21.89	5.54	0.291	0.55	-41	0.187	29.6	
14.20	0.4		1.40	21.54	5.56	0.278	0.42	-48	0.180	27.5	
14.22	0.4		1.40	21.33	5.57	0.267	0.31	-57	0.172	27.8	

IF Negative Redox and >2mg/L DO. RECALIBRATE and check again.

Miscellaneous Field Comments

Well Head Integrity: 1.4

Samples Filtered: metals

Weather Conditions: overcast

Other:

PERTH
Level 2, 200 Adelaide Terrace
East Perth WA 6004
Ph: 08 9225 5199

SYDNEY
Level 3, 100 Pacific Highway
North Sydney NSW 2060
Ph: 02 9954 8100

HUNTER
Suite 18, 50 Glebe Road
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RAMBOLL

Low Flow Groundwater Sampling Field Parameter Form

Well ID: MW2

Project Name:	2021 NEH Annual Monitoring	Ramboll Personnel:	J Bourke N McGuire
Project No:	318001140		
Date:	15/04/2021		
Start time:	9.25am	Subcontractors:	
Finish time:	10.05am		

Field Measurements			
Organic Vapours in Well:		ppm	Measurement device:
Depth to Groundwater	0.54m	m	IP Probe
Correction:	0.37m	m	
Groundwater Elevation:		m	Measurement device:
Depth to Immiscible Layer		m	
Thickness to Immiscible layer:		m	
Well Depth	4.29m	m	Measurement device:
Thickness to Groundwater Column:		m	

Well Sampling

Method: ☐ Micro-Purge ☑ Peristalic ☐ Bailer

Start Sampling: End Sampling:

Sample Appearance:

Stability Parameters			<0.1m	±0.1°C	±0.1 pH unit	±10%	±0.1mg/L	±10%	±10%	±10%	
TIME	Vol (L)	flowrate (L/min)	Drawdown (m)	TEMP (°C)	pH	SPEC. COND. (µS/cm	DO (mg/L)	Redox (mV)	TDS (mS/cm)	Turbidity (NTU)	Comments (Appearance, colour and odour)
9.31	500		0.95	19.09	7.02	1670	0.0	-166	1070	—	clear, grey/black, strong (organic?)
9.34	500		0.98	18.90	7.12	1640	0.0	-183	1050	—	odour
9.39	500		1.13	18.92	7.13	1600	0.0	-187	1020	—	" "
9.44	500		1.33	18.95	7.11	1540	0.0	-183	985	—	" "
9.49	500		1.45	19.00	7.07	1460	0.0	-189	933	—	" "

IF Negative Redox and >2mg/L DO. RECALIBRATE and check again.

Miscellaneous Field Comments

Final water level 1.47 mbTOC

Well Head Integrity:

Samples Filtered: N/A

Weather Conditions: Fine / Sunny

Other:

PERTH
Level 2, 200 Adelaide Terrace
East Perth WA 6004
Ph: 08 9225 5199

SYDNEY
Level 3, 100 Pacific Highway
North Sydney NSW 2060
Ph: 02 9954 8100

HUNTER
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The Junction NSW 2291
Ph: 02 4962 5444

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Multi-Parameter Water Quality Meter Calibration

Instrument: Horiba U-50 Series
Control Unit Serial No: WVM29BTT
Sensor Probe Unit Serial No: WSMJCJ88

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Solution	Standard Solution	Solution Model No.	Instrument Reading
pH	pH 4 AUTO CAL SOLN	4.01 pH units	100-4	4.00 pH units
Conductivity	pH 4 AUTO CAL SOLN	4.49 mS/cm	100-4	4.48 mS/cm
Turbidity	pH 4 AUTO CAL SOLN	0.0 NTU	100-4	0.0 NTU
DO	Ambient Air	9.09 mg/L	N/A	10.25 mg/L
Depth	Ambient Air	0.00 m	N/A	0.00 m

Calibrated by: **Jake Bourke**

Calibration date: **3/02/2021**

Next calibration due: 3/04/2021

Oil / Water Interface Meter

Instrument **Geotech Interface Meter (60M)**
Serial No. **3953**

airmet
Air-Met Scientific Pty Ltd
1300 137 067

Item	Test	Pass	Comments
Battery	Compartment	✓	Beeper noise is soft
	Capacity	✓	
Probe	Cleaned/Decon.	✓	
	Operation	✓	
Connectors	Condition	✓	
		✓	
Tape Check	Cleaned	✓	
Connectors	Checked for cuts	✓	
Instrument Test	At surface level	✓	

Certificate of Calibration

This is to certify that the above instrument has been cleaned and tested.

Calibrated by: **Elyce Ireland**

Calibration date: **13/04/2021**

Next calibration due: **12/06/2021**

Multi-Parameter Water Quality Meter Calibration

pH Manual Calibration (two-points)

Instrument: Horiba U-52G/10m
Control Unit Serial No: WVM29BTT
Sensor Probe Unit Serial No: WSMJCJ88

Certificate of Calibration

This is to certify that the above instrument has been calibrated to the following specifications:

Sensor	Solution	Solution Temperature	Calibration Point	Measurement Value
pH	pH 4 standard solution phthalate	25.55	4.01	4.01
	pH 7 standard solution Neutral phosphate	23.36	7.02	7.02

Calibrated by: **Jake Bourke**

Calibration date: **14/04/2021**

Table A: Change in pH with temperature (°C)

Temperature (°C)	pH 4 standard solution	pH 7 standard solution	pH 10 standard solution
5	4.00	7.09	10.24
10	4.00	7.06	10.19
15	4.00	7.04	10.12
20	4.00	7.02	10.06
30	4.01	7.00	9.96
35	4.02	6.99	9.92
40	4.03	6.97	9.90
50	4.06	6.95	9.82

APPENDIX 3
RESULTS SUMMARY TABLE

Project No: 318001140
Client Name: NEH c/- Torque Projects
Project Name: NEH Annual Groundwater and Surface Water Monitoring
Project Site: Tomago
5/7/2021

Table 1 - Physico-chemical Properties

Well ID / Surface Water ID	Date	Time	SWL (mbtoc)	pH	Temperature (°C)	DO (mg/L)	Eh (mV)	Spec Cond. (µS/cm)	TDS (mg/L)	Turbidity (NTU)	Comments
SW1	3/12/2021	-	-	6.57	21.23	0.91	-14	130	84	3.8	Clear, no odour, some flocculants
SW2	3/12/2021	15:45	-	7.08	22.18	3.47	-84	342	223	248	Highly turbid, brown, no odour, reeds growing in drainage line
SW3a	3/12/2021	15:58	-	6.42	22.69	1.07	30	170	110	365	Highly turbid, brown, no odour, reeds growing in drainage line
Graham Drive	3/12/2021	15:26	-	5.31	22.97	2.97	76	294	191	15.1	Slightly turbid, brown, strong odour
MW2	3/12/2021	10:09	1.64	7.45	21.51	0.18	-155	1,640	1,070	64.6	Highly turbid, brown to black, strong 'foul' odour
MW2	15/4/2021	9:49	0.54	7.07	19.00	0.00	-189	1,460	933	-	clear, grey, black, strong organic odour
MW4	3/12/2021	11:44	1.26	7.36	22.31	0.38	-106	3,410	20,800	19.8	Clear, small black flocculants, slight odour
MW6	3/12/2021	10:55	0.79	7.51	21.52	0.38	-17	1,280	8,020	12.6	Clear, slight odour
MW8	3/12/2021	14:59	2.65	5.60	20.41	0.19	58	219	142	4.0	-
MW10	3/12/2021	13:25	1.37	5.90	22.11	0.26	-103	234	150	159.0	Slightly turbid, light brown, sulphide odour
MW11	3/12/2021	14:22	1.40	5.57	21.33	0.31	-58	267	172	27.8	Slightly turbid, slight sulphide odour

Notes

L = Litre

DO = Dissolved Oxygen

ppm = parts per million

EC = Electrical Conductivity

µScm-¹ = microSiemens per centimetre

Eh = Redox

mV = milli Volts

TDS = Total Dissolved Solids

NTU =Nephelometric Turbidity Units

Project No: 318001140
Client Name: NEH c/- Torque Projects
Project Name: NEH Annual Groundwater and Surface Water Monitoring
Project Site: Tomago
5/7/2021

TABLE 2:
Groundwater and Surface Water Sampling Results

RAMBOLL

Guidelines	95% Fresh Water Protection for Aquatic Ecosystems [A]	Drinking Water Guidelines [B]														
			Sample Type:		REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
			ALS Sample number:		ES2109007001	ES2113835001	ES2109007002	ES2109007003	ES2109007004	ES2109007005	ES2109007006	ES2109007008	ES2109007009	ES2109007010	ES2109007011
			Sample date:		12/03/2021	15/04/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021
			Sample ID:		MW2	MW2 - resample	MW4	MW6	MW8	MW10	MW11	SW1	SW2	Graham Drive	SW3a
			Project Name:		NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring
			Site:		Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago
			Sampling Method:		Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Grab Sample	Grab Sample	Grab Sample	Grab Sample
Analyte grouping/Analyte			**Units**	**LOR**											
EA025: Total Suspended Solids dried at 104 ± 2°C															
Suspended Solids (SS)		600	mg/L	5	247	-	86	34	8	22	23	112	**1720**	29	**935**
ED037P: Alkalinity by PC Titrator															
Hydroxide Alkalinity as CaCO3			mg/L	1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3			mg/L	1	<1	-	<1	<1	<1	<1	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3			mg/L	1	688	-	1230	400	13	28	17	29	141	5	26
Total Alkalinity as CaCO3			mg/L	1	688	-	1230	400	13	28	17	29	141	5	26
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA															
Sulfate as SO4 - Turbidimetric		500	mg/L	1	9	-	**4610**	**896**	32	3	2	1	6	<1	9
ED045G: Chloride by Discrete Analyser															
Chloride		250	mg/L	1	71	-	**10400**	**5960**	33	46	60	18	19	68	22
ED093F: Dissolved Major Cations															
Calcium			mg/L	1	38	-	534	297	11	2	2	8	34	4	8
Magnesium			mg/L	1	19	-	1310	439	4	4	6	2	7	3	3
Sodium			mg/L	1	198	-	6520	2760	24	31	33	12	17	41	15
Potassium			mg/L	1	21	-	222	86	2	4	2	1	4	1	4
EK026SF: Total CN by Segmented Flow Analyser															
Total Cyanide	0.007	0.08	mg/L	0.004	<0.004	-	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004	<0.004
EK040P: Fluoride by PC Titrator															
Fluoride		1.5	mg/L	0.1	0.6	-	0.6	0.5	<0.1	<0.1	<0.1	0.1	0.1	0.2	<0.1
EK055G: Ammonia as N by Discrete Analyser															
Ammonia as N	0.9	0.5	mg/L	0.01	**55.6**	-	**1.05**	**1.05**	0.08	0.34	**0.67**	<0.01	**0.76**	<0.01	0.46
EK057G: Nitrite as N by Discrete Analyser															
Nitrite as N		3	mg/L	0.01	<0.01	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser															
Nitrate as N	0.7	50	mg/L	0.01	0.3	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.14	0.13	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser															
Nitrite + Nitrate as N			mg/L	0.01	0.3	-	<0.01	<0.01	<0.01	<0.01	<0.01	0.14	0.13	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser															
Total Kjeldahl Nitrogen as N			mg/L	0.1	56	-	2.1	1.8	0.4	0.9	0.9	2.3	67.1	1.5	70.8
EK067G: Total Phosphorus as P by Discrete Analyser															
Total Phosphorus as P	0.025		mg/L	0.01	**6.05**	-	**1.7**	**1.76**	0.01	0.02	0.02	**0.19**	**6.67**	**0.03**	**6.78**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser															
Total Nitrogen as N			mg/L	0.01	56.3	-	2.1	1.8	0.4	0.9	0.9	2.4	67.2	1.5	70.8
EN055: Ionic Balance															
Total Anions			meq/L	0.01	15.9	-	414	195	1.86	1.92	2.07	1.11	3.48	2.02	1.33
Total Cations			meq/L	0.01	16.6	-	424	173	1.97	1.88	2.08	1.11	3.17	2.26	1.4
Ionic Balance			%	0.01	1.94	-	1.17	5.86	-	-	-	-	4.69	-	-
EG020T: Dissolved Metals by ICP-MS															
Arsenic (V)	13	10	µg/L	1	2	--	<10	1	1	<1	<1	-	-	-	-
Cadmium [K]	0.2	2	µg/L	0.1	<0.1	-	**<1.0**	<0.1	<0.1	<0.1	<0.1	-	-	-	-
Chromium (VI) [J]	1	50	µg/L	1	1	-	**<10**	1	**2**	**2**	1	-	-	-	-
Copper	1.4	2000	µg/L	1	<1	-	**<10**	<1	<1	<1	<1	-	-	-	-
Lead	3.4	10	µg/L	1	<1	-	**<10**	<1	<1	<1	<1	-	-	-	-
Manganese	1900	500	µg/L	1	449	-	**12200**	**2010**	21	10	13	-	-	-	-
Molybdenum		50	µg/L	1	<1	-	<10	<1	<1	<1	<1	-	-	-	-
Nickel	11	20	µg/L	1	1	-	<10	<1	<1	<1	<1	-	-	-	-
Zinc	8	3000	µg/L	5	<5	-	**<50**	<5	<5	<5	<5	-	-	-	-
Iron	700	300	µg/L	50	**6670**	-	**34700**	<50	**590**	**400**	**720**	-	-	-	-
EG035F: Dissolved Mercury by FIMS						-									
Mercury	**0.06**	1	µg/L	0.1	**<0.1**	-	**<0.1**	**<0.1**	**<0.1**	**<0.1**	**<0.1**	-	-	-	-
EG020T: Total Metals by ICP-MS															
Arsenic (V)	13	10	µg/L	1	-	-	-	-	-	-	-	4	7	<1	8
Cadmium [K]	0.2	2	µg/L	0.1	-	-	-	-	-	-	-	<0.1	0.1	<0.1	**0.4**
Chromium [J]	1	50	µg/L	1	-	-	-	-	-	-	-	<1	**4**	**3**	**24**
Copper	1.4	2000	µg/L	1	-	-	-	-	-	-	-	<1	**3**	1	**32**
Lead	3.4	10	µg/L	1	-	-	-	-	-	-	-	<1	2	1	**25**
Manganese	1900	500	µg/L	1	-	-	-	-	-	-	-	214	**1360**	84	**583**
Molybdenum		50	µg/L	1	-	-	-	-	-	-	-	<1	<1	<1	3
Nickel	11	20	µg/L	1	-	-	-	-	-	-	-	1	3	5	11
Zinc	8	3000	µg/L	5	-	-	-	-	-	-	-	8	**31**	**84**	**218**
Iron	700	300	µg/L	50	-	-	-	-	-	-	-	**15300**	**40600**	**4280**	**27400**
EG035T: Total Recoverable Mercury by FIMS															
Mercury	**0.06**	1	µg/L	0.1	-	-	-	-	-	-	-	**<0.1**	**<0.1**	**<0.1**	**<0.1**
EP066: Polychlorinated Biphenyls (PCB)															
Total Polychlorinated biphenyls		1	µg/L	1	<1	-	<1	<1	<1	<1	<1	-	<1	-	<1
EP068A: Organochlorine Pesticides (OC)															
alpha-BHC			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Hexachlorobenzene (HCB)	*0.1*		µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
beta-BHC			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
gamma-BHC			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
delta-BHC			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Heptachlor [K]	0.09	0.3	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Aldrin	*0.001*		µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Heptachlor epoxide			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
trans-Chlordane			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
alpha-Endosulfan	*0.0002*		µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
cis-Chlordane			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Dieldrin	*0.01*		µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
4.4`-DDE	*0.03*		µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Endrin [K]	0.02		µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
beta-Endosulfan	*0.007*		µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
4.4`-DDD			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Endrin aldehyde			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Endosulfan sulfate [K L]	0.2	20	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
4.4`-DDT [K]	0.01	9	µg/L	2	**<2.0**	-	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	-	**<2.0**	-	**<2.0**
Endrin ketone			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Methoxychlor	*0.005*	300	µg/L	2	**<2.0**	-	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	-	**<2.0**	-	**<2.0**
^ Total Chlordane (sum) [K]	0.08	2	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
^ Sum of DDD + DDE + DDT			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
^ Sum of Aldrin + Dieldrin		0.3	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
EP068B: Organophosphorus Pesticides (OP)															
Dichlorvos		5	µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Demeton-S-methyl	*4*		µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Monocrotophos			µg/L	2	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	-	<2.0
Dimethoate	0.15	7	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Diazinon	0.01	4	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Chlorpyrifos-methyl			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Parathion-methyl		0.7	µg/L	2	<2.0	-	<2.0	<2.0	<2.0	<2.0	<2.0	-	<2.0	-	<2.0
Malathion	0.05	70	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Fenthion		7	µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Chlorpyrifos [K]	0.01	10	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Parathion [J]	0.004	20	µg/L	2	**<2.0**	-	**<2.0**	**<2.0**	**<2.0**	**<2.0**	**<2.0**	-	**<2.0**	-	**<2.0**
Pirimphos-ethyl			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Chlorfenvinphos		2	µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Bromophos-ethyl			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Fenamiphos		0.5	µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Prothiofos			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Ethion		4	µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Carbophenothion			µg/L	0.5	<0.5	-	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Azinphos Methyl	**0.01**	30	µg/L	0.5	**<0.5**	-	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
EP075(SIM)A: Phenolic Compounds															
Phenol	320		µg/L	1	97.1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol [J]	**340**	300	µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol			µg/L	2	4710	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	*2*		µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	*2*		µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dichlorophenol	**120**	200	µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	*34*		µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2.4.6-Trichlorophenol [J]	**3**	20	µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
2.4.5-Trichlorophenol	*0.5*		µg/L	1	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**
Pentachlorophenol [J]	**3.6**	10	µg/L	2	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons															
Naphthalene [J]	16		µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Acenaphthylene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Acenaphthene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Fluorene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Phenanthrene [K]	***0.6***		µg/L	1	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	-	**<1.0**	-	**<1.0**
Anthracene [K]	***0.01***		µg/L	1	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	**<1.0**	-	**<1.0**	-	**<1.0**
Fluoranthene [K]	***1***		µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Pyrene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Benz(a)anthracene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Chrysene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Benzo(b+j)fluoranthene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Benzo(k)fluoranthene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Benzo(a)pyrene [K]	***0.1***	0.01	µg/L	0.5	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	**<0.5**	-	**<0.5**	-	**<0.5**
Indeno(1.2.3.cd)pyrene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Dibenz(a.h)anthracene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Benzo(g.h.i)perylene			µg/L	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	-	<1.0
Sum of polycyclic aromatic hydrocarbons			µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
Benzo(a)pyrene TEQ (zero)			µg/L	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	<0.5	-	<0.5
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions															
C6 - C10 Fraction			µg/L	20	**120**	**20**	<20	<20	<20	<20	<20	<20	<20	<20	<20
C6 - C10 Fraction minus BTEX (F1)			µg/L	20	**40**	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction			µg/L	100	**2750**	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction			µg/L	100	**3560**	**230**	<100	<100	<100	<100	<100	<100	<100	**280**	<100
>C34 - C40 Fraction			µg/L	100	**340**	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
>C10 - C40 Fraction (sum)			µg/L	100	**6650**	**230**	<100	<100	<100	<100	<100	<100	<100	**280**	<100
>C10 - C16 Fraction minus Naphthalene (F2)			µg/L	100	**2750**	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup															
>C10 - C40 Fraction (sum)			µg/L	100	<100	-	-	-	-	-	-	-	-	<100	-

Project No: 318001140
Client Name: NEH c/- Torque Projects
Project Name: NEH Annual Groundwater and Surface Water Monitoring
Project Site: Tomago
5/7/2021

TABLE 2:
Groundwater and Surface Water Sampling Results

Guidelines	95% Fresh Water Protection for Aquatic Ecosystems [A]	Drinking Water Guidelines [B]												
			Sample Type:		REG	REG	REG	REG	REG	REG	REG	REG	REG	REG	REG
			ALS Sample number:		ES2109007001	ES2113835001	ES2109007002	ES2109007003	ES2109007004	ES2109007005	ES2109007006	ES2109007008	ES2109007009	ES2109007010	ES2109007011
			Sample date:		12/03/2021	15/04/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021	12/03/2021
			Sample ID:		MW2	MW2 - resample	MW4	MW6	MW8	MW10	MW11	SW1	SW2	Graham Drive	SW3a
			Project Name:		NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring
			Site:		Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago	Tomago
			Sampling Method:		Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump	Grab Sample	Grab Sample	Grab Sample	Grab Sample
Analyte grouping/Analyte				**Units**	**LOR**										
EP071 SG: Total Recoverable Hydrocarbons - SV NEPM 2013 Fractions - Silica gel cleanup															
>C10 - C16 Fraction				µg/L	100	<100	-	-	-	-	-	-	-	<100	-
>C16 - C34 Fraction				µg/L	100	<100	-	-	-	-	-	-	-	<100	-
>C34 - C40 Fraction				µg/L	100	<100	-	-	-	-	-	-	-	<100	-
EP080: BTEXN															
Benzene [J]	950	1		µg/L	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1
Toluene	*180*	800		µg/L	2	75	23	<2	<2	<2	<2	<2	<2	<2	<2
Ethylbenzene	*80*	300		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	75			µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
ortho-Xylene	350			µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Total Xylenes		600		µg/L	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2
Sum of BTEX				µg/L	1	75	23	<1	<1	<1	<1	<1	<1	<1	<1
Naphthalene [J]	16			µg/L	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5
EP131B: Polychlorinated Biphenyls (as Aroclors)															
Total Polychlorinated biphenyls				µg/L	0.1	-	-	-	-	-	-	-	<0.10	-	<0.10	-
Aroclor 1016	*0.001*			µg/L	0.1	-	-	-	-	-	-	-	**<0.10**	-	**<0.10**	-
Aroclor 1221	*1*			µg/L	0.1	-	-	-	-	-	-	-	<0.10	-	<0.10	-
Aroclor 1232	*0.3*			µg/L	0.1	-	-	-	-	-	-	-	<0.10	-	<0.10	-
Aroclor 1242 [K]	***0.3***			µg/L	0.1	-	-	-	-	-	-	-	<0.10	-	<0.10	-
Aroclor 1248	*0.03*			µg/L	0.1	-	-	-	-	-	-	-	**<0.10**	-	**<0.10**	-
Aroclor 1254 [K]	***0.01***			µg/L	0.1	-	-	-	-	-	-	-	**<0.10**	-	**<0.10**	-
Aroclor 1260	*25*			µg/L	0.1	-	-	-	-	-	-	-	<0.10	-	<0.10	-
EP132B: Polynuclear Aromatic Hydrocarbons															
3-Methylcholanthrene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
2-Methylnaphthalene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
7.12-Dimethylbenz(a)anthracene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Acenaphthene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Acenaphthylene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Anthracene [K]	***0.01***			µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Benz(a)anthracene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Benzo(a)pyrene [K]	***0.1***	0.01		µg/L	0.05	-	-	-	-	-	-	-	<0.05	-	<0.05	-
Benzo(b+j)fluoranthene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Benzo(e)pyrene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Benzo(g.h.i)perylene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Benzo(k)fluoranthene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Chrysene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Coronene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Dibenz(a.h)anthracene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Fluoranthene [K]	***1***			µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Fluorene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Indeno(1.2.3.cd)pyrene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Naphthalene [J]	16			µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Perylene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Phenanthrene [K]	***0.6***			µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Pyrene				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Sum of PAHs				µg/L	0.05	-	-	-	-	-	-	-	<0.05	-	<0.05	-
Benzo(a)pyrene TEQ (zero)				µg/L	0.05	-	-	-	-	-	-	-	<0.05	-	<0.05	-
EP234A: OP Pesticides															
Acephate				µg/L	0.5	-	-	-	-	-	-	-	<0.5	-	<0.5	-
Azinphos Methyl	**0.01**	30		µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Azinphos-ethyl				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Bensulide				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Bromophos-ethyl				µg/L	0.1	-	-	-	-	-	-	-	<0.10	-	<0.10	-
Carbofenothion				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Chlorfenvinphos		2		µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Chlorpyrifos [K]	0.01	10		µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Chlorpyrifos-methyl				µg/L	0.2	-	-	-	-	-	-	-	<0.2	-	<0.2	-
Coumaphos				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Demeton-O				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Demeton-O & Demeton-S				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Demeton-S				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Demeton-S-methyl	*4*			µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Diazinon	0.01	4		µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Dichlorvos		5		µg/L	0.2	-	-	-	-	-	-	-	<0.20	-	<0.20	-
Dimethoate	0.15	7		µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Disulfoton				µg/L	0.05	-	-	-	-	-	-	-	<0.05	-	<0.05	-
EPN				µg/L	0.05	-	-	-	-	-	-	-	<0.05	-	<0.05	-
Ethion		4		µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Ethoprophos				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Fenamiphos		0.5		µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Fenchlorphos (Ronnel)				µg/L	10	-	-	-	-	-	-	-	<10	-	<10	-
Fenitrothion				µg/L	2	-	-	-	-	-	-	-	<2	-	<2	-
Fensulfothion				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Fenthion		7		µg/L	0.05	-	-	-	-	-	-	-	<0.05	-	<0.05	-
Formothion				µg/L	20	-	-	-	-	-	-	-	<20	-	<20	-
Fosetyl Aluminium				µg/L	10	-	-	-	-	-	-	-	<10	-	<10	-
Malathion	0.05	70		µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Methidathion				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Mevinphos				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Monocrotophos				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Naftalofos				µg/L	1	-	-	-	-	-	-	-	<1.0	-	<1.0	-
Omethoate				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Parathion [J]	0.004	20		µg/L	0.2	-	-	-	-	-	-	-	**<0.2**	-	**<0.2**	-
Parathion-methyl		0.7		µg/L	0.5	-	-	-	-	-	-	-	<0.5	-	<0.5	-
Phorate				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Pirimiphos-ethyl				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Pirimiphos-methyl				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Profenofos				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Prothiofos				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Pyrazophos				µg/L	0.1	-	-	-	-	-	-	-	<0.1	-	<0.1	-
Sulfotep				µg/L	0.005	-	-	-	-	-	-	-	<0.005	-	<0.005	-
Sulprofos				µg/L	0.05	-	-	-	-	-	-	-	<0.05	-	<0.05	-
Temephos				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Terbufos				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Tetrachlorvinphos				µg/L	0.01	-	-	-	-	-	-	-	<0.01	-	<0.01	-
Thiometon				µg/L	0.5	-	-	-	-	-	-	-	<0.5	-	<0.5	-
Triazophos				µg/L	0.005	-	-	-	-	-	-	-	<0.005	-	<0.005	-
Trichlorfon				µg/L	0.02	-	-	-	-	-	-	-	<0.02	-	<0.02	-
Trichloronate				µg/L	0.5	-	-	-	-	-	-	-	<0.5	-	<0.5	-
EP131A: Organochlorine Pesticides															
Aldrin	*0.001*			µg/L	0.01	-	-	-	-	-	-	-	**<0.010**	-	**<0.010**	-
alpha-BHC				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
beta-BHC				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
delta-BHC				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
4.4`-DDD				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
4.4`-DDE	*0.03*			µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
4.4`-DDT	**0.006**	9		µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Dieldrin	*0.01*			µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
alpha-Endosulfan	*0.0002*			µg/L	0.01	-	-	-	-	-	-	-	**<0.010**	-	**<0.010**	-
beta-Endosulfan	*0.007*			µg/L	0.01	-	-	-	-	-	-	-	**<0.010**	-	**<0.010**	-
Endosulfan sulfate	**0.03**	20		µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Endrin	**0.01**			µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Endosulfan (sum)				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Endrin aldehyde				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Endrin ketone				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Heptachlor	**0.01**	0.3		µg/L	0.005	-	-	-	-	-	-	-	<0.005	-	<0.005	-
Heptachlor epoxide				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Hexachlorobenzene (HCB)	***0.05***			µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
gamma-BHC				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Methoxychlor	*0.005*	300		µg/L	0.01	-	-	-	-	-	-	-	**<0.010**	-	**<0.010**	-
cis-Chlordane				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
trans-Chlordane				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Total Chlordane (sum)	**0.03**	2		µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Oxychlordane				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-
Sum of DDD + DDE + DDT				µg/L	0.01	-	-	-	-	-	-	-	<0.010	-	<0.010	-

Blank Cell indicates no criterion available
LOR = Limit of Reporting
Concentrations below the LOR noted as <value
NOC = No observed contamination

[A] Australian and New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018)
[B] National Health and Medical Research Council, National Resource Management Ministerial Council (2011) Australian Drinking Water Guidelines, updated August 2018.
[J] Figure may not protect key species from chronic toxicity, refer to ANZG (2018) for further guidance.
[K] Chemical for which possible bioaccumulation and secondary poisoning effects should be considered, refer to ANZG (2018) for further guidance.
[L] ANZECC endosulfan guideline value was compared to endosulfan sulfate listed in the table.
Default trigger values for TP are for NSW & VIC east flowing coastal rivers for slightly disturbed ecosystems
Guideline values exist for both meta-xylene and para-xylene as per ANZG (2018). The guideline value for meta- & para-Xylene guideline has been adopted as the meta-Xylene value from ANZG (2018) as it is the most conservative of the two guideline values.
Bold indicates the 99% protection level should be adopted for slightly-moderately disturbed ecosystems protection level due to potential for bio-accumulation or acute toxicity to particular species
Chlordane guideline value was compared to Total Chlordane listed in the table
TSS compared to TDS value in the absence of TSS guideline value
The 99% protection level should be adopted for slightly-moderately disturbed ecosystems protection level due to potential for bio-accumulation or acute toxicity to particular species
Arsenic guideline based on As (V) for fresh, the lowest of presented guidelines for ANZG (2018)
NHMRC arsenic guidelines are based on total arsenic
ANZG (2018) and NHMRC guidelines for chromium are based on Cr (VI)
NHMRC guidelines for mercury are based on total mercury.
ANZG (2018) and NHMRC guidelines for endosulfan sulfate are based on endosulfan
LORs in **green** font are above the guideline value
Concentration in **blue** font and grey box exceed the adopted ecosystem guideline value

Table 3:
QA/QC Groundwater Sampling Results

	Sample Type:	REG	REG	RPD	REG	REG
	ALS Sample number:	ES2109007005	ES2109007007		ES2109007012	ES2109007013
	Sample date:	12/03/2021	12/03/2021		12/03/2021	12/03/2021
	Sample ID:	MW10	D01_20210312		TRIP BLANK	TRIP SPIKE
	Project Name:	NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring		NEH Annual Groundwater Monitoring	NEH Annual Groundwater Monitoring
	Site:	Tomago	Tomago		Tomago	Tomago
	Sampling Method:	Low Flow Peristaltic Pump	Low Flow Peristaltic Pump		Low Flow Peristaltic Pump	Low Flow Peristaltic Pump
	Sample Description	PRIMARY SAMPLE	DUPLICATE OF MW10		TRIP BLANK	TRIP SPIKE
Analyte grouping/Analyte	**Units**	**LOR**				
EA025: Total Suspended Solids dried at 104 ± 2°C						
Suspended Solids (SS)	mg/L	5	22	8	93.3	-	-
ED037P: Alkalinity by PC Titrator						
Hydroxide Alkalinity as CaCO3	mg/L	1	1	1	*0.0*	-	-
Carbonate Alkalinity as CaCO3	mg/L	1	1	1	*0.0*	-	-
Bicarbonate Alkalinity as CaCO3	mg/L	1	28	22	*24.0*	-	-
Total Alkalinity as CaCO3	mg/L	1	28	22	*24.0*	-	-
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA						
Sulfate as SO4 - Turbidimetric	mg/L	1	3	3	*0.0*	-	-
ED045G: Chloride by Discrete Analyser						
Chloride	mg/L	1	46	46	*0.0*	-	-
ED093F: Dissolved Major Cations						
Calcium	mg/L	1	2	2	*0.0*	-	-
Magnesium	mg/L	1	4	4	*0.0*	-	-
Sodium	mg/L	1	31	31	*0.0*	-	-
Potassium	mg/L	1	4	4	*0.0*	-	-
EK026SF: Total CN by Segmented Flow Analyser						
Total Cyanide	mg/L	0.004	0.004	0.004	*0.0*	-	-
EK040P: Fluoride by PC Titrator						
Fluoride	mg/L	0.1	0.1	0.1	*0.0*	-	-
EK055G: Ammonia as N by Discrete Analyser						
Ammonia as N	mg/L	0.01	0.34	0.34	*0.0*	-	-
EK057G: Nitrite as N by Discrete Analyser						
Nitrite as N	mg/L	0.01	0.01	0.01	*0.0*	-	-
EK058G: Nitrate as N by Discrete Analyser						
Nitrate as N	mg/L	0.01	0.01	0.01	*0.0*	-	-
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser						
Nitrite + Nitrate as N	mg/L	0.01	0.01	0.01	*0.0*	-	-
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser						
Total Kjeldahl Nitrogen as N	mg/L	0.1	0.9	0.9	*0.0*	-	-
EK067G: Total Phosphorus as P by Discrete Analyser						
Total Phosphorus as P	mg/L	0.01	0.02	0.03	*40.0*	-	-
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser						
Total Nitrogen as N	mg/L	0.01	0.9	0.9	*0.0*	-	-
EN055: Ionic Balance						
Total Anions	meq/L	0.01	1.92	1.8	*6.5*	-	-
Total Cations	meq/L	0.01	1.88	1.88	*0.0*	-	-
Ionic Balance	%	0.01	-	-	NC	-	-
EG020T: Dissolved Metals by ICP-MS						
Arsenic (V)	µg/L	1	1	1	*0.0*	-	-
Cadmium [K]	µg/L	0.1	0.1	0.1	*0.0*	-	-
Chromium (VI) [J]	µg/L	1	2	2	*0.0*	-	-
Copper	µg/L	1	1	1	*0.0*	-	-
Manganese	µg/L	1	10	10	*0.0*	-	-
Molybdenum	µg/L	1	1	1	*0.0*	-	-
Lead	µg/L	1	1	1	*0.0*	-	-
Nickel	µg/L	1	1	1	*0.0*	-	-
Zinc	µg/L	5	5	5	*0.0*	-	-
Iron	µg/L	50	400	390	*2.5*	-	-
EG035F: Dissolved Mercury by FIMS						
Mercury	µg/L	0.1	0.1	0.1	*0.0*	-	-
EP066: Polychlorinated Biphenyls (PCB)						
Total Polychlorinated biphenyls	µg/L	1	1	1	*0.0*	-	-
EP068A: Organochlorine Pesticides (OC)						
alpha-BHC	µg/L	0.5	0.5	0.5	*0.0*	-	-
Hexachlorobenzene (HCB)	µg/L	0.5	0.5	0.5	*0.0*	-	-
beta-BHC	µg/L	0.5	0.5	0.5	*0.0*	-	-
gamma-BHC	µg/L	0.5	0.5	0.5	*0.0*	-	-
delta-BHC	µg/L	0.5	0.5	0.5	*0.0*	-	-
Heptachlor [K]	µg/L	0.5	0.5	0.5	*0.0*	-	-
Aldrin	µg/L	0.5	0.5	0.5	*0.0*	-	-
Heptachlor epoxide	µg/L	0.5	0.5	0.5	*0.0*	-	-
trans-Chlordane	µg/L	0.5	0.5	0.5	*0.0*	-	-
alpha-Endosulfan	µg/L	0.5	0.5	0.5	*0.0*	-	-
cis-Chlordane	µg/L	0.5	0.5	0.5	*0.0*	-	-
Dieldrin	µg/L	0.5	0.5	0.5	*0.0*	-	-
4.4`-DDE	µg/L	0.5	0.5	0.5	*0.0*	-	-
Endrin [K]	µg/L	0.5	0.5	0.5	*0.0*	-	-
beta-Endosulfan	µg/L	0.5	0.5	0.5	*0.0*	-	-
4.4`-DDD	µg/L	0.5	0.5	0.5	*0.0*	-	-
Endrin aldehyde	µg/L	0.5	0.5	0.5	*0.0*	-	-
Endosulfan sulfate [K,L]	µg/L	0.5	0.5	0.5	*0.0*	-	-
4.4`-DDT [K]	µg/L	2	2	2	*0.0*	-	-
Endrin ketone	µg/L	0.5	0.5	0.5	*0.0*	-	-
Methoxychlor	µg/L	2	2	2	*0.0*	-	-
^ Total Chlordane (sum) [K]	µg/L	0.5	0.5	0.5	*0.0*	-	-
^ Sum of DDD + DDE + DDT	µg/L	0.5	0.5	0.5	*0.0*	-	-
^ Sum of Aldrin + Dieldrin	µg/L	0.5	0.5	0.5	*0.0*	-	-
EP068B: Organophosphorus Pesticides (OP)						
Dichlorvos	µg/L	0.5	0.5	0.5	*0.0*	-	-
Demeton-S-methyl	µg/L	0.5	0.5	0.5	*0.0*	-	-
Monocrotophos	µg/L	2	2	2	*0.0*	-	-
Dimethoate	µg/L	0.5	0.5	0.5	*0.0*	-	-
Diazinon	µg/L	0.5	0.5	0.5	*0.0*	-	-
Chlorpyrifos-methyl	µg/L	0.5	0.5	0.5	*0.0*	-	-
Parathion-methyl	µg/L	2	2	2	*0.0*	-	-
Malathion	µg/L	0.5	0.5	0.5	*0.0*	-	-
Fenthion	µg/L	0.5	0.5	0.5	*0.0*	-	-
Chlorpyrifos [K]	µg/L	0.5	0.5	0.5	*0.0*	-	-
Parathion [J]	µg/L	2	2	2	*0.0*	-	-
Pirimphos-ethyl	µg/L	0.5	0.5	0.5	*0.0*	-	-
Chlorfenvinphos	µg/L	0.5	0.5	0.5	*0.0*	-	-
Bromophos-ethyl	µg/L	0.5	0.5	0.5	*0.0*	-	-
Fenamiphos	µg/L	0.5	0.5	0.5	*0.0*	-	-
Prothiofos	µg/L	0.5	0.5	0.5	*0.0*	-	-
Ethion	µg/L	0.5	0.5	0.5	*0.0*	-	-
Carbophenothion	µg/L	0.5	0.5	0.5	*0.0*	-	-
Azinphos Methyl	µg/L	0.5	0.5	0.5	*0.0*	-	-
EP075(SIM)A: Phenolic Compounds						
Phenol	µg/L	1	1	1	*0.0*	-	-
2-Chlorophenol [J]	µg/L	1	1	1	*0.0*	-	-
2-Methylphenol	µg/L	1	1	1	*0.0*	-	-
3- & 4-Methylphenol	µg/L	2	2	2	*0.0*	-	-
2-Nitrophenol	µg/L	1	1	1	*0.0*	-	-
2.4-Dimethylphenol	µg/L	1	1	1	*0.0*	-	-
2.4-Dichlorophenol	µg/L	1	1	1	*0.0*	-	-
2.6-Dichlorophenol	µg/L	1	1	1	*0.0*	-	-
4-Chloro-3-methylphenol	µg/L	1	1	1	*0.0*	-	-
2.4.6-Trichlorophenol [J]	µg/L	1	1	1	*0.0*	-	-
2.4.5-Trichlorophenol	µg/L	1	1	1	*0.0*	-	-
Pentachlorophenol [J]	µg/L	2	2	2	*0.0*	-	-
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons						
Naphthalene [J]	µg/L	1	1	1	*0.0*	-	-
Acenaphthylene	µg/L	1	1	1	*0.0*	-	-
Acenaphthene	µg/L	1	1	1	*0.0*	-	-
Fluorene	µg/L	1	1	1	*0.0*	-	-
Phenanthrene [K]	µg/L	1	1	1	*0.0*	-	-
Anthracene [K]	µg/L	1	1	1	*0.0*	-	-
Fluoranthene [K]	µg/L	1	1	1	*0.0*	-	-
Pyrene	µg/L	1	1	1	*0.0*	-	-
Benz(a)anthracene	µg/L	1	1	1	*0.0*	-	-
Chrysene	µg/L	1	1	1	*0.0*	-	-
Benzo(b+j)fluoranthene	µg/L	1	1	1	*0.0*	-	-
Benzo(k)fluoranthene	µg/L	1	1	1	*0.0*	-	-
Benzo(a)pyrene [K]	µg/L	0.5	0.5	0.5	*0.0*	-	-
Indeno(1.2.3.cd)pyrene	µg/L	1	1	1	*0.0*	-	-
Dibenz(a.h)anthracene	µg/L	1	1	1	*0.0*	-	-
Benzo(g.h.i)perylene	µg/L	1	1	1	*0.0*	-	-
Sum of polycyclic aromatic hydrocarbons	µg/L	0.5	0.5	0.5	*0.0*	-	-
Benzo(a)pyrene TEQ (zero)	µg/L	0.5	0.5	0.5	*0.0*	-	-
EP080/071: Total Petroleum Hydrocarbons						
C6 - C9 Fraction	µg/L	20	20	20	*0.0*	20	-
C10 - C14 Fraction	µg/L	50	50	50	*0.0*	-	-
C15 - C28 Fraction	µg/L	100	100	100	*0.0*	-	-
C29 - C36 Fraction	µg/L	50	50	50	*0.0*	-	-
C10 - C36 Fraction (sum)	µg/L	50	50	50	*0.0*	-	-
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions						
C6 - C10 Fraction	µg/L	20	20	20	*0.0*	20	-
C6 - C10 Fraction minus BTEX (F1)	µg/L	20	20	20	*0.0*	20	-
>C10 - C16 Fraction	µg/L	100	100	100	*0.0*	-	-
>C16 - C34 Fraction	µg/L	100	100	100	*0.0*	-	-
>C34 - C40 Fraction	µg/L	100	100	100	*0.0*	-	-
>C10 - C40 Fraction (sum)	µg/L	100	100	100	*0.0*	-	-
>C10 - C16 Fraction minus Naphthalene (F2)	µg/L	100	100	100	*0.0*	-	-
EP080: BTEXN						
Benzene [J]	µg/L	1	1	1	*0.0*	1	17
Toluene	µg/L	2	2	2	*0.0*	2	15
Ethylbenzene	µg/L	2	2	2	*0.0*	2	15
meta- & para-Xylene	µg/L	2	2	2	*0.0*	2	15
ortho-Xylene	µg/L	2	2	2	*0.0*	2	16
Total Xylenes	µg/L	2	2	2	*0.0*	2	31
Sum of BTEX	µg/L	1	1	1	*0.0*	1	78
Naphthalene [J]	µg/L	5	5	5	*0.0*	<5	16

LOR = Limit of Reporting
<value = Less than the laboratory Limit of Reporting (LOR)
An underlined value indicates avalue that was reported at LOR
Italics and Shaded cells exceed RPD >30%
Bold indicates when above the acceptance criteria for Trip Spikes/Blanks and Rinsates
NC = not calculated as one or more results are below the LOR.

APPENDIX 4
LABORATORY REPORTS

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2109007**	Page	: 1 of 25
Amendment	: **3**		
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NATALIE GILBERT	Contact	: Loren Schiavon
Address	: EASTPOINT COMPLEX SUITE 19B, LEVEL 2 50 GLEBE ROAD THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9954 8114	Telephone	: +61 2 8784 8555
Project	: Tomago Water Sampling 318001140	Date Samples Received	: 15-Mar-2021 17:00
Order number	: ----	Date Analysis Commenced	: 16-Mar-2021
C-O-C number	: ----	Issue Date	: 26-Apr-2021 14:25
Sampler	: JAKE BOURKE, NATALIE GILBERT		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 13		
No. of samples analysed	: 13		

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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Rassem Ayoubi	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP131A: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP068: Where reported, Total Chlordane (sum) is the sum of the reported concentrations of cis-Chlordane and trans-Chlordane at or above the LOR.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.
- Amendment (01/04/2021): This report has been amended and re-released to allow the reporting of additional analytical data, specifically method EP071SVSG: TPH after silica gel clean-up for sample MW2 (001).
- Amendment (23/04/2021): This report has been amended and re-released to allow the reporting of additional analytical data, specifically method EP071: TRH after Silica Gel Clean-up for sample Graham Drive (010).
- EP080: Sample TRIP SPIKE contains volatile compounds spiked into the sample containers prior to dispatch from the laboratory. BTEXN compounds spiked at 20 ug/L.
- Amendment (30/03/2021):This report has been amended following the change of reporting units for EG020 and EG035 methods from mg/L to ug/L. All analysis results are as per the previous reports.
- EP132: Where reported, Total PAH reported as the sum of Naphthalene, Acenaphthylene, Acenaphthene, Fluorene, Phenanthrene, Anthracene, Fluoranthene, Pyrene, Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Benzo(a)pyrene, Indeno(1,2,3-cd)pyrene, Dibenz(a,h)anthracene and Benzo(g,h,i)perylene.
- 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)			Sample ID	MW2	MW4	MW6	MW8	MW10
			Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit	ES2109007-001	ES2109007-002	ES2109007-003	ES2109007-004	ES2109007-005
				Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	247	86	34	8	22
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	688	1230	400	13	28
Total Alkalinity as CaCO3	----	1	mg/L	688	1230	400	13	28
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	4610	896	32	3
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	71	10400	5960	33	46
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	38	534	297	11	2
Magnesium	7439-95-4	1	mg/L	19	1310	439	4	4
Sodium	7440-23-5	1	mg/L	198	6520	2760	24	31
Potassium	7440-09-7	1	mg/L	21	222	86	2	4
EG020F: Dissolved Metals by ICP-MS								
Arsenic	7440-38-2	1	µg/L	2	<10	1	1	<1
Cadmium	7440-43-9	0.1	µg/L	<0.1	<1.0	<0.1	<0.1	<0.1
Chromium	7440-47-3	1	µg/L	1	<10	1	2	2
Copper	7440-50-8	1	µg/L	<1	<10	<1	<1	<1
Nickel	7440-02-0	1	µg/L	1	<10	<1	<1	<1
Lead	7439-92-1	1	µg/L	<1	<10	<1	<1	<1
Zinc	7440-66-6	5	µg/L	<5	<50	<5	<5	<5
Manganese	7439-96-5	1	µg/L	449	12200	2010	21	10
Molybdenum	7439-98-7	1	µg/L	<1	<10	<1	<1	<1
Iron	7439-89-6	50	µg/L	6670	34700	<50	590	400
EG035F: Dissolved Mercury by FIMS								
Mercury	7439-97-6	0.1	µg/L	<0.1	<0.1	<0.1	<0.1	<0.1
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	<0.004	<0.004	<0.004
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	0.6	0.6	0.5	<0.1	<0.1
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	55.6	1.05	1.05	0.08	0.34

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW2	MW4	MW6	MW8	MW10
			Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit	ES2109007-001	ES2109007-002	ES2109007-003	ES2109007-004	ES2109007-005
				Result	Result	Result	Result	Result
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	**0.30**	<0.01	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	**0.30**	<0.01	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**56.0**	**2.1**	**1.8**	**0.4**	**0.9**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**56.3**	**2.1**	**1.8**	**0.4**	**0.9**
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**6.05**	**1.70**	**1.76**	**0.01**	**0.02**
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**15.9**	**414**	**195**	**1.86**	**1.92**
ø Total Cations	----	0.01	meq/L	**16.6**	**----**	**----**	**----**	**----**
ø Total Cations	----	0.01	meq/L	**----**	**424**	**173**	**1.97**	**1.88**
ø Ionic Balance	----	0.01	%	**1.94**	**----**	**----**	**----**	**----**
ø Ionic Balance	----	0.01	%	**----**	**1.17**	**5.86**	**----**	**----**
EP066: Polychlorinated Biphenyls (PCB)								
^ Total Polychlorinated biphenyls	----	1	µg/L	<1	<1	<1	<1	<1
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5
Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	<0.5	<0.5	<0.5

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	MW2	MW4	MW6	MW8	MW10
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
					ES2109007-001	ES2109007-002	ES2109007-003	ES2109007-004	ES2109007-005
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Methoxychlor	72-43-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
^ **Total Chlordane (sum)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of DDD + DDE + DDT**	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Sum of Aldrin + Dieldrin**	309-00-2/60-57-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
Dimethoate	60-51-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Diazinon	333-41-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
Malathion	121-75-5	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Fenthion	55-38-9	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Parathion	56-38-2	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Prothiofos	34643-46-4	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Ethion	563-12-2	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Carbophenothion	786-19-6	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									
C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	----	----	----
EP071 SG: Total Petroleum Hydrocarbons - SV Silica gel cleanup									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW2	MW4	MW6	MW8	MW10
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-001	ES2109007-002	ES2109007-003	ES2109007-004	ES2109007-005
					Result	Result	Result	Result	Result
EP071 SG: Total Petroleum Hydrocarbons - SV Silica gel cleanup - Continued									
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
EP071 SG: Total Recoverable Hydrocarbons - SV NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		**97.1**	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		**4710**	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	MW2	MW4	MW6	MW8	MW10
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
					ES2109007-001	ES2109007-002	ES2109007-003	ES2109007-004	ES2109007-005
					Result	Result	Result	Result	Result
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons - Continued									
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
^ **Sum of polycyclic aromatic hydrocarbons**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
^ **Benzo(a)pyrene TEQ (zero)**	----	0.5	µg/L		<0.5	<0.5	<0.5	<0.5	<0.5
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**120**	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		**2480**	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		**3020**	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L		**1240**	<50	<50	<50	<50
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		**6740**	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**120**	<20	<20	<20	<20
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		**40**	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		**2750**	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		**3560**	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		**340**	<100	<100	<100	<100
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		**6650**	<100	<100	<100	<100
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		**2750**	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		**75**	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ **Total Xylenes**	----	2	µg/L		<2	<2	<2	<2	<2
^ **Sum of BTEX**	----	1	µg/L		**75**	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**72.2**	**70.0**	**75.3**	**77.5**	**70.7**

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	MW2	MW4	MW6	MW8	MW10
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
					ES2109007-001	ES2109007-002	ES2109007-003	ES2109007-004	ES2109007-005
					Result	Result	Result	Result	Result
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**78.5**	**76.4**	**74.6**	**93.3**	**85.8**
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**93.5**	**89.7**	**82.2**	**101**	**93.7**
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**22.6**	**18.3**	**20.6**	**24.0**	**22.1**
2-Chlorophenol-D4	93951-73-6	1.0	%		**38.9**	**35.4**	**40.5**	**50.9**	**45.9**
2.4.6-Tribromophenol	118-79-6	1.0	%		**78.5**	**68.6**	**65.0**	**81.0**	**81.0**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**56.5**	**59.4**	**82.8**	**86.0**	**88.7**
Anthracene-d10	1719-06-8	1.0	%		**67.1**	**64.6**	**60.9**	**67.2**	**63.0**
4-Terphenyl-d14	1718-51-0	1.0	%		**61.2**	**62.8**	**61.4**	**73.5**	**68.1**
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**117**	**125**	**120**	**116**	**116**
Toluene-D8	2037-26-5	2	%		**118**	**116**	**105**	**106**	**99.6**
4-Bromofluorobenzene	460-00-4	2	%		**118**	**108**	**99.2**	**101**	**96.9**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EA025: Total Suspended Solids dried at 104 ± 2°C									
Suspended Solids (SS)	----	5	mg/L		23	8	112	1720	29
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L		<1	<1	<1	<1	<1
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L		<1	<1	<1	<1	<1
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L		17	22	29	141	5
Total Alkalinity as CaCO3	----	1	mg/L		17	22	29	141	5
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L		2	3	1	6	<1
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L		60	46	18	19	68
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L		2	2	8	34	4
Magnesium	7439-95-4	1	mg/L		6	4	2	7	3
Sodium	7440-23-5	1	mg/L		33	31	12	17	41
Potassium	7440-09-7	1	mg/L		2	4	1	4	1
EG020F: Dissolved Metals by ICP-MS									
Arsenic	7440-38-2	1	µg/L		<1	<1	----	----	----
Cadmium	7440-43-9	0.1	µg/L		<0.1	<0.1	----	----	----
Chromium	7440-47-3	1	µg/L		1	2	----	----	----
Copper	7440-50-8	1	µg/L		<1	<1	----	----	----
Nickel	7440-02-0	1	µg/L		<1	<1	----	----	----
Lead	7439-92-1	1	µg/L		<1	<1	----	----	----
Zinc	7440-66-6	5	µg/L		<5	<5	----	----	----
Manganese	7439-96-5	1	µg/L		13	10	----	----	----
Molybdenum	7439-98-7	1	µg/L		<1	<1	----	----	----
Iron	7439-89-6	50	µg/L		720	390	----	----	----
EG020T: Total Metals by ICP-MS									
Arsenic	7440-38-2	1	µg/L		----	----	4	7	<1
Cadmium	7440-43-9	0.1	µg/L		----	----	<0.1	0.1	<0.1
Chromium	7440-47-3	1	µg/L		----	----	<1	4	3
Copper	7440-50-8	1	µg/L		----	----	<1	3	1
Nickel	7440-02-0	1	µg/L		----	----	1	3	5
Lead	7439-92-1	1	µg/L		----	----	<1	2	1
Zinc	7440-66-6	5	µg/L		----	----	8	31	84

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EG020T: Total Metals by ICP-MS - Continued									
Manganese	7439-96-5	1	µg/L		----	----	**214**	**1360**	**84**
Molybdenum	7439-98-7	1	µg/L		----	----	<1	<1	<1
Iron	7439-89-6	50	µg/L		----	----	**15300**	**40600**	**4280**
EG035F: Dissolved Mercury by FIMS									
Mercury	7439-97-6	0.1	µg/L		<0.1	<0.1	----	----	----
EG035T: Total Recoverable Mercury by FIMS									
Mercury	7439-97-6	0.1	µg/L		----	----	<0.1	<0.1	<0.1
EK026SF: Total CN by Segmented Flow Analyser									
Total Cyanide	57-12-5	0.004	mg/L		<0.004	<0.004	<0.004	<0.004	<0.004
EK040P: Fluoride by PC Titrator									
Fluoride	16984-48-8	0.1	mg/L		<0.1	<0.1	**0.1**	**0.1**	**0.2**
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L		**0.67**	**0.34**	<0.01	**0.76**	<0.01
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L		<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L		<0.01	<0.01	**0.14**	**0.13**	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L		<0.01	<0.01	**0.14**	**0.13**	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L		**0.9**	**0.9**	**2.3**	**67.1**	**1.5**
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L		**0.9**	**0.9**	**2.4**	**67.2**	**1.5**
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		**0.02**	**0.03**	**0.19**	**6.67**	**0.03**
EN055: Ionic Balance									
ø Total Anions	----	0.01	meq/L		**2.07**	**1.80**	**1.11**	**3.48**	**2.02**
ø Total Cations	----	0.01	meq/L		----	----	----	**3.17**	----
ø Total Cations	----	0.01	meq/L		**2.08**	**1.88**	**1.11**	----	**2.26**
ø Ionic Balance	----	0.01	%		----	----	----	**4.69**	----
EP066: Polychlorinated Biphenyls (PCB)									
^ Total Polychlorinated biphenyls	----	1	µg/L		<1	<1	----	<1	----
EP068A: Organochlorine Pesticides (OC)									

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EP068A: Organochlorine Pesticides (OC) - Continued									
alpha-BHC	319-84-6	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L		<0.5	<0.5	----	<0.5	----
beta-BHC	319-85-7	0.5	µg/L		<0.5	<0.5	----	<0.5	----
gamma-BHC	58-89-9	0.5	µg/L		<0.5	<0.5	----	<0.5	----
delta-BHC	319-86-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Heptachlor	76-44-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Aldrin	309-00-2	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Heptachlor epoxide	1024-57-3	0.5	µg/L		<0.5	<0.5	----	<0.5	----
trans-Chlordane	5103-74-2	0.5	µg/L		<0.5	<0.5	----	<0.5	----
alpha-Endosulfan	959-98-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
cis-Chlordane	5103-71-9	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Dieldrin	60-57-1	0.5	µg/L		<0.5	<0.5	----	<0.5	----
4.4`-DDE	72-55-9	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Endrin	72-20-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
beta-Endosulfan	33213-65-9	0.5	µg/L		<0.5	<0.5	----	<0.5	----
4.4`-DDD	72-54-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Endrin aldehyde	7421-93-4	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	<2.0	----	<2.0	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	<2.0	----	<2.0	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	<0.5	----	<0.5	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	<0.5	----	<0.5	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	<0.5	----	<0.5	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	<2.0	----	<2.0	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Diazinon	333-41-5	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	<2.0	----	<2.0	----
Malathion	121-75-5	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Fenthion	55-38-9	0.5	µg/L		<0.5	<0.5	----	<0.5	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EP068B: Organophosphorus Pesticides (OP) - Continued									
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Parathion	56-38-2	2.0	µg/L		<2.0	<2.0	----	<2.0	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Ethion	563-12-2	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	<0.5	----	<0.5	----
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup									
C10 - C36 Fraction (sum)	----	50	µg/L		----	----	----	----	<50
EP071 SG: Total Petroleum Hydrocarbons - SV Silica gel cleanup									
C10 - C14 Fraction	----	50	µg/L		----	----	----	----	<50
C15 - C28 Fraction	----	100	µg/L		----	----	----	----	<100
C29 - C36 Fraction	----	50	µg/L		----	----	----	----	<50
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C40 Fraction (sum)	----	100	µg/L		----	----	----	----	<100
EP071 SG: Total Recoverable Hydrocarbons - SV NEPM 2013 Fractions - Silica gel cleanup									
>C10 - C16 Fraction	----	100	µg/L		----	----	----	----	<100
>C16 - C34 Fraction	----	100	µg/L		----	----	----	----	<100
>C34 - C40 Fraction	----	100	µg/L		----	----	----	----	<100
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	<1.0	<1.0	<1.0	<1.0

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EP075(SIM)A: Phenolic Compounds - Continued									
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	<2.0	<2.0	<2.0	<2.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Fluorene	86-73-7	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Anthracene	120-12-7	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Pyrene	129-00-0	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Chrysene	218-01-9	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	<0.5	----	<0.5	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	<1.0	----	<1.0	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	<1.0	----	<1.0	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	<0.5	----	<0.5	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	<0.5	----	<0.5	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	**250**
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	**70**
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	**320**
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	**280**
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	**280**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
			Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit	ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
				Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued								
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP131A: Organochlorine Pesticides								
Aldrin	309-00-2	0.010	µg/L	----	----	<0.010	----	<0.010
alpha-BHC	319-84-6	0.010	µg/L	----	----	<0.010	----	<0.010
beta-BHC	319-85-7	0.010	µg/L	----	----	<0.010	----	<0.010
delta-BHC	319-86-8	0.010	µg/L	----	----	<0.010	----	<0.010
4.4`-DDD	72-54-8	0.010	µg/L	----	----	<0.010	----	<0.010
4.4`-DDE	72-55-9	0.010	µg/L	----	----	<0.010	----	<0.010
4.4`-DDT	50-29-3	0.010	µg/L	----	----	<0.010	----	<0.010
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-29-3	0.010	µg/L	----	----	<0.010	----	<0.010
Dieldrin	60-57-1	0.010	µg/L	----	----	<0.010	----	<0.010
alpha-Endosulfan	959-98-8	0.010	µg/L	----	----	<0.010	----	<0.010
beta-Endosulfan	33213-65-9	0.010	µg/L	----	----	<0.010	----	<0.010
Endosulfan sulfate	1031-07-8	0.010	µg/L	----	----	<0.010	----	<0.010
^ Endosulfan (sum)	115-29-7	0.010	µg/L	----	----	<0.010	----	<0.010
Endrin	72-20-8	0.010	µg/L	----	----	<0.010	----	<0.010
Endrin aldehyde	7421-93-4	0.010	µg/L	----	----	<0.010	----	<0.010
Endrin ketone	53494-70-5	0.010	µg/L	----	----	<0.010	----	<0.010
Heptachlor	76-44-8	0.005	µg/L	----	----	<0.005	----	<0.005
Heptachlor epoxide	1024-57-3	0.010	µg/L	----	----	<0.010	----	<0.010
Hexachlorobenzene (HCB)	118-74-1	0.010	µg/L	----	----	<0.010	----	<0.010
gamma-BHC	58-89-9	0.010	µg/L	----	----	<0.010	----	<0.010
Methoxychlor	72-43-5	0.010	µg/L	----	----	<0.010	----	<0.010
cis-Chlordane	5103-71-9	0.010	µg/L	----	----	<0.010	----	<0.010

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EP131A: Organochlorine Pesticides - Continued									
trans-Chlordane	5103-74-2	0.010	µg/L		----	----	<0.010	----	<0.010
^ Total Chlordane (sum)	----	0.010	µg/L		----	----	<0.010	----	<0.010
Oxychlordane	27304-13-8	0.010	µg/L		----	----	<0.010	----	<0.010
EP131B: Polychlorinated Biphenyls (as Aroclors)									
Total Polychlorinated biphenyls	----	0.10	µg/L		----	----	<0.10	----	<0.10
Aroclor 1016	12674-11-2	0.10	µg/L		----	----	<0.10	----	<0.10
Aroclor 1221	11104-28-2	0.10	µg/L		----	----	<0.10	----	<0.10
Aroclor 1232	11141-16-5	0.10	µg/L		----	----	<0.10	----	<0.10
Aroclor 1242	53469-21-9	0.10	µg/L		----	----	<0.10	----	<0.10
Aroclor 1248	12672-29-6	0.10	µg/L		----	----	<0.10	----	<0.10
Aroclor 1254	11097-69-1	0.10	µg/L		----	----	<0.10	----	<0.10
Aroclor 1260	11096-82-5	0.10	µg/L		----	----	<0.10	----	<0.10
EP132B: Polynuclear Aromatic Hydrocarbons									
3-Methylcholanthrene	56-49-5	0.1	µg/L		----	----	<0.1	----	<0.1
2-Methylnaphthalene	91-57-6	0.1	µg/L		----	----	<0.1	----	<0.1
7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L		----	----	<0.1	----	<0.1
Acenaphthene	83-32-9	0.1	µg/L		----	----	<0.1	----	<0.1
Acenaphthylene	208-96-8	0.1	µg/L		----	----	<0.1	----	<0.1
Anthracene	120-12-7	0.1	µg/L		----	----	<0.1	----	<0.1
Benz(a)anthracene	56-55-3	0.1	µg/L		----	----	<0.1	----	<0.1
Benzo(a)pyrene	50-32-8	0.05	µg/L		----	----	<0.05	----	<0.05
Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L		----	----	<0.1	----	<0.1
Benzo(e)pyrene	192-97-2	0.1	µg/L		----	----	<0.1	----	<0.1
Benzo(g.h.i)perylene	191-24-2	0.1	µg/L		----	----	<0.1	----	<0.1
Benzo(k)fluoranthene	207-08-9	0.1	µg/L		----	----	<0.1	----	<0.1
Chrysene	218-01-9	0.1	µg/L		----	----	<0.1	----	<0.1
Coronene	191-07-1	0.1	µg/L		----	----	<0.1	----	<0.1
Dibenz(a.h)anthracene	53-70-3	0.1	µg/L		----	----	<0.1	----	<0.1
Fluoranthene	206-44-0	0.1	µg/L		----	----	<0.1	----	<0.1
Fluorene	86-73-7	0.1	µg/L		----	----	<0.1	----	<0.1
Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L		----	----	<0.1	----	<0.1
Naphthalene	91-20-3	0.1	µg/L		----	----	<0.1	----	<0.1
Perylene	198-55-0	0.1	µg/L		----	----	<0.1	----	<0.1
Phenanthrene	85-01-8	0.1	µg/L		----	----	<0.1	----	<0.1

Analytical Results

Sub-Matrix: **WATER**
(Matrix: **WATER**)

Compound	CAS Number	LOR	Unit	Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
					ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EP132B: Polynuclear Aromatic Hydrocarbons - Continued									
Pyrene	129-00-0	0.1	µg/L		----	----	<0.1	----	<0.1
^ **Sum of PAHs**	----	0.05	µg/L		----	----	<0.05	----	<0.05
^ **Benzo(a)pyrene TEQ (zero)**	----	0.05	µg/L		----	----	<0.05	----	<0.05
EP234A: OP Pesticides									
Acephate	30560-19-1	0.5	µg/L		----	----	<0.5	----	<0.5
Azinphos-methyl	86-50-0	0.02	µg/L		----	----	<0.02	----	<0.02
Azinphos-ethyl	2642-71-9	0.02	µg/L		----	----	<0.02	----	<0.02
Bensulide	741-58-2	0.1	µg/L		----	----	<0.1	----	<0.1
Bromophos-ethyl	4824-78-6	0.10	µg/L		----	----	<0.10	----	<0.10
Carbofenothion	786-19-6	0.02	µg/L		----	----	<0.02	----	<0.02
Chlorfenvinphos	470-90-6	0.02	µg/L		----	----	<0.02	----	<0.02
Chlorpyrifos	2921-88-2	0.02	µg/L		----	----	<0.02	----	<0.02
Chlorpyrifos-methyl	5598-13-0	0.2	µg/L		----	----	<0.2	----	<0.2
Coumaphos	56-72-4	0.01	µg/L		----	----	<0.01	----	<0.01
Demeton-O	298-03-3	0.02	µg/L		----	----	<0.02	----	<0.02
Demeton-O & Demeton-S	298-03-3/126-75-0	0.02	µg/L		----	----	<0.02	----	<0.02
Demeton-S	126-75-0	0.02	µg/L		----	----	<0.02	----	<0.02
Demeton-S-methyl	919-86-8	0.02	µg/L		----	----	<0.02	----	<0.02
Diazinon	333-41-5	0.01	µg/L		----	----	<0.01	----	<0.01
Dichlorvos	62-73-7	0.20	µg/L		----	----	<0.20	----	<0.20
Dimethoate	60-51-5	0.02	µg/L		----	----	<0.02	----	<0.02
Disulfoton	298-04-4	0.05	µg/L		----	----	<0.05	----	<0.05
EPN	2104-64-5	0.05	µg/L		----	----	<0.05	----	<0.05
Ethion	563-12-2	0.02	µg/L		----	----	<0.02	----	<0.02
Ethoprophos	13194-48-4	0.01	µg/L		----	----	<0.01	----	<0.01
Fenamiphos	22224-92-6	0.01	µg/L		----	----	<0.01	----	<0.01
Fenchlorphos (Ronnel)	299-84-3	10	µg/L		----	----	<10	----	<10
Fenitrothion	122-14-5	2	µg/L		----	----	<2	----	<2
Fensulfothion	115-90-2	0.01	µg/L		----	----	<0.01	----	<0.01
Fenthion	55-38-9	0.05	µg/L		----	----	<0.05	----	<0.05
Formothion	2540-82-1	20	µg/L		----	----	<20	----	<20
Fosetyl Aluminium	39148-24-8	10	µg/L		----	----	<10	----	<10
Malathion	121-75-5	0.02	µg/L		----	----	<0.02	----	<0.02
Methidathion	950-37-8	0.1	µg/L		----	----	<0.1	----	<0.1
Mevinphos	7786-34-7	0.02	µg/L		----	----	<0.02	----	<0.02

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EP234A: OP Pesticides - Continued									
Monocrotophos	6923-22-4	0.02	µg/L		----	----	<0.02	----	<0.02
Naftalofos	1491-41-4	1.0	µg/L		----	----	<1.0	----	<1.0
Omethoate	1113-02-6	0.01	µg/L		----	----	<0.01	----	<0.01
Parathion	56-38-2	0.2	µg/L		----	----	<0.2	----	<0.2
Parathion-methyl	298-00-0	0.5	µg/L		----	----	<0.5	----	<0.5
Phorate	298-02-2	0.1	µg/L		----	----	<0.1	----	<0.1
Pirimiphos-ethyl	23505-41-1	0.01	µg/L		----	----	<0.01	----	<0.01
Pirimiphos-methyl	29232-93-7	0.01	µg/L		----	----	<0.01	----	<0.01
Profenofos	41198-08-7	0.01	µg/L		----	----	<0.01	----	<0.01
Prothiofos	34643-46-4	0.1	µg/L		----	----	<0.1	----	<0.1
Pyrazophos	13457-18-6	0.1	µg/L		----	----	<0.1	----	<0.1
Sulfotep	3689-24-5	0.005	µg/L		----	----	<0.005	----	<0.005
Sulprofos	35400-43-2	0.05	µg/L		----	----	<0.05	----	<0.05
Temephos	3383-96-8	0.02	µg/L		----	----	<0.02	----	<0.02
Terbufos	13071-79-9	0.01	µg/L		----	----	<0.01	----	<0.01
Tetrachlorvinphos	22248-79-9	0.01	µg/L		----	----	<0.01	----	<0.01
Thiometon	640-15-3	0.5	µg/L		----	----	<0.5	----	<0.5
Triazophos	24017-47-8	0.005	µg/L		----	----	<0.005	----	<0.005
Trichlorfon	52-68-6	0.02	µg/L		----	----	<0.02	----	<0.02
Trichloronate	327-98-0	0.5	µg/L		----	----	<0.5	----	<0.5
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		**70.5**	**70.5**	----	**76.2**	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		**78.8**	**81.5**	----	**88.4**	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		**86.9**	**90.4**	----	**98.6**	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**21.7**	**24.0**	**21.4**	**22.6**	**20.9**
2-Chlorophenol-D4	93951-73-6	1.0	%		**44.4**	**50.0**	**41.4**	**41.8**	**36.8**
2.4.6-Tribromophenol	118-79-6	1.0	%		**74.5**	**80.1**	**82.8**	**96.3**	**91.2**
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**79.2**	**86.4**	**88.7**	**77.5**	**85.5**
Anthracene-d10	1719-06-8	1.0	%		**63.3**	**65.9**	**70.1**	**70.5**	**65.0**
4-Terphenyl-d14	1718-51-0	1.0	%		**66.5**	**70.3**	**76.4**	**72.0**	**69.8**

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW11	D01_20210312	SW1	SW2	Graham Drive
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00
Compound	CAS Number	LOR	Unit		ES2109007-006	ES2109007-007	ES2109007-008	ES2109007-009	ES2109007-010
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		117	121	116	113	121
Toluene-D8	2037-26-5	2	%		107	110	114	111	110
4-Bromofluorobenzene	460-00-4	2	%		101	104	113	100.0	102
EP131S: OC Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.010	%		----	----	94.0	----	89.4
EP131T: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	0.10	%		----	----	119	----	115
EP132T: Base/Neutral Extractable Surrogates									
2-Fluorobiphenyl	321-60-8	0.1	%		----	----	69.6	----	61.4
Anthracene-d10	1719-06-8	0.1	%		----	----	72.9	----	69.7
4-Terphenyl-d14	1718-51-0	0.1	%		----	----	79.0	----	75.2

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW3a	TRIP BLANK	TRIP SPIKE	----	----
			Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2109007-011	ES2109007-012	ES2109007-013	--------	--------
				Result	Result	Result	----	----
EA025: Total Suspended Solids dried at 104 ± 2°C								
Suspended Solids (SS)	----	5	mg/L	935	----	----	----	----
ED037P: Alkalinity by PC Titrator								
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	26	----	----	----	----
Total Alkalinity as CaCO3	----	1	mg/L	26	----	----	----	----
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA								
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	----	----	----	----
ED045G: Chloride by Discrete Analyser								
Chloride	16887-00-6	1	mg/L	22	----	----	----	----
ED093F: Dissolved Major Cations								
Calcium	7440-70-2	1	mg/L	8	----	----	----	----
Magnesium	7439-95-4	1	mg/L	3	----	----	----	----
Sodium	7440-23-5	1	mg/L	15	----	----	----	----
Potassium	7440-09-7	1	mg/L	4	----	----	----	----
EG020T: Total Metals by ICP-MS								
Arsenic	7440-38-2	1	µg/L	8	----	----	----	----
Cadmium	7440-43-9	0.1	µg/L	0.4	----	----	----	----
Chromium	7440-47-3	1	µg/L	24	----	----	----	----
Copper	7440-50-8	1	µg/L	32	----	----	----	----
Nickel	7440-02-0	1	µg/L	11	----	----	----	----
Lead	7439-92-1	1	µg/L	25	----	----	----	----
Zinc	7440-66-6	5	µg/L	218	----	----	----	----
Manganese	7439-96-5	1	µg/L	583	----	----	----	----
Molybdenum	7439-98-7	1	µg/L	3	----	----	----	----
Iron	7439-89-6	50	µg/L	27400	----	----	----	----
EG035T: Total Recoverable Mercury by FIMS								
Mercury	7439-97-6	0.1	µg/L	<0.1	----	----	----	----
EK026SF: Total CN by Segmented Flow Analyser								
Total Cyanide	57-12-5	0.004	mg/L	<0.004	----	----	----	----
EK040P: Fluoride by PC Titrator								
Fluoride	16984-48-8	0.1	mg/L	<0.1	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.46	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)			Sample ID	SW3a	TRIP BLANK	TRIP SPIKE	----	----
			Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	----	----
Compound	CAS Number	LOR	Unit	ES2109007-011	ES2109007-012	ES2109007-013	--------	--------
				Result	Result	Result	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	**70.8**	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	**70.8**	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	**6.78**	----	----	----	----
EN055: Ionic Balance								
ø Total Anions	----	0.01	meq/L	**1.33**	----	----	----	----
ø Total Cations	----	0.01	meq/L	**1.40**	----	----	----	----
EP066: Polychlorinated Biphenyls (PCB)								
^ Total Polychlorinated biphenyls	----	1	µg/L	<1	----	----	----	----
EP068A: Organochlorine Pesticides (OC)								
alpha-BHC	319-84-6	0.5	µg/L	<0.5	----	----	----	----
Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	----	----	----	----
beta-BHC	319-85-7	0.5	µg/L	<0.5	----	----	----	----
gamma-BHC	58-89-9	0.5	µg/L	<0.5	----	----	----	----
delta-BHC	319-86-8	0.5	µg/L	<0.5	----	----	----	----
Heptachlor	76-44-8	0.5	µg/L	<0.5	----	----	----	----
Aldrin	309-00-2	0.5	µg/L	<0.5	----	----	----	----
Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	----	----	----	----
trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	----	----	----	----
alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	----	----	----	----
cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	----	----	----	----
Dieldrin	60-57-1	0.5	µg/L	<0.5	----	----	----	----
4.4`-DDE	72-55-9	0.5	µg/L	<0.5	----	----	----	----
Endrin	72-20-8	0.5	µg/L	<0.5	----	----	----	----
beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	----	----	----	----
4.4`-DDD	72-54-8	0.5	µg/L	<0.5	----	----	----	----
Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW3a	TRIP BLANK	TRIP SPIKE	----	----
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2109007-011	ES2109007-012	ES2109007-013	--------	--------
					Result	Result	Result	----	----
EP068A: Organochlorine Pesticides (OC) - Continued									
Endosulfan sulfate	1031-07-8	0.5	µg/L		<0.5	----	----	----	----
4.4`-DDT	50-29-3	2.0	µg/L		<2.0	----	----	----	----
Endrin ketone	53494-70-5	0.5	µg/L		<0.5	----	----	----	----
Methoxychlor	72-43-5	2.0	µg/L		<2.0	----	----	----	----
^ Total Chlordane (sum)	----	0.5	µg/L		<0.5	----	----	----	----
^ Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.5	µg/L		<0.5	----	----	----	----
^ Sum of Aldrin + Dieldrin	309-00-2/60-57-1	0.5	µg/L		<0.5	----	----	----	----
EP068B: Organophosphorus Pesticides (OP)									
Dichlorvos	62-73-7	0.5	µg/L		<0.5	----	----	----	----
Demeton-S-methyl	919-86-8	0.5	µg/L		<0.5	----	----	----	----
Monocrotophos	6923-22-4	2.0	µg/L		<2.0	----	----	----	----
Dimethoate	60-51-5	0.5	µg/L		<0.5	----	----	----	----
Diazinon	333-41-5	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos-methyl	5598-13-0	0.5	µg/L		<0.5	----	----	----	----
Parathion-methyl	298-00-0	2.0	µg/L		<2.0	----	----	----	----
Malathion	121-75-5	0.5	µg/L		<0.5	----	----	----	----
Fenthion	55-38-9	0.5	µg/L		<0.5	----	----	----	----
Chlorpyrifos	2921-88-2	0.5	µg/L		<0.5	----	----	----	----
Parathion	56-38-2	2.0	µg/L		<2.0	----	----	----	----
Pirimphos-ethyl	23505-41-1	0.5	µg/L		<0.5	----	----	----	----
Chlorfenvinphos	470-90-6	0.5	µg/L		<0.5	----	----	----	----
Bromophos-ethyl	4824-78-6	0.5	µg/L		<0.5	----	----	----	----
Fenamiphos	22224-92-6	0.5	µg/L		<0.5	----	----	----	----
Prothiofos	34643-46-4	0.5	µg/L		<0.5	----	----	----	----
Ethion	563-12-2	0.5	µg/L		<0.5	----	----	----	----
Carbophenothion	786-19-6	0.5	µg/L		<0.5	----	----	----	----
Azinphos Methyl	86-50-0	0.5	µg/L		<0.5	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW3a	TRIP BLANK	TRIP SPIKE	----	----
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2109007-011	ES2109007-012	ES2109007-013	--------	--------
					Result	Result	Result	----	----
EP075(SIM)A: Phenolic Compounds - Continued									
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----
C15 - C28 Fraction	----	100	µg/L		<100	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		<50	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	SW3a	TRIP BLANK	TRIP SPIKE	----	----
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	----	----
Compound	CAS Number	LOR	Unit		ES2109007-011	ES2109007-012	ES2109007-013	--------	--------
					Result	Result	Result	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Continued									
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	17	----	----
Toluene	108-88-3	2	µg/L		<2	<2	15	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	15	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	15	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	16	----	----
^ Total Xylenes	----	2	µg/L		<2	<2	31	----	----
^ Sum of BTEX	----	1	µg/L		<1	<1	78	----	----
Naphthalene	91-20-3	5	µg/L		<5	<5	16	----	----
EP066S: PCB Surrogate									
Decachlorobiphenyl	2051-24-3	1	%		71.4	----	----	----	----
EP068S: Organochlorine Pesticide Surrogate									
Dibromo-DDE	21655-73-2	0.5	%		74.1	----	----	----	----
EP068T: Organophosphorus Pesticide Surrogate									
DEF	78-48-8	0.5	%		82.1	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		21.0	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		43.8	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		84.3	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		94.0	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		62.0	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		64.3	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		120	113	119	----	----
Toluene-D8	2037-26-5	2	%		110	104	110	----	----

Analytical Results

Sub-Matrix: **WATER** (Matrix: **WATER**)				Sample ID	**SW3a**	**TRIP BLANK**	**TRIP SPIKE**	**----**	**----**
				Sampling date / time	12-Mar-2021 00:00	12-Mar-2021 00:00	12-Mar-2021 00:00	----	----
Compound	*CAS Number*	*LOR*	*Unit*		**ES2109007-011**	**ES2109007-012**	**ES2109007-013**	**--------**	**--------**
					Result	Result	Result	----	----
EP080S: TPH(V)/BTEX Surrogates - Continued									
4-Bromofluorobenzene	460-00-4	2	%		**103**	**97.6**	**104**	**----**	**----**

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP066S: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	45	134
EP068S: Organochlorine Pesticide Surrogate			
Dibromo-DDE	21655-73-2	67	111
EP068T: Organophosphorus Pesticide Surrogate			
DEF	78-48-8	67	111
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128
EP131S: OC Pesticide Surrogate			
Dibromo-DDE	21655-73-2	14	166
EP131T: PCB Surrogate			
Decachlorobiphenyl	2051-24-3	10	144
EP132T: Base/Neutral Extractable Surrogates			
2-Fluorobiphenyl	321-60-8	43	135
Anthracene-d10	1719-06-8	48	138
4-Terphenyl-d14	1718-51-0	48	144

ALS Environmental

QUALITY CONTROL REPORT

Work Order	: **ES2109007**	Page	: 1 of 26
Amendment	: **3**		
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NATALIE GILBERT	Contact	: Loren Schiavon
Address	: EASTPOINT COMPLEX SUITE 19B, LEVEL 2 50 GLEBE ROAD THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9954 8114	Telephone	: +61 2 8784 8555
Project	: Tomago Water Sampling 318001140	Date Samples Received	: 15-Mar-2021
Order number	: ----	Date Analysis Commenced	: 16-Mar-2021
C-O-C number	: ----	Issue Date	: 26-Apr-2021
Sampler	: JAKE BOURKE, NATALIE GILBERT		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 13		
No. of samples analysed	: 13		

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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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
Ashesh Patel	Senior Chemist	Sydney Inorganics, Smithfield, NSW
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Franco Lentini	LCMS Coordinator	Sydney Organics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Rassem Ayoubi	Senior Organic Chemist	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3572846)									
ES2108381-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
ES2108381-011	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
EA025: Total Suspended Solids dried at 104 ± 2°C (QC Lot: 3572847)									
ES2109007-007	D01_20210312	EA025H: Suspended Solids (SS)	----	5	mg/L	8	<5	43.1	No Limit
ES2109026-001	Anonymous	EA025H: Suspended Solids (SS)	----	5	mg/L	<5	<5	0.00	No Limit
ED037P: Alkalinity by PC Titrator (QC Lot: 3566744)									
ES2108580-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	102	109	5.85	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	102	109	5.85	0% - 20%
ES2108768-019	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	11	10	9.91	0% - 50%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	11	10	9.91	0% - 50%
ED037P: Alkalinity by PC Titrator (QC Lot: 3566749)									
ES2109007-005	MW10	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	28	27	4.73	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	28	27	4.73	0% - 20%
ES2109031-003	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	991	1000	1.08	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	991	1000	1.08	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3568327)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 3568327) - continued									
ES2109007-001	MW2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	9	8	0.00	No Limit
ES2109007-010	Graham Drive	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	<1	0.00	No Limit
ED045G: Chloride by Discrete Analyser (QC Lot: 3568326)									
ES2109007-001	MW2	ED045G: Chloride	16887-00-6	1	mg/L	71	71	0.00	0% - 20%
ES2109007-010	Graham Drive	ED045G: Chloride	16887-00-6	1	mg/L	68	68	0.00	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 3573075)									
ES2109007-008	SW1	ED093F: Calcium	7440-70-2	1	mg/L	8	7	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	12	12	0.00	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	1	<1	0.00	No Limit
ES2109610-007	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	6	6	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	2	2	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	16	17	0.00	0% - 50%
		ED093F: Potassium	7440-09-7	1	mg/L	5	5	0.00	No Limit
ED093F: Dissolved Major Cations (QC Lot: 3573231)									
ES2109007-002	MW4	ED093F: Calcium	7440-70-2	1	mg/L	534	546	2.24	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1310	1350	2.72	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	6520	6780	3.97	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	222	229	2.82	0% - 20%
EW2101157-004	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	3	3	0.00	No Limit
		ED093F: Magnesium	7439-95-4	1	mg/L	1	1	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	800	826	3.24	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	3	3	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3573230)									
ES2109007-002	MW4	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<1.0 µg/L	<0.0010	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<10 µg/L	<0.010	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<10 µg/L	<0.010	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<10 µg/L	<0.010	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<10 µg/L	<0.010	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	12200 µg/L	12.8	4.89	0% - 20%
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<10 µg/L	<0.010	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<10 µg/L	<0.010	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<50 µg/L	<0.050	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	34700 µg/L	35.8	3.26	0% - 20%
EW2101157-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EG020F: Dissolved Metals by ICP-MS (QC Lot: 3573230) - continued									
EW2101157-004	Anonymous	EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	0.037	0.036	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 3573200)									
ES2107852-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.002	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Molybdenum	7439-98-7	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES2108987-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.043	0.045	3.84	0% - 20%
		EG020A-T: Molybdenum	7439-98-7	0.001	mg/L	0.007	0.006	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.004	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.024	0.026	8.47	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.27	0.27	0.00	No Limit
EG035F: Dissolved Mercury by FIMS (QC Lot: 3573229)									
ES2109007-004	MW8	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.1 µg/L	<0.0001	0.00	No Limit
EW2101157-003	Anonymous	EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EG035T: Total Recoverable Mercury by FIMS (QC Lot: 3573043)									
ES2108580-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
ES2109021-001	Anonymous	EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
EK026SF: Total CN by Segmented Flow Analyser (QC Lot: 3565364)									
ES2108201-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	0.00	No Limit
ES2109007-005	MW10	EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	<0.004	0.00	No Limit
EK040P: Fluoride by PC Titrator (QC Lot: 3566748)									
ES2108988-018	Anonymous	EK040P: Fluoride	16984-48-8	0.1	mg/L	0.8	0.8	0.00	No Limit
ES2109007-005	MW10	EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3569405)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 3569405) - continued									
ES2108725-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES2109007-003	MW6	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.05	1.04	1.44	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 3568325)									
ES2109007-001	MW2	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES2109007-010	Graham Drive	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 3569407)									
ES2108725-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
ES2109007-003	MW6	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 3569411)									
ES2108725-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	1.5	6.70	0% - 50%
ES2109007-004	MW8	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.3	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 3569410)									
ES2108725-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.16	0.15	0.00	0% - 50%
ES2109007-004	MW8	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	<0.01	0.00	No Limit
EP066: Polychlorinated Biphenyls (PCB) (QC Lot: 3565816)									
ES2109007-001	MW2	EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	<1	0.00	No Limit
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3565815)									
ES2109007-009	SW2	EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	<2.0	0.00	No Limit
ES2109007-001	MW2	EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068A: Organochlorine Pesticides (OC) (QC Lot: 3565815) - continued									
ES2109007-001	MW2	EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin	72-20-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	<2.0	0.00	No Limit
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3565815)									
ES2109007-009	SW2	EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Parathion	56-38-2	2	µg/L	<2.0	<2.0	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP068B: Organophosphorus Pesticides (OP) (QC Lot: 3565815) - continued									
ES2109007-001	MW2	EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Malathion	121-75-5	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Ethion	563-12-2	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP068: Parathion	56-38-2	2	µg/L	<2.0	<2.0	0.00	No Limit
EP075(SIM)A: Phenolic Compounds (QC Lot: 3565814)									
ES2109007-009	SW2	EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	<2.0	0.00	No Limit
		EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	0.00	No Limit
ES2109007-001	MW2	EP075(SIM): Phenol	108-95-2	1	µg/L	97.1	91.5	5.94	0% - 20%
		EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	<1.0	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP075(SIM)A: Phenolic Compounds (QC Lot: 3565814) - continued									
ES2109007-001	MW2	EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	4710	4530	3.97	0% - 20%
		EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	<2.0	0.00	No Limit
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3565814)									
ES2109007-009	SW2	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
ES2109007-001	MW2	EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	<1.0	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3565813)									

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3565813) - continued									
ES2109007-009	SW2	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
ES2109007-001	MW2	EP071: C15 - C28 Fraction	----	100	µg/L	3020	3020	0.00	0% - 20%
		EP071: C10 - C14 Fraction	----	50	µg/L	2480	2800	12.2	0% - 20%
		EP071: C29 - C36 Fraction	----	50	µg/L	1240	1240	0.00	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3567253)									
CA2101629-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES2109007-004	MW8	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3565813)									
ES2109007-009	SW2	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
ES2109007-001	MW2	EP071: >C10 - C16 Fraction	----	100	µg/L	2750	2840	3.37	0% - 20%
		EP071: >C16 - C34 Fraction	----	100	µg/L	3560	3460	3.12	0% - 20%
		EP071: >C34 - C40 Fraction	----	100	µg/L	340	380	13.3	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3567253)									
CA2101629-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES2109007-004	MW8	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 3567253)									
CA2101629-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES2109007-004	MW8	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP131A: Organochlorine Pesticides (QC Lot: 3565887)									
ES2109007-008	SW1	EP131A: Heptachlor	76-44-8	0.005	µg/L	<0.005	<0.005	0.00	No Limit
		EP131A: Aldrin	309-00-2	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: alpha-BHC	319-84-6	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: beta-BHC	319-85-7	0.01	µg/L	<0.010	<0.010	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP131A: Organochlorine Pesticides (QC Lot: 3565887) - continued									
ES2109007-008	SW1	EP131A: delta-BHC	319-86-8	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: 4.4`-DDD	72-54-8	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: 4.4`-DDE	72-55-9	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: 4.4`-DDT	50-29-3	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Dieldrin	60-57-1	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: alpha-Endosulfan	959-98-8	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: beta-Endosulfan	33213-65-9	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Endosulfan sulfate	1031-07-8	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Endrin	72-20-8	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Endosulfan (sum)	115-29-7	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Endrin aldehyde	7421-93-4	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Endrin ketone	53494-70-5	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Heptachlor epoxide	1024-57-3	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Hexachlorobenzene (HCB)	118-74-1	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: gamma-BHC	58-89-9	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Methoxychlor	72-43-5	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: cis-Chlordane	5103-71-9	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: trans-Chlordane	5103-74-2	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Total Chlordane (sum)	----	0.01	µg/L	<0.010	<0.010	0.00	No Limit
		EP131A: Sum of DDD + DDE + DDT	72-54-8/72-55-9/50-2	0.01	µg/L	<0.010	<0.010	0.00	No Limit
EP131B: Polychlorinated Biphenyls (as Aroclors) (QC Lot: 3565886)									
ES2109007-008	SW1	EP131B: Total Polychlorinated biphenyls	----	0.1	µg/L	<0.10	<0.10	0.00	No Limit
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3565885)									
ES2109007-010	Graham Drive	EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Coronene	191-07-1	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP132B: Polynuclear Aromatic Hydrocarbons (QC Lot: 3565885) - continued									
ES2109007-010	Graham Drive	EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Perylene	198-55-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	<0.1	0.00	No Limit
EP234A: OP Pesticides (QC Lot: 3565558)									
WN2102953-001	Anonymous	EP234-1: Sulfotep	3689-24-5	0.005	µg/L	<0.005	<0.005	0.00	No Limit
		EP234-1: Triazophos	24017-47-8	0.005	µg/L	<0.005	<0.005	0.00	No Limit
		EP234-1: Coumaphos	56-72-4	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Diazinon	333-41-5	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Ethoprophos	13194-48-4	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Fenamiphos	22224-92-6	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Fensulfothion	115-90-2	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Omethoate	1113-02-6	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Pirimiphos-ethyl	23505-41-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Pirimiphos-methyl	29232-93-7	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Profenofos	41198-08-7	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Terbufos	13071-79-9	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Tetrachlorvinphos	22248-79-9	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Azinphos-methyl	86-50-0	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Azinphos-ethyl	2642-71-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Carbofenothion	786-19-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Chlorfenvinphos	470-90-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Chlorpyrifos	2921-88-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-O	298-03-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-O & Demeton-S	298-03-3/126-75-0	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-S	126-75-0	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-S-methyl	919-86-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Dimethoate	60-51-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Ethion	563-12-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Malathion	121-75-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Mevinphos	7786-34-7	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Monocrotophos	6923-22-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Temephos	3383-96-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Trichlorfon	52-68-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Disulfoton	298-04-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP234-1: EPN	2104-64-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Acceptable RPD (%)
EP234A: OP Pesticides (QC Lot: 3565558) - continued									
WN2102953-001	Anonymous	EP234-1: Fenthion	55-38-9	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP234-1: Sulprofos	35400-43-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP234-1: Bromophos-ethyl	4824-78-6	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP234-1: Phorate	298-02-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP234-1: Prothiofos	34643-46-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP234-1: Chlorpyrifos-methyl	5598-13-0	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EP234-1: Dichlorvos	62-73-7	0.2	µg/L	<0.20	<0.20	0.00	No Limit
		EP234-1: Parathion	56-38-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EP234-1: Parathion-methyl	298-00-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP234-1: Trichloronate	327-98-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP234-1: Fenchlorphos (Ronnel)	299-84-3	10	µg/L	<10	<10	0.00	No Limit
		EP234-1: Fenitrothion	122-14-5	2	µg/L	<2	<2	0.00	No Limit
ES2109000-001	Anonymous	EP234-1: Sulfotep	3689-24-5	0.005	µg/L	<0.005	<0.005	0.00	No Limit
		EP234-1: Triazophos	24017-47-8	0.005	µg/L	<0.005	<0.005	0.00	No Limit
		EP234-1: Coumaphos	56-72-4	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Diazinon	333-41-5	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Ethoprophos	13194-48-4	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Fenamiphos	22224-92-6	0.01	µg/L	<0.01	0.01	0.00	No Limit
		EP234-1: Fensulfothion	115-90-2	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Omethoate	1113-02-6	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Pirimiphos-ethyl	23505-41-1	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Pirimiphos-methyl	29232-93-7	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Profenofos	41198-08-7	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Terbufos	13071-79-9	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Tetrachlorvinphos	22248-79-9	0.01	µg/L	<0.01	<0.01	0.00	No Limit
		EP234-1: Azinphos-methyl	86-50-0	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Azinphos-ethyl	2642-71-9	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Carbofenothion	786-19-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Chlorfenvinphos	470-90-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Chlorpyrifos	2921-88-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-O	298-03-3	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-O & Demeton-S	298-03-3/126-75-0	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-S	126-75-0	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Demeton-S-methyl	919-86-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Dimethoate	60-51-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Ethion	563-12-2	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Malathion	121-75-5	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Mevinphos	7786-34-7	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Monocrotophos	6923-22-4	0.02	µg/L	<0.02	<0.02	0.00	No Limit

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP234A: OP Pesticides (QC Lot: 3565558) - continued									
ES2109000-001	Anonymous	EP234-1: Temephos	3383-96-8	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Trichlorfon	52-68-6	0.02	µg/L	<0.02	<0.02	0.00	No Limit
		EP234-1: Disulfoton	298-04-4	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP234-1: EPN	2104-64-5	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP234-1: Fenthion	55-38-9	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP234-1: Sulprofos	35400-43-2	0.05	µg/L	<0.05	<0.05	0.00	No Limit
		EP234-1: Bromophos-ethyl	4824-78-6	0.1	µg/L	<0.10	<0.10	0.00	No Limit
		EP234-1: Phorate	298-02-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP234-1: Prothiofos	34643-46-4	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP234-1: Chlorpyrifos-methyl	5598-13-0	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EP234-1: Dichlorvos	62-73-7	0.2	µg/L	<0.20	<0.20	0.00	No Limit
		EP234-1: Parathion	56-38-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
		EP234-1: Parathion-methyl	298-00-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP234-1: Trichloronate	327-98-0	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP234-1: Fenchlorphos (Ronnel)	299-84-3	10	µg/L	<10	<10	0.00	No Limit
		EP234-1: Fenitrothion	122-14-5	2	µg/L	<2	<2	0.00	No Limit
EP234A: OP Pesticides (QC Lot: 3565559)									
ES2109000-001	Anonymous	EP234-1x: Bensulide	741-58-2	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP234-1x: Methidathion	950-37-8	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP234-1x: Pyrazophos	13457-18-6	0.1	µg/L	<0.1	<0.1	0.00	No Limit
		EP234-1x: Acephate	30560-19-1	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP234-1x: Thiometon	640-15-3	0.5	µg/L	<0.5	<0.5	0.00	No Limit
		EP234-1x: Naftalofos	1491-41-4	1	µg/L	<1.0	<1.0	0.00	No Limit
		EP234-1x: Fosetyl Aluminium	39148-24-8	10	µg/L	<10	<10	0.00	No Limit
		EP234-1x: Formothion	2540-82-1	20	µg/L	<20	<20	0.00	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP071 SG: Total Petroleum Hydrocarbons - SV Silica gel cleanup (QCLot: 3600015)								
EP071-SVSG: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	68.5	55.8	112
EP071-SVSG: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	96.1	71.6	113
EP071-SVSG: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	78.2	56.0	121
EP071 SG: Total Petroleum Hydrocarbons - SV Silica gel cleanup (QCLot: 3639786)								
EP071-SVSG: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	73.7	55.8	112
EP071-SVSG: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	76.0	71.6	113
EP071-SVSG: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	91.5	56.0	121
EP071 SG: Total Recoverable Hydrocarbons - SV NEPM 2013 Fractions - Silica gel cleanup (QCLot: 3600015)								
EP071-SVSG: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	70.0	56.0	119
EP071-SVSG: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	97.5	62.5	110
EP071-SVSG: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	89.6	61.5	121
EP071 SG: Total Recoverable Hydrocarbons - SV NEPM 2013 Fractions - Silica gel cleanup (QCLot: 3639786)								
EP071-SVSG: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	87.4	56.0	119
EP071-SVSG: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	95.8	62.5	110
EP071-SVSG: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	65.7	61.5	121
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3572846)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	98.3	83.0	129
				<5	1000 mg/L	98.7	82.0	110
				<5	463 mg/L	95.2	83.0	118
EA025: Total Suspended Solids dried at 104 ± 2°C (QCLot: 3572847)								
EA025H: Suspended Solids (SS)	----	5	mg/L	<5	150 mg/L	104	83.0	129
				<5	1000 mg/L	95.8	82.0	110
				<5	463 mg/L	88.9	83.0	118
ED037P: Alkalinity by PC Titrator (QCLot: 3566744)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	101	81.0	111
				----	50 mg/L	111	80.0	120
ED037P: Alkalinity by PC Titrator (QCLot: 3566749)								
ED037-P: Total Alkalinity as CaCO3	----	----	mg/L	----	200 mg/L	98.9	81.0	111
				----	50 mg/L	107	80.0	120
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3568327)								
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	82.0	122
				<1	500 mg/L	106	82.0	122
ED045G: Chloride by Discrete Analyser (QCLot: 3568326)								

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
ED045G: Chloride by Discrete Analyser (QCLot: 3568326) - continued								
ED045G: Chloride	16887-00-6	1	mg/L	<1	50 mg/L	96.4	80.9	127
				<1	1000 mg/L	91.3	80.9	127
ED093F: Dissolved Major Cations (QCLot: 3573075)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	89.0	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	93.0	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	93.5	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	93.1	85.0	113
ED093F: Dissolved Major Cations (QCLot: 3573231)								
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	108	80.0	114
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	99.0	90.0	116
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	98.4	82.0	120
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	98.0	85.0	113
EG020F: Dissolved Metals by ICP-MS (QCLot: 3573230)								
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.0	85.0	114
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.0	84.0	110
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.2	85.0	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.4	81.0	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.5	83.0	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.3	82.0	110
EG020A-F: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	97.5	79.0	113
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.4	82.0	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.4	81.0	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.8	82.0	112
EG020T: Total Metals by ICP-MS (QCLot: 3573200)								
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.4	82.0	114
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.0	84.0	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.8	86.0	116
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.6	83.0	118
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.6	85.0	115
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	100	85.0	113
EG020A-T: Molybdenum	7439-98-7	0.001	mg/L	<0.001	0.1 mg/L	95.9	83.0	121
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.7	84.0	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.5	79.0	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	92.5	85.0	117
EG035F: Dissolved Mercury by FIMS (QCLot: 3573229)								
EG035F: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	95.0	83.0	105
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3573043)								
EG035T: Mercury	7439-97-6	0.0001	mg/L	<0.0001	0.01 mg/L	93.4	77.0	111

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 3565364)								
EK026SF: Total Cyanide	57-12-5	0.004	mg/L	<0.004	0.2 mg/L	96.6	73.0	133
EK040P: Fluoride by PC Titrator (QCLot: 3566748)								
EK040P: Fluoride	16984-48-8	0.1	mg/L	<0.1	5 mg/L	96.2	82.0	116
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3569405)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	90.0	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3568325)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	103	82.0	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3569407)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	91.0	113
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3569411)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	87.9	69.0	101
				<0.1	1 mg/L	92.3	70.0	118
				<0.1	5 mg/L	100	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3569410)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	95.5	71.0	101
				<0.01	0.442 mg/L	94.9	72.0	108
				<0.01	1 mg/L	103	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3565816)								
EP066: Total Polychlorinated biphenyls	----	1	µg/L	<1	10 µg/L	84.5	68.9	113
EP068A: Organochlorine Pesticides (OC) (QCLot: 3565815)								
EP068: alpha-BHC	319-84-6	0.5	µg/L	<0.5	5 µg/L	102	64.9	107
EP068: Hexachlorobenzene (HCB)	118-74-1	0.5	µg/L	<0.5	5 µg/L	99.2	58.3	111
EP068: beta-BHC	319-85-7	0.5	µg/L	<0.5	5 µg/L	100	69.0	117
EP068: gamma-BHC	58-89-9	0.5	µg/L	<0.5	5 µg/L	104	70.0	112
EP068: delta-BHC	319-86-8	0.5	µg/L	<0.5	5 µg/L	104	68.9	110
EP068: Heptachlor	76-44-8	0.5	µg/L	<0.5	5 µg/L	103	65.2	108
EP068: Aldrin	309-00-2	0.5	µg/L	<0.5	5 µg/L	101	65.8	109
EP068: Heptachlor epoxide	1024-57-3	0.5	µg/L	<0.5	5 µg/L	102	67.1	107
EP068: trans-Chlordane	5103-74-2	0.5	µg/L	<0.5	5 µg/L	99.8	64.1	110
EP068: alpha-Endosulfan	959-98-8	0.5	µg/L	<0.5	5 µg/L	99.5	66.7	112
EP068: cis-Chlordane	5103-71-9	0.5	µg/L	<0.5	5 µg/L	98.7	63.2	111
EP068: Dieldrin	60-57-1	0.5	µg/L	<0.5	5 µg/L	102	65.2	113
EP068: 4.4`-DDE	72-55-9	0.5	µg/L	<0.5	5 µg/L	103	66.0	112
EP068: Endrin	72-20-8	0.5	µg/L	<0.5	5 µg/L	98.5	65.2	113
EP068: beta-Endosulfan	33213-65-9	0.5	µg/L	<0.5	5 µg/L	99.6	67.3	114
EP068: 4.4`-DDD	72-54-8	0.5	µg/L	<0.5	5 µg/L	105	72.0	122
EP068: Endrin aldehyde	7421-93-4	0.5	µg/L	<0.5	5 µg/L	81.7	66.9	109
EP068: Endosulfan sulfate	1031-07-8	0.5	µg/L	<0.5	5 µg/L	81.9	65.2	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP068A: Organochlorine Pesticides (OC) (QCLot: 3565815) - continued								
EP068: 4.4`-DDT	50-29-3	2	µg/L	<2.0	5 µg/L	97.0	65.2	112
EP068: Endrin ketone	53494-70-5	0.5	µg/L	<0.5	5 µg/L	85.2	63.8	110
EP068: Methoxychlor	72-43-5	2	µg/L	<2.0	5 µg/L	84.8	61.1	114
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3565815)								
EP068: Dichlorvos	62-73-7	0.5	µg/L	<0.5	5 µg/L	86.2	65.6	114
EP068: Demeton-S-methyl	919-86-8	0.5	µg/L	<0.5	5 µg/L	96.6	63.7	113
EP068: Monocrotophos	6923-22-4	2	µg/L	<2.0	5 µg/L	24.3	19.7	48.0
EP068: Dimethoate	60-51-5	0.5	µg/L	<0.5	5 µg/L	89.9	69.5	110
EP068: Diazinon	333-41-5	0.5	µg/L	<0.5	5 µg/L	102	71.1	110
EP068: Chlorpyrifos-methyl	5598-13-0	0.5	µg/L	<0.5	5 µg/L	100	77.0	119
EP068: Parathion-methyl	298-00-0	2	µg/L	<2.0	5 µg/L	105	70.0	124
EP068: Malathion	121-75-5	0.5	µg/L	<0.5	5 µg/L	103	68.4	116
EP068: Fenthion	55-38-9	0.5	µg/L	<0.5	5 µg/L	101	68.6	112
EP068: Chlorpyrifos	2921-88-2	0.5	µg/L	<0.5	5 µg/L	105	75.0	119
EP068: Parathion	56-38-2	2	µg/L	<2.0	5 µg/L	105	67.0	121
EP068: Pirimphos-ethyl	23505-41-1	0.5	µg/L	<0.5	5 µg/L	102	69.0	121
EP068: Chlorfenvinphos	470-90-6	0.5	µg/L	<0.5	5 µg/L	100	71.8	110
EP068: Bromophos-ethyl	4824-78-6	0.5	µg/L	<0.5	5 µg/L	103	67.5	112
EP068: Fenamiphos	22224-92-6	0.5	µg/L	<0.5	5 µg/L	101	64.1	116
EP068: Prothiofos	34643-46-4	0.5	µg/L	<0.5	5 µg/L	105	67.8	114
EP068: Ethion	563-12-2	0.5	µg/L	<0.5	5 µg/L	103	74.0	120
EP068: Carbophenothion	786-19-6	0.5	µg/L	<0.5	5 µg/L	85.4	66.2	114
EP068: Azinphos Methyl	86-50-0	0.5	µg/L	<0.5	5 µg/L	89.9	51.6	128
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 3600015)								
EP071-SVSG: C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup (QCLot: 3639786)								
EP071-SVSG: C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 3600015)								
EP071-SVSG: >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup (QCLot: 3639786)								
EP071-SVSG: >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
EP075(SIM)A: Phenolic Compounds (QCLot: 3565814)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	42.7	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	66.7	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	66.8	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	58.0	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	70.8	48.0	100
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	71.5	49.0	99.0

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 3565814) - continued								
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	67.8	53.0	105
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	67.9	57.0	105
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	67.6	53.0	99.0
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	66.5	50.0	106
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	76.8	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	46.9	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3565814)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	62.9	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	82.4	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	89.9	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	77.0	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	66.5	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	69.0	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	73.7	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	75.0	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	70.9	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	75.7	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	68.9	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	76.8	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	71.7	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	71.5	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	72.4	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	71.3	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3565813)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	74.4	55.8	112
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	74.5	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	104	56.0	121
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3567253)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	76.3	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3565813)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	85.2	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	85.8	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	80.1	61.5	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3567253)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	76.9	75.0	127
EP080: BTEXN (QCLot: 3567253)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	94.7	70.0	122

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP080: BTEXN (QCLot: 3567253) - continued								
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	95.3	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	96.6	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	95.3	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	95.6	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	100	70.0	120
EP131A: Organochlorine Pesticides (QCLot: 3565887)								
EP131A: Aldrin	309-00-2	0.01	µg/L	<0.010	1.1 µg/L	113	34.0	145
EP131A: alpha-BHC	319-84-6	0.01	µg/L	<0.010	1.1 µg/L	114	27.2	131
EP131A: beta-BHC	319-85-7	0.01	µg/L	<0.010	1.1 µg/L	94.2	28.6	133
EP131A: delta-BHC	319-86-8	0.01	µg/L	<0.010	1.1 µg/L	107	36.0	131
EP131A: 4.4`-DDD	72-54-8	0.01	µg/L	<0.010	1.1 µg/L	102	36.0	142
EP131A: 4.4`-DDE	72-55-9	0.01	µg/L	<0.010	1.1 µg/L	102	30.4	112
EP131A: 4.4`-DDT	50-29-3	0.01	µg/L	<0.010	1.1 µg/L	88.6	29.5	142
EP131A: Dieldrin	60-57-1	0.01	µg/L	<0.010	1.1 µg/L	119	28.1	122
EP131A: alpha-Endosulfan	959-98-8	0.01	µg/L	<0.010	1.1 µg/L	106	34.0	119
EP131A: beta-Endosulfan	33213-65-9	0.01	µg/L	<0.010	1.1 µg/L	109	31.6	128
EP131A: Endosulfan sulfate	1031-07-8	0.01	µg/L	<0.010	1.1 µg/L	82.4	35.0	159
EP131A: Endrin	72-20-8	0.01	µg/L	<0.010	1.1 µg/L	94.2	21.5	165
EP131A: Endosulfan (sum)	115-29-7	0.01	µg/L	<0.010	----	----	----	----
EP131A: Endrin aldehyde	7421-93-4	0.01	µg/L	<0.010	1.1 µg/L	94.8	22.7	123
EP131A: Endrin ketone	53494-70-5	0.01	µg/L	<0.010	1.1 µg/L	122	16.3	144
EP131A: Heptachlor	76-44-8	0.005	µg/L	<0.005	1.1 µg/L	112	33.0	160
EP131A: Heptachlor epoxide	1024-57-3	0.01	µg/L	<0.010	1.1 µg/L	115	33.0	117
EP131A: Hexachlorobenzene (HCB)	118-74-1	0.01	µg/L	<0.010	1.1 µg/L	114	23.6	126
EP131A: gamma-BHC	58-89-9	0.01	µg/L	<0.010	1.1 µg/L	113	28.7	134
EP131A: Methoxychlor	72-43-5	0.01	µg/L	<0.010	1.1 µg/L	94.2	29.5	150
EP131A: cis-Chlordane	5103-71-9	0.01	µg/L	<0.010	1.1 µg/L	111	27.0	116
EP131A: trans-Chlordane	5103-74-2	0.01	µg/L	<0.010	1.1 µg/L	106	31.2	119
EP131A: Total Chlordane (sum)	----	0.01	µg/L	<0.010	----	----	----	----
EP131A: Sum of DDD + DDE + DDT	72-54-8/72-5 5-9/50-2	0.01	µg/L	<0.010	----	----	----	----
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 3565886)								
EP131B: Total Polychlorinated biphenyls	----	0.1	µg/L	<0.10	----	----	----	----
EP131B: Aroclor 1254	11097-69-1	----	µg/L	----	1 µg/L	104	51.0	133
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 3565885)								
EP132: 3-Methylcholanthrene	56-49-5	0.1	µg/L	<0.1	2 µg/L	103	60.0	120
EP132: 2-Methylnaphthalene	91-57-6	0.1	µg/L	<0.1	2 µg/L	79.2	59.0	123

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 3565885) - continued								
EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	0.1	µg/L	<0.1	2 µg/L	106	36.0	144
EP132: Acenaphthene	83-32-9	0.1	µg/L	<0.1	2 µg/L	85.7	64.0	122
EP132: Acenaphthylene	208-96-8	0.1	µg/L	<0.1	2 µg/L	88.3	64.0	126
EP132: Anthracene	120-12-7	0.1	µg/L	<0.1	2 µg/L	89.3	65.0	127
EP132: Benz(a)anthracene	56-55-3	0.1	µg/L	<0.1	2 µg/L	96.4	64.0	130
EP132: Benzo(a)pyrene	50-32-8	0.05	µg/L	<0.05	2 µg/L	99.8	64.0	126
EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	0.1	µg/L	<0.1	2 µg/L	103	62.0	126
EP132: Benzo(e)pyrene	192-97-2	0.1	µg/L	<0.1	2 µg/L	99.6	62.0	126
EP132: Benzo(g.h.i)perylene	191-24-2	0.1	µg/L	<0.1	2 µg/L	102	56.0	126
EP132: Benzo(k)fluoranthene	207-08-9	0.1	µg/L	<0.1	2 µg/L	98.6	68.0	130
EP132: Chrysene	218-01-9	0.1	µg/L	<0.1	2 µg/L	95.0	66.0	130
EP132: Coronene	191-07-1	0.1	µg/L	<0.1	2 µg/L	104	35.0	133
EP132: Dibenz(a.h)anthracene	53-70-3	0.1	µg/L	<0.1	2 µg/L	102	58.0	128
EP132: Fluoranthene	206-44-0	0.1	µg/L	<0.1	2 µg/L	93.4	65.0	127
EP132: Fluorene	86-73-7	0.1	µg/L	<0.1	2 µg/L	87.9	64.0	124
EP132: Indeno(1.2.3.cd)pyrene	193-39-5	0.1	µg/L	<0.1	2 µg/L	89.7	57.0	127
EP132: Naphthalene	91-20-3	0.1	µg/L	<0.1	2 µg/L	74.5	54.0	128
EP132: Perylene	198-55-0	0.1	µg/L	<0.1	2 µg/L	98.8	66.0	130
EP132: Phenanthrene	85-01-8	0.1	µg/L	<0.1	2 µg/L	90.0	65.0	129
EP132: Pyrene	129-00-0	0.1	µg/L	<0.1	2 µg/L	92.1	66.0	128
EP234A: OP Pesticides (QCLot: 3565558)								
EP234-1: Azinphos-methyl	86-50-0	0.02	µg/L	<0.02	0.2 µg/L	93.0	77.0	129
EP234-1: Azinphos-ethyl	2642-71-9	0.02	µg/L	<0.02	0.2 µg/L	102	75.0	135
EP234-1: Bromophos-ethyl	4824-78-6	0.1	µg/L	<0.10	1 µg/L	120	70.0	130
EP234-1: Carbofenothion	786-19-6	0.02	µg/L	<0.02	0.2 µg/L	114	70.0	130
EP234-1: Chlorfenvinphos	470-90-6	0.02	µg/L	<0.02	0.4 µg/L	92.8	74.0	134
EP234-1: Chlorpyrifos	2921-88-2	0.02	µg/L	<0.02	0.2 µg/L	116	70.0	130
EP234-1: Chlorpyrifos-methyl	5598-13-0	0.2	µg/L	<0.2	2 µg/L	100	70.0	130
EP234-1: Coumaphos	56-72-4	0.01	µg/L	<0.01	0.1 µg/L	107	70.0	130
EP234-1: Demeton-O	298-03-3	0.02	µg/L	<0.02	0.1 µg/L	99.0	64.0	134
EP234-1: Demeton-O & Demeton-S	298-03-3/12 6-75-0	0.02	µg/L	<0.02	0.2 µg/L	92.0	79.0	127
EP234-1: Demeton-S	126-75-0	0.02	µg/L	<0.02	0.1 µg/L	85.0	63.0	135
EP234-1: Demeton-S-methyl	919-86-8	0.02	µg/L	<0.02	0.2 µg/L	95.0	70.0	128
EP234-1: Diazinon	333-41-5	0.01	µg/L	<0.01	0.1 µg/L	81.0	68.0	138
EP234-1: Dichlorvos	62-73-7	0.2	µg/L	<0.20	2 µg/L	107	76.0	128
EP234-1: Dimethoate	60-51-5	0.02	µg/L	<0.02	0.2 µg/L	95.5	75.0	127
EP234-1: Disulfoton	298-04-4	0.05	µg/L	<0.05	0.5 µg/L	84.8	72.0	134

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
				Result	Concentration	LCS	Low	High
EP234A: OP Pesticides (QCLot: 3565558) - continued								
EP234-1: EPN	2104-64-5	0.05	µg/L	<0.05	0.5 µg/L	119	70.0	130
EP234-1: Ethion	563-12-2	0.02	µg/L	<0.02	0.2 µg/L	122	70.0	130
EP234-1: Ethoprophos	13194-48-4	0.01	µg/L	<0.01	0.1 µg/L	87.0	78.0	128
EP234-1: Fenamiphos	22224-92-6	0.01	µg/L	<0.01	0.1 µg/L	101	71.0	135
EP234-1: Fenchlorphos (Ronnel)	299-84-3	10	µg/L	<10	100 µg/L	78.2	70.0	130
EP234-1: Fenitrothion	122-14-5	2	µg/L	<2	20 µg/L	108	64.0	136
EP234-1: Fensulfothion	115-90-2	0.01	µg/L	<0.01	0.1 µg/L	99.0	79.0	125
EP234-1: Fenthion	55-38-9	0.05	µg/L	<0.05	0.5 µg/L	94.4	70.0	130
EP234-1: Malathion	121-75-5	0.02	µg/L	<0.02	0.2 µg/L	106	70.0	130
EP234-1: Mevinphos	7786-34-7	0.02	µg/L	<0.02	0.4 µg/L	99.0	77.0	123
EP234-1: Monocrotophos	6923-22-4	0.02	µg/L	<0.02	0.2 µg/L	97.5	75.0	129
EP234-1: Omethoate	1113-02-6	0.01	µg/L	<0.01	0.1 µg/L	105	74.0	130
EP234-1: Parathion	56-38-2	0.2	µg/L	<0.2	2 µg/L	84.5	69.0	139
EP234-1: Parathion-methyl	298-00-0	0.5	µg/L	<0.5	20 µg/L	102	66.0	140
EP234-1: Phorate	298-02-2	0.1	µg/L	<0.1	1 µg/L	75.8	68.0	136
EP234-1: Pirimiphos-ethyl	23505-41-1	0.01	µg/L	<0.01	0.1 µg/L	116	70.0	130
EP234-1: Pirimiphos-methyl	29232-93-7	0.01	µg/L	<0.01	0.1 µg/L	102	71.0	137
EP234-1: Profenofos	41198-08-7	0.01	µg/L	<0.01	0.1 µg/L	95.0	70.0	130
EP234-1: Prothiofos	34643-46-4	0.1	µg/L	<0.1	1 µg/L	103	70.0	130
EP234-1: Sulfotep	3689-24-5	0.005	µg/L	<0.005	0.05 µg/L	116	71.0	137
EP234-1: Sulprofos	35400-43-2	0.05	µg/L	<0.05	0.5 µg/L	85.4	70.0	130
EP234-1: Temephos	3383-96-8	0.02	µg/L	<0.02	0.2 µg/L	96.5	70.0	130
EP234-1: Terbufos	13071-79-9	0.01	µg/L	<0.01	0.1 µg/L	81.0	70.0	130
EP234-1: Tetrachlorvinphos	22248-79-9	0.01	µg/L	<0.01	0.1 µg/L	98.0	74.0	128
EP234-1: Triazophos	24017-47-8	0.005	µg/L	<0.005	0.05 µg/L	90.0	77.0	131
EP234-1: Trichlorfon	52-68-6	0.02	µg/L	<0.02	0.2 µg/L	82.0	70.0	130
EP234-1: Trichloronate	327-98-0	0.5	µg/L	<0.5	5 µg/L	101	63.0	139
EP234A: OP Pesticides (QCLot: 3565559)								
EP234-1x: Acephate	30560-19-1	0.5	µg/L	<0.5	5 µg/L	95.5	70.0	130
EP234-1x: Bensulide	741-58-2	0.1	µg/L	<0.1	5 µg/L	77.6	70.0	130
EP234-1x: Formothion	2540-82-1	20	µg/L	<20	5 µg/L	114	70.0	130
EP234-1x: Fosetyl Aluminium	39148-24-8	10	µg/L	<10	5 µg/L	84.4	70.0	130
EP234-1x: Methidathion	950-37-8	0.1	µg/L	<0.1	5 µg/L	98.9	70.0	130
EP234-1x: Naftalofos	1491-41-4	1	µg/L	<1.0	5 µg/L	72.0	70.0	130
EP234-1x: Pyrazophos	13457-18-6	0.1	µg/L	<0.1	5 µg/L	95.4	70.0	130
EP234-1x: Thiometon	640-15-3	0.5	µg/L	<0.5	5 µg/L	92.9	70.0	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 3568327)							
ES2109007-001	MW2	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	10 mg/L	130	70.0	130
ED045G: Chloride by Discrete Analyser (QCLot: 3568326)							
ES2109007-001	MW2	ED045G: Chloride	16887-00-6	50 mg/L	102	70.0	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 3573230)							
ES2109007-003	MW6	EG020A-F: Arsenic	7440-38-2	1 mg/L	96.4	70.0	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	96.9	70.0	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	83.6	70.0	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.6	70.0	130
		EG020A-F: Lead	7439-92-1	1 mg/L	86.3	70.0	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	80.2	70.0	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	95.3	70.0	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	95.1	70.0	130
EG020T: Total Metals by ICP-MS (QCLot: 3573200)							
ES2107852-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	105	70.0	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	106	70.0	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	102	70.0	130
		EG020A-T: Copper	7440-50-8	1 mg/L	103	70.0	130
		EG020A-T: Lead	7439-92-1	1 mg/L	101	70.0	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	110	70.0	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	70.0	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	103	70.0	130
EG035F: Dissolved Mercury by FIMS (QCLot: 3573229)							
ES2109007-001	MW2	EG035F: Mercury	7439-97-6	0.01 mg/L	86.6	70.0	130
EG035T: Total Recoverable Mercury by FIMS (QCLot: 3573043)							
ES2108580-002	Anonymous	EG035T: Mercury	7439-97-6	0.01 mg/L	85.4	70.0	130
EK026SF: Total CN by Segmented Flow Analyser (QCLot: 3565364)							
ES2108201-001	Anonymous	EK026SF: Total Cyanide	57-12-5	0.2 mg/L	82.4	70.0	130
EK040P: Fluoride by PC Titrator (QCLot: 3566748)							
ES2108988-019	Anonymous	EK040P: Fluoride	16984-48-8	5 mg/L	95.6	70.0	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 3569405)							
ES2108725-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	103	70.0	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 3568325)							
ES2109007-001	MW2	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	101	70.0	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3569407)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 3569407) - continued							
ES2108725-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.5	70.0	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 3569411)							
ES2108725-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.2	70.0	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 3569410)							
ES2108725-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	106	70.0	130
EP066: Polychlorinated Biphenyls (PCB) (QCLot: 3565816)							
ES2109007-002	MW4	EP066: Total Polychlorinated biphenyls	----	10 µg/L	95.3	68.2	116
EP068A: Organochlorine Pesticides (OC) (QCLot: 3565815)							
ES2109007-002	MW4	EP068: gamma-BHC	58-89-9	5 µg/L	89.5	70.0	130
		EP068: Heptachlor	76-44-8	5 µg/L	86.1	70.0	130
		EP068: Aldrin	309-00-2	5 µg/L	75.1	70.0	130
		EP068: Dieldrin	60-57-1	5 µg/L	94.5	70.0	130
		EP068: Endrin	72-20-8	20 µg/L	84.9	70.0	130
		EP068: 4.4`-DDT	50-29-3	20 µg/L	84.5	70.0	130
EP068B: Organophosphorus Pesticides (OP) (QCLot: 3565815)							
ES2109007-002	MW4	EP068: Diazinon	333-41-5	5 µg/L	109	70.0	130
		EP068: Chlorpyrifos-methyl	5598-13-0	5 µg/L	88.0	70.0	130
		EP068: Pirimphos-ethyl	23505-41-1	5 µg/L	88.5	70.0	130
		EP068: Bromophos-ethyl	4824-78-6	5 µg/L	85.9	70.0	130
		EP068: Prothiofos	34643-46-4	5 µg/L	80.3	70.0	130
EP075(SIM)A: Phenolic Compounds (QCLot: 3565814)							
ES2109007-002	MW4	EP075(SIM): Phenol	108-95-2	20 µg/L	32.7	20.0	130
		EP075(SIM): 2-Chlorophenol	95-57-8	20 µg/L	82.6	60.0	130
		EP075(SIM): 2-Nitrophenol	88-75-5	20 µg/L	72.5	60.0	130
		EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	20 µg/L	78.9	70.0	130
		EP075(SIM): Pentachlorophenol	87-86-5	20 µg/L	59.1	20.0	130
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3565814)							
ES2109007-002	MW4	EP075(SIM): Acenaphthene	83-32-9	20 µg/L	79.3	70.0	130
		EP075(SIM): Pyrene	129-00-0	20 µg/L	75.7	70.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3565813)							
ES2109007-002	MW4	EP071: C10 - C14 Fraction	----	200 µg/L	89.1	70.0	130
		EP071: C15 - C28 Fraction	----	250 µg/L	107	71.0	130
		EP071: C29 - C36 Fraction	----	200 µg/L	103	67.0	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3567253)							
CA2101629-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	82.7	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3565813)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3565813) - continued							
ES2109007-002	MW4	EP071: >C10 - C16 Fraction	----	250 µg/L	90.6	70.0	130
		EP071: >C16 - C34 Fraction	----	350 µg/L	92.4	75.0	130
		EP071: >C34 - C40 Fraction	----	150 µg/L	99.1	67.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3567253)							
CA2101629-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	79.4	70.0	130
EP080: BTEXN (QCLot: 3567253)							
CA2101629-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	92.5	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	88.9	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	88.8	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	86.9	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	88.5	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	86.4	70.0	130
EP131A: Organochlorine Pesticides (QCLot: 3565887)							
ES2109007-010	Graham Drive	EP131A: Aldrin	309-00-2	1.1 µg/L	113	35.8	139
		EP131A: alpha-BHC	319-84-6	1.1 µg/L	108	19.7	153
		EP131A: beta-BHC	319-85-7	1.1 µg/L	91.7	43.8	136
		EP131A: delta-BHC	319-86-8	1.1 µg/L	106	37.4	144
		EP131A: 4.4`-DDD	72-54-8	1.1 µg/L	103	37.5	145
		EP131A: 4.4`-DDE	72-55-9	1.1 µg/L	110	30.5	146
		EP131A: 4.4`-DDT	50-29-3	1.1 µg/L	100	31.0	151
		EP131A: Dieldrin	60-57-1	1.1 µg/L	99.2	34.4	145
		EP131A: alpha-Endosulfan	959-98-8	1.1 µg/L	106	30.2	141
		EP131A: beta-Endosulfan	33213-65-9	1.1 µg/L	109	30.3	148
		EP131A: Endosulfan sulfate	1031-07-8	1.1 µg/L	76.6	19.1	150
		EP131A: Endrin	72-20-8	1.1 µg/L	116	13.0	165
		EP131A: Endrin aldehyde	7421-93-4	1.1 µg/L	89.1	28.3	134
		EP131A: Endrin ketone	53494-70-5	1.1 µg/L	119	15.1	146
		EP131A: Heptachlor	76-44-8	1.1 µg/L	112	33.2	148
		EP131A: Heptachlor epoxide	1024-57-3	1.1 µg/L	116	36.0	143
		EP131A: Hexachlorobenzene (HCB)	118-74-1	1.1 µg/L	112	14.0	146
		EP131A: gamma-BHC	58-89-9	1.1 µg/L	110	27.2	147
		EP131A: Methoxychlor	72-43-5	1.1 µg/L	117	34.4	150
		EP131A: cis-Chlordane	5103-71-9	1.1 µg/L	110	15.4	152
		EP131A: trans-Chlordane	5103-74-2	1.1 µg/L	122	45.1	140
EP131B: Polychlorinated Biphenyls (as Aroclors) (QCLot: 3565886)							
ES2109007-008	SW1	EP131B: Aroclor 1254	11097-69-1	1 µg/L	102	61.6	123
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 3565885)							

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP132B: Polynuclear Aromatic Hydrocarbons (QCLot: 3565885) - continued							
ES2109007-010	Graham Drive	EP132: 3-Methylcholanthrene	56-49-5	2 µg/L	85.8	59.0	115
		EP132: 2-Methylnaphthalene	91-57-6	2 µg/L	69.1	46.0	120
		EP132: 7.12-Dimethylbenz(a)anthracene	57-97-6	2 µg/L	83.0	21.0	135
		EP132: Acenaphthene	83-32-9	2 µg/L	71.9	62.0	114
		EP132: Acenaphthylene	208-96-8	2 µg/L	76.4	61.0	119
		EP132: Anthracene	120-12-7	2 µg/L	72.4	68.0	116
		EP132: Benz(a)anthracene	56-55-3	2 µg/L	78.2	67.0	122
		EP132: Benzo(a)pyrene	50-32-8	2 µg/L	80.0	72.0	114
		EP132: Benzo(b+j)fluoranthene	205-99-2 205-82-3	2 µg/L	80.5	69.0	119
		EP132: Benzo(e)pyrene	192-97-2	2 µg/L	78.6	71.0	119
		EP132: Benzo(g.h.i)perylene	191-24-2	2 µg/L	79.5	49.0	133
		EP132: Benzo(k)fluoranthene	207-08-9	2 µg/L	78.7	71.0	124
		EP132: Chrysene	218-01-9	2 µg/L	75.7	70.0	118
		EP132: Coronene	191-07-1	2 µg/L	78.5	29.0	138
		EP132: Dibenz(a.h)anthracene	53-70-3	2 µg/L	80.3	60.0	122
		EP132: Fluoranthene	206-44-0	2 µg/L	75.9	65.0	121
		EP132: Fluorene	86-73-7	2 µg/L	73.8	63.0	118
		EP132: Indeno(1.2.3.cd)pyrene	193-39-5	2 µg/L	81.2	57.0	123
		EP132: Naphthalene	91-20-3	2 µg/L	65.1	53.0	115
		EP132: Perylene	198-55-0	2 µg/L	78.1	71.0	118
		EP132: Phenanthrene	85-01-8	2 µg/L	72.7	67.0	120
		EP132: Pyrene	129-00-0	2 µg/L	74.6	70.0	117
EP234A: OP Pesticides (QCLot: 3565558)							
ES2109000-001	Anonymous	EP234-1: Azinphos-methyl	86-50-0	0.2 µg/L	76.0	70.0	130
		EP234-1: Azinphos-ethyl	2642-71-9	0.2 µg/L	91.0	70.0	130
		EP234-1: Bromophos-ethyl	4824-78-6	1 µg/L	93.9	70.0	130
		EP234-1: Carbofenothion	786-19-6	0.2 µg/L	108	70.0	130
		EP234-1: Chlorfenvinphos	470-90-6	0.4 µg/L	84.2	70.0	130
		EP234-1: Chlorpyrifos	2921-88-2	0.2 µg/L	104	70.0	130
		EP234-1: Chlorpyrifos-methyl	5598-13-0	2 µg/L	95.6	58.0	136
		EP234-1: Coumaphos	56-72-4	0.1 µg/L	118	70.0	130
		EP234-1: Demeton-O	298-03-3	0.1 µg/L	74.0	70.0	130
		EP234-1: Demeton-O & Demeton-S	298-03-3/126-75-0	0.2 µg/L	78.0	69.0	129
		EP234-1: Demeton-S	126-75-0	0.1 µg/L	82.0	70.0	130
		EP234-1: Demeton-S-methyl	919-86-8	0.2 µg/L	81.5	70.0	130
		EP234-1: Diazinon	333-41-5	0.1 µg/L	88.0	70.0	130
		EP234-1: Dichlorvos	62-73-7	2 µg/L	87.6	70.0	130

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Acceptable Limits (%)	
Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP234A: OP Pesticides (QCLot: 3565558) - continued							
ES2109000-001	Anonymous	EP234-1: Dimethoate	60-51-5	0.2 µg/L	97.0	69.0	131
		EP234-1: Disulfoton	298-04-4	0.5 µg/L	71.6	70.0	130
		EP234-1: EPN	2104-64-5	0.5 µg/L	100	70.0	130
		EP234-1: Ethion	563-12-2	0.2 µg/L	102	70.0	130
		EP234-1: Ethoprophos	13194-48-4	0.1 µg/L	103	70.0	132
		EP234-1: Fenamiphos	22224-92-6	0.1 µg/L	104	70.0	130
		EP234-1: Fenchlorphos (Ronnel)	299-84-3	100 µg/L	82.2	71.0	133
		EP234-1: Fenitrothion	122-14-5	20 µg/L	96.8	64.0	136
		EP234-1: Fensulfothion	115-90-2	0.1 µg/L	89.0	83.0	123
		EP234-1: Fenthion	55-38-9	0.5 µg/L	85.4	70.0	130
		EP234-1: Malathion	121-75-5	0.2 µg/L	106	70.0	130
		EP234-1: Mevinphos	7786-34-7	0.4 µg/L	100	69.0	125
		EP234-1: Monocrotophos	6923-22-4	0.2 µg/L	110	70.0	128
		EP234-1: Omethoate	1113-02-6	0.1 µg/L	97.0	70.0	130
		EP234-1: Parathion	56-38-2	2 µg/L	92.6	70.0	130
		EP234-1: Parathion-methyl	298-00-0	20 µg/L	99.3	70.0	140
		EP234-1: Phorate	298-02-2	1 µg/L	85.1	70.0	130
		EP234-1: Pirimiphos-ethyl	23505-41-1	0.1 µg/L	115	70.0	130
		EP234-1: Pirimiphos-methyl	29232-93-7	0.1 µg/L	80.0	70.0	130
		EP234-1: Profenofos	41198-08-7	0.1 µg/L	92.0	70.0	130
		EP234-1: Prothiofos	34643-46-4	1 µg/L	93.0	70.0	130
		EP234-1: Sulfotep	3689-24-5	0.05 µg/L	104	63.0	135
		EP234-1: Sulprofos	35400-43-2	0.5 µg/L	85.0	70.0	130
		EP234-1: Temephos	3383-96-8	0.2 µg/L	85.0	70.0	130
		EP234-1: Terbufos	13071-79-9	0.1 µg/L	89.0	70.0	130
		EP234-1: Tetrachlorvinphos	22248-79-9	0.1 µg/L	82.0	77.0	125
		EP234-1: Triazophos	24017-47-8	0.05 µg/L	76.0	74.0	132
		EP234-1: Trichlorfon	52-68-6	0.2 µg/L	108	70.0	130
		EP234-1: Trichloronate	327-98-0	5 µg/L	94.8	63.0	139
EP234A: OP Pesticides (QCLot: 3565559)							
ES2109000-001	Anonymous	EP234-1x: Acephate	30560-19-1	5 µg/L	101	70.0	130
		EP234-1x: Bensulide	741-58-2	5 µg/L	86.9	70.0	130
		EP234-1x: Formothion	2540-82-1	5 µg/L	124	70.0	130
		EP234-1x: Fosetyl Aluminium	39148-24-8	5 µg/L	117	70.0	130
		EP234-1x: Methidathion	950-37-8	5 µg/L	105	70.0	130
		EP234-1x: Naftalofos	1491-41-4	5 µg/L	116	70.0	130
		EP234-1x: Pyrazophos	13457-18-6	5 µg/L	89.6	70.0	130
		EP234-1x: Thiometon	640-15-3	5 µg/L	98.8	70.0	130

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2109007**	Page	: 1 of 15
Amendment	: **3**		
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NATALIE GILBERT	Telephone	: +61 2 8784 8555
Project	: Tomago Water Sampling 318001140	Date Samples Received	: 15-Mar-2021
Site	: ----	Issue Date	: 26-Apr-2021
Sampler	: JAKE BOURKE, NATALIE GILBERT	No. of samples received	: 13
Order number	: ----	No. of samples analysed	: 13

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **Analysis Holding Time Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method / Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK057G: Nitrite as N by Discrete Analyser						
Clear Plastic Bottle - Natural						
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	----	----	----	17-Mar-2021	14-Mar-2021	**3**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	0	2	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	0	2	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA025: Total Suspended Solids dried at 104 ± 2°C							
Clear Plastic Bottle - Natural (EA025H)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**----**	----	----	**18-Mar-2021**	19-Mar-2021	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**----**	----	----	**16-Mar-2021**	26-Mar-2021	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**----**	----	----	**17-Mar-2021**	09-Apr-2021	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**----**	----	----	**17-Mar-2021**	09-Apr-2021	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F)							
MW6	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	19-Mar-2021	✓
Clear Plastic Bottle - Nitric Acid; Filtered (ED093F)							
MW2, MW4, MW8, MW10, MW11, D01_20210312, SW2, SW3a	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	09-Apr-2021	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (ED093F)							
SW1, Graham Drive	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	19-Mar-2021	✓
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Natural (EG020A-F)							
MW6	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	08-Sep-2021	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG020A-F)							
MW2, MW4, MW8, MW10, MW11, D01_20210312	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	08-Sep-2021	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)		Sample Date	Extraction / Preparation			Analysis		
			Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Natural (EG020A-T)								
SW2,	SW3a	**12-Mar-2021**	**19-Mar-2021**	08-Sep-2021	✓	**19-Mar-2021**	08-Sep-2021	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG020A-T)								
SW1,	Graham Drive	**12-Mar-2021**	**19-Mar-2021**	08-Sep-2021	✓	**19-Mar-2021**	08-Sep-2021	✓
EG035F: Dissolved Mercury by FIMS								
Clear Plastic Bottle - Natural (EG035F)								
MW6		**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	09-Apr-2021	✓
Clear Plastic Bottle - Nitric Acid; Filtered (EG035F)								
MW2,	MW4,	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	09-Apr-2021	✓
MW8,	MW10,							
MW11,	D01_20210312							
EG035T: Total Recoverable Mercury by FIMS								
Clear Plastic Bottle - Natural (EG035T)								
SW2,	SW3a	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	09-Apr-2021	✓
Clear Plastic Bottle - Nitric Acid; Unfiltered (EG035T)								
SW1,	Graham Drive	**12-Mar-2021**	**----**	----	----	**19-Mar-2021**	09-Apr-2021	✓
EK026SF: Total CN by Segmented Flow Analyser								
Opaque plastic bottle - NaOH (EK026SF)								
MW2,	MW4,	**12-Mar-2021**	**----**	----	----	**16-Mar-2021**	26-Mar-2021	✓
MW6,	MW8,							
MW10,	MW11,							
D01_20210312,	SW1,							
SW2,	Graham Drive,							
SW3a								
EK040P: Fluoride by PC Titrator								
Clear Plastic Bottle - Natural (EK040P)								
MW2,	MW4,	**12-Mar-2021**	**----**	----	----	**16-Mar-2021**	09-Apr-2021	✓
MW6,	MW8,							
MW10,	MW11,							
D01_20210312,	SW1,							
SW2,	Graham Drive,							
SW3a								
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G)								
MW2,	MW4,	**12-Mar-2021**	**----**	----	----	**17-Mar-2021**	09-Apr-2021	✓
MW6,	MW8,							
MW10,	MW11,							
D01_20210312,	SW1,							
SW2,	Graham Drive,							
SW3a								

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**----**	----	----	**17-Mar-2021**	14-Mar-2021	×
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**----**	----	----	**17-Mar-2021**	09-Apr-2021	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**17-Mar-2021**	09-Apr-2021	✓	**17-Mar-2021**	09-Apr-2021	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**17-Mar-2021**	09-Apr-2021	✓	**17-Mar-2021**	09-Apr-2021	✓
EP066: Polychlorinated Biphenyls (PCB)							
Amber Glass Bottle - Unpreserved (EP066)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW2, SW3a	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**19-Mar-2021**	27-Apr-2021	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP068A: Organochlorine Pesticides (OC)							
Amber Glass Bottle - Unpreserved (EP068)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW2, SW3a	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**19-Mar-2021**	27-Apr-2021	✓
EP068B: Organophosphorus Pesticides (OP)							
Amber Glass Bottle - Unpreserved (EP068)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW2, SW3a	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**19-Mar-2021**	27-Apr-2021	✓
EP071 SG: Total Petroleum Hydrocarbons - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
MW2	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**06-Apr-2021**	27-Apr-2021	✓
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
Graham Drive	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**26-Apr-2021**	27-Apr-2021	✓
EP071 SG: Total Petroleum Hydrocarbons - SV Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
MW2	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**06-Apr-2021**	27-Apr-2021	✓
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
Graham Drive	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**26-Apr-2021**	27-Apr-2021	✓
EP071 SG: Total Recoverable Hydrocarbons - NEPM 2013 Fractions - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
MW2	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**06-Apr-2021**	27-Apr-2021	✓
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
Graham Drive	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**26-Apr-2021**	27-Apr-2021	✓
EP071 SG: Total Recoverable Hydrocarbons - SV NEPM 2013 Fractions - Silica gel cleanup							
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
MW2	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**06-Apr-2021**	27-Apr-2021	✓
Amber Glass Bottle - Unpreserved (EP071-SVSG)							
Graham Drive	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**26-Apr-2021**	27-Apr-2021	✓
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**19-Mar-2021**	27-Apr-2021	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW2, SW3a	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**19-Mar-2021**	27-Apr-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**18-Mar-2021**	27-Apr-2021	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a, TRIP BLANK	**12-Mar-2021**	**19-Mar-2021**	26-Mar-2021	✓	**19-Mar-2021**	26-Mar-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a	**12-Mar-2021**	**18-Mar-2021**	19-Mar-2021	✓	**18-Mar-2021**	27-Apr-2021	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a, TRIP BLANK	**12-Mar-2021**	**19-Mar-2021**	26-Mar-2021	✓	**19-Mar-2021**	26-Mar-2021	✓

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
MW2, MW4, MW6, MW8, MW10, MW11, D01_20210312, SW1, SW2, Graham Drive, SW3a, TRIP BLANK, TRIP SPIKE	**12-Mar-2021**	**19-Mar-2021**	26-Mar-2021	✓	**19-Mar-2021**	26-Mar-2021	✓
EP131A: Organochlorine Pesticides							
Amber Glass Bottle - Unpreserved (EP131A)							
SW1, Graham Drive	**12-Mar-2021**	**17-Mar-2021**	19-Mar-2021	✓	**17-Mar-2021**	26-Apr-2021	✓
EP131B: Polychlorinated Biphenyls (as Aroclors)							
Amber Glass Bottle - Unpreserved (EP131B)							
SW1, Graham Drive	**12-Mar-2021**	**17-Mar-2021**	19-Mar-2021	✓	**17-Mar-2021**	26-Apr-2021	✓
EP132B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP132)							
SW1, Graham Drive	**12-Mar-2021**	**17-Mar-2021**	19-Mar-2021	✓	**18-Mar-2021**	26-Apr-2021	✓
EP234A: OP Pesticides							
Amber Glass Bottle - Unpreserved (EP234-1x)							
SW1, Graham Drive	**12-Mar-2021**	**----**	----	----	**17-Mar-2021**	19-Mar-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	2	19	**10.53**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	4	35	**11.43**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	4	**25.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	2	9	**22.22**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode)	EP234-1	2	11	**18.18**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode) - extended	EP234-1x	1	3	**33.33**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	9	**11.11**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	2	**50.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	2	16	**12.50**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	13	**15.38**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	0	2	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	4	40	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Control Samples (LCS) - Continued							
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode)	EP234-1	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode) - extended	EP234-1x	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	6	40	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	2	17	**11.76**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	20	**15.00**	**15.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	2	2	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	35	**5.71**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode)	EP234-1	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode) - extended	EP234-1x	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Suspended Solids (High Level)	EA025H	2	40	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Method Blanks (MB) - Continued							
Total Cyanide by Segmented Flow Analyser	EK026SF	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	2	2	**100.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Mercury by FIMS	EG035F	1	19	**5.26**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Fluoride by PC Titrator	EK040P	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Organochlorine Pesticides (Ultra-trace)	EP131A	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
PCB's (Ultra-trace)	EP131B	1	4	**25.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by GCMS	EP068	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode)	EP234-1	1	11	**9.09**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Pesticides by LCMSMS (Positive Ion Mode) - extended	EP234-1x	1	3	**33.33**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Polychlorinated Biphenyls (PCB)	EP066	1	9	**11.11**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	1	2	**50.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Cyanide by Segmented Flow Analyser	EK026SF	1	17	**5.88**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Mercury by FIMS	EG035T	1	16	**6.25**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	**7.69**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	0	2	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Suspended Solids (High Level)	EA025H	WATER	In house: Referenced to APHA 2540D. A gravimetric procedure employed to determine the amount of `non-filterable` residue in a aqueous sample. The prescribed GFC (1.2um) filter is rinsed with deionised water, oven dried and weighed prior to analysis. A well-mixed sample is filtered through a glass fibre filter (1.2um). The residue on the filter paper is dried at 104+/-2C . This method is compliant with NEPM Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) on a settled supernatant aliquot of the sample using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G.The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride.in the presence of ferric ions the librated thiocynate forms highly-coloured ferric thiocynate which is measured at 480 nm APHA seal method 2 017-1-L
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Mercury by FIMS	EG035F	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) Samples are 0.45µm filtered prior to analysis. FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the filtered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).

Analytical Methods	Method	Matrix	Method Descriptions
Total Mercury by FIMS	EG035T	WATER	In house: Referenced to AS 3550, APHA 3112 Hg - B (Flow-injection (SnCl2)(Cold Vapour generation) AAS) FIM-AAS is an automated flameless atomic absorption technique. A bromate/bromide reagent is used to oxidise any organic mercury compounds in the unfiltered sample. The ionic mercury is reduced online to atomic mercury vapour by SnCl2 which is then purged into a heated quartz cell. Quantification is by comparing absorbance against a calibration curve. This method is compliant with NEPM Schedule B(3).
Total Cyanide by Segmented Flow Analyser	EK026SF	WATER	In house: Referenced to APHA 4500-CN C&O / ASTM D7511 / ISO 14403. Sodium hydroxide preserved samples are introduced into an automated segmented flow analyser. Complex bound cyanide is decomposed in a continuously flowing stream, at a pH of 3.8, by the effect of UV light. A UV-B lamp (312 nm) and a decomposition spiral of borosilicate glass are used to filter out UV light with a wavelength of less than 290 nm thus preventing the conversion of thiocyanate into cyanide. The hydrogen cyanide present at a pH of 3.8 is separated by gas dialysis. The hydrogen cyanide is then determined photometrically, based on the reaction of cyanide with chloramine-T to form cyanogen chloride. This then reacts with 4-pyridine carboxylic acid and 1,3-dimethylbarbituric acid to give a red colour which is measured at 600 nm. This method is compliant with NEPM Schedule B(3)
Fluoride by PC Titrator	EK040P	WATER	In house: Referenced to APHA 4500-F C: CDTA is added to the sample to provide a uniform ionic strength background, adjust pH, and break up complexes. Fluoride concentration is determined by either manual or automatic ISE measurement. This method is compliant with NEPM Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al, Zhang et al. This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	* EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM Schedule B(3)
Polychlorinated Biphenyls (PCB)	EP066	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)

Analytical Methods	Method	Matrix	Method Descriptions
Pesticides by GCMS	EP068	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
TRH - Semivolatile Fractions Only (after Silica Gel Cleanup)	EP071-SVSG	WATER	In house: Referenced to USEPA SW 846 - 8015 Sample extracts cleaned up using silica gel and are analysed by Capillary GC/FID and quantified against alkane standards over the range C10 - C36. This method is compliant with NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)
Organochlorine Pesticides (Ultra-trace)	EP131A	WATER	In house: Referenced to USEPA Method 3640 (GPC cleanup),3620 (Florisil), 8081/8082 (GC/µECD/uECD). This method is compliant with NEPM Schedule B(3)
PCB's (Ultra-trace)	EP131B	WATER	In house: Referenced to USEPA Method 3640 (GPC cleanup), 3620 (Florisil), 8081/8082 (GC/µECD/µECD). This method is compliant with NEPM Schedule B(3)
Semivolatile Compounds by GCMS(SIM - Ultra-trace)	EP132	WATER	In house: Referenced to USEPA 3640 (GPC Cleanup), 8270 GCMS Capiliary column, SIM mode. This method is compliant with NEPM Schedule B(3)
Pesticides by LCMSMS (Positive Ion Mode)	EP234-1	WATER	In house: LC-MSMS, direct injection. A sample is filtered and injected directly onto the LC-MSMS. Analysis is by LC/MSMS, ESI Positive Mode.
Pesticides by LCMSMS (Positive Ion Mode) - extended	EP234-1x	WATER	In house: LC-MSMS, direct injection. A sample is filtered and injected directly onto the LC-MSMS. Analysis is by LC/MSMS, ESI Positive Mode.

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Sep. Funnel Extraction /Acetylation of Phenolic Compounds	ORG14-AC	WATER	In house: Referenced to USEPA 3510 (Extraction) / In-house (Acetylation): A 1L sample is extracted into dichloromethane and concentrated to 1 mL with echange into cyclohexane. Phenolic compounds are reacted with acetic anhydride to yield phenyl acetates suitable for ultra-trace analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.

Preparation Methods	Method	Matrix	Method Descriptions
Sep. Funnel Extraction of Liquids (Ultra-trace pesticides.)	ORG14-UTP	WATER	In house: Referenced to USEPA 3510 Samples are extracted into dichloromethane, concentrated and exchanged into an apporpriate solvent for GPC and florisil cleanup as required. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

CHAIN OF CUSTODY

ALS Laboratory: please tick →

ADELAIDE 21 Burma Road Pooraka SA 5095 Ph: 08 8359 0890 E: adelaide@alsglobal.com

BRISBANE 2 Byth Street Stafford QLD 4053 Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

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WOLLONGONG 99 Kenny Street Wollongong NSW 2500 Ph: 02 4225 3125 E: wollongong@alsglobal.com

LAB OF ORIGIN: NEWCASTLE

CLIENT: Torque Projects	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: 50 Glebe Road, The Junction, NSW 2291		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: Tomago Water Sampling **PROJECT NO.** 318001140	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN:** Australia	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Natalie Gilbert **CONTACT PH:** 0467580473		OF: 1 2 3 4 5 6 7	Other comment: 7.1
SAMPLER: Natalie Gilbert / Jake Bourke **SAMPLER MOBILE:** 0467580473	**RELINQUISHED BY:** DATE/TIME: 12-3-21 4:30pm	**RECEIVED BY:** IES DATE/TIME: 12-3-21 4:30pm	**RELINQUISHED BY:** IES DATE/TIME: 15.3.21 5pm
COC Emailed to ALS? (YES / NO) **EDD FORMAT (or default):**			**RECEIVED BY:** Wamd DATE/TIME: 15/3/21 09:24
Email Reports to (will default to PM if no other addresses are listed): ngilbert@ramboll.com; jbourke@ramboll.com			
Email Invoice to (will default to PM if no other addresses are listed): ngilbert@ramboll.com; jbourke@ramboll.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL: COC received @ 5:24pm.

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Additional Information
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE (refer to codes below)	TOTAL BOTTLES	W-19 + Dissolved Fe, Mn, Mo		W-5T plus phenols	NT-8	cations (Na, K, Mg, Ca) and anions (HCO3/CO3, SO4, Cl), Fluoride, ammonia and cyanide	Ultra Trace - PAHs, OCP/OPP/PCB	TSS	W-4		Comments on likely contaminant levels, dilutions, or samples requiring specific QC analysis etc.
1	MW2	3/12/2021	W			x			x	x		x			
2	MW4	3/12/2021	W			x			x	x		x			
3	MW6	3/12/2021	W			x			x	x		x			
4	MW8	3/12/2021	W			x			x	x		x			
5	MW10	3/12/2021	W			x			x	x		x			
6	MW11	3/12/2021	W			x			x	x		x			
7	D01_20210312	3/12/2021	W			x			x	x		x			
8	SW1	3/12/2021	w					x	x	x	x	x			
9	SW2	3/12/2021	w			x			x	x		x			
10	Graham Drive	3/12/2021	w					x	x	x	x	x			
11	SW3a	3/12/2021	W			x			x	x		x			
12	Trip Blank	3/12/2021	W										x		
13	Trip Spike	3/12/2021	W										x		
				TOTAL											

Environmental Division
Sydney
Work Order Reference
ES2109007

Telephone : + 61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **ES2113835**	Page	: 1 of 5
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NATALIE GILBERT	Contact	: Loren Schiavon
Address	: EASTPOINT COMPLEX SUITE 19B, LEVEL 2 50 GLEBE ROAD THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9954 8114	Telephone	: +61 2 8784 8555
Project	: Tomago Water Sampling 318001140	Date Samples Received	: 15-Apr-2021 12:18
Order number	: ----	Date Analysis Commenced	: 19-Apr-2021
C-O-C number	: ----	Issue Date	: 22-Apr-2021 15:59
Sampler	: JAKE BOURKE/NATHAN MCGUIRE		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

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*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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.

- EP075 (SIM): Where reported, Benzo(a)pyrene Toxicity Equivalent Quotient (TEQ) per the NEPM (2013) is the sum total of the concentration of the eight carcinogenic PAHs multiplied by their Toxicity Equivalence Factor (TEF) relative to Benzo(a)pyrene. TEF values are provided in brackets as follows: Benz(a)anthracene (0.1), Chrysene (0.01), Benzo(b+j) & Benzo(k)fluoranthene (0.1), Benzo(a)pyrene (1.0), Indeno(1.2.3.cd)pyrene (0.1), Dibenz(a.h)anthracene (1.0), Benzo(g.h.i)perylene (0.01). Less than LOR results for 'TEQ Zero' are treated as zero.
- EP080: Where reported, Total Xylenes is the sum of the reported concentrations of m&p-Xylene and o-Xylene at or above the LOR.
- EP075(SIM): Where reported, Total Cresol is the sum of the reported concentrations of 2-Methylphenol and 3- & 4-Methylphenol at or above the LOR.

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW2	----	----	----	----
				Sampling date / time	15-Apr-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2113835-001	--------	--------	--------	--------
					Result	----	----	----	----
EP075(SIM)A: Phenolic Compounds									
Phenol	108-95-2	1.0	µg/L		<1.0	----	----	----	----
2-Chlorophenol	95-57-8	1.0	µg/L		<1.0	----	----	----	----
2-Methylphenol	95-48-7	1.0	µg/L		<1.0	----	----	----	----
3- & 4-Methylphenol	1319-77-3	2.0	µg/L		<2.0	----	----	----	----
2-Nitrophenol	88-75-5	1.0	µg/L		<1.0	----	----	----	----
2.4-Dimethylphenol	105-67-9	1.0	µg/L		<1.0	----	----	----	----
2.4-Dichlorophenol	120-83-2	1.0	µg/L		<1.0	----	----	----	----
2.6-Dichlorophenol	87-65-0	1.0	µg/L		<1.0	----	----	----	----
4-Chloro-3-methylphenol	59-50-7	1.0	µg/L		<1.0	----	----	----	----
2.4.6-Trichlorophenol	88-06-2	1.0	µg/L		<1.0	----	----	----	----
2.4.5-Trichlorophenol	95-95-4	1.0	µg/L		<1.0	----	----	----	----
Pentachlorophenol	87-86-5	2.0	µg/L		<2.0	----	----	----	----
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons									
Naphthalene	91-20-3	1.0	µg/L		<1.0	----	----	----	----
Acenaphthylene	208-96-8	1.0	µg/L		<1.0	----	----	----	----
Acenaphthene	83-32-9	1.0	µg/L		<1.0	----	----	----	----
Fluorene	86-73-7	1.0	µg/L		<1.0	----	----	----	----
Phenanthrene	85-01-8	1.0	µg/L		<1.0	----	----	----	----
Anthracene	120-12-7	1.0	µg/L		<1.0	----	----	----	----
Fluoranthene	206-44-0	1.0	µg/L		<1.0	----	----	----	----
Pyrene	129-00-0	1.0	µg/L		<1.0	----	----	----	----
Benz(a)anthracene	56-55-3	1.0	µg/L		<1.0	----	----	----	----
Chrysene	218-01-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(b+j)fluoranthene	205-99-2 205-82-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(k)fluoranthene	207-08-9	1.0	µg/L		<1.0	----	----	----	----
Benzo(a)pyrene	50-32-8	0.5	µg/L		<0.5	----	----	----	----
Indeno(1.2.3.cd)pyrene	193-39-5	1.0	µg/L		<1.0	----	----	----	----
Dibenz(a.h)anthracene	53-70-3	1.0	µg/L		<1.0	----	----	----	----
Benzo(g.h.i)perylene	191-24-2	1.0	µg/L		<1.0	----	----	----	----
^ Sum of polycyclic aromatic hydrocarbons	----	0.5	µg/L		<0.5	----	----	----	----
^ Benzo(a)pyrene TEQ (zero)	----	0.5	µg/L		<0.5	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		**30**	----	----	----	----
C10 - C14 Fraction	----	50	µg/L		<50	----	----	----	----

Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Sample ID	MW2	----	----	----	----
				Sampling date / time	15-Apr-2021 00:00	----	----	----	----
Compound	CAS Number	LOR	Unit		ES2113835-001	--------	--------	--------	--------
					Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued									
C15 - C28 Fraction	----	100	µg/L		**130**	----	----	----	----
C29 - C36 Fraction	----	50	µg/L		**140**	----	----	----	----
^ **C10 - C36 Fraction (sum)**	----	50	µg/L		**270**	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		**20**	----	----	----	----
^ **C6 - C10 Fraction minus BTEX (F1)**	C6_C10-BTEX	20	µg/L		<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L		<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L		**230**	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L		<100	----	----	----	----
^ **>C10 - C40 Fraction (sum)**	----	100	µg/L		**230**	----	----	----	----
^ **>C10 - C16 Fraction minus Naphthalene (F2)**	----	100	µg/L		<100	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	----	----	----	----
Toluene	108-88-3	2	µg/L		**23**	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L		<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L		<2	----	----	----	----
^ **Total Xylenes**	----	2	µg/L		<2	----	----	----	----
^ **Sum of BTEX**	----	1	µg/L		**23**	----	----	----	----
Naphthalene	91-20-3	5	µg/L		<5	----	----	----	----
EP075(SIM)S: Phenolic Compound Surrogates									
Phenol-d6	13127-88-3	1.0	%		**29.0**	----	----	----	----
2-Chlorophenol-D4	93951-73-6	1.0	%		**59.9**	----	----	----	----
2.4.6-Tribromophenol	118-79-6	1.0	%		**70.9**	----	----	----	----
EP075(SIM)T: PAH Surrogates									
2-Fluorobiphenyl	321-60-8	1.0	%		**76.3**	----	----	----	----
Anthracene-d10	1719-06-8	1.0	%		**91.6**	----	----	----	----
4-Terphenyl-d14	1718-51-0	1.0	%		**99.9**	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1.2-Dichloroethane-D4	17060-07-0	2	%		**131**	----	----	----	----
Toluene-D8	2037-26-5	2	%		**129**	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%		**124**	----	----	----	----

Surrogate Control Limits

Sub-Matrix: **WATER**

Compound	CAS Number	Recovery Limits (%) Low	High
EP075(SIM)S: Phenolic Compound Surrogates			
Phenol-d6	13127-88-3	10	44
2-Chlorophenol-D4	93951-73-6	14	94
2.4.6-Tribromophenol	118-79-6	17	125
EP075(SIM)T: PAH Surrogates			
2-Fluorobiphenyl	321-60-8	20	104
Anthracene-d10	1719-06-8	27	113
4-Terphenyl-d14	1718-51-0	32	112
EP080S: TPH(V)/BTEX Surrogates			
1.2-Dichloroethane-D4	17060-07-0	71	137
Toluene-D8	2037-26-5	79	131
4-Bromofluorobenzene	460-00-4	70	128

QUALITY CONTROL REPORT

Work Order	: **ES2113835**	Page	: 1 of 4
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NATALIE GILBERT	Contact	: Loren Schiavon
Address	: EASTPOINT COMPLEX SUITE 19B, LEVEL 2 50 GLEBE ROAD THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
Telephone	: +61 02 9954 8114	Telephone	: +61 2 8784 8555
Project	: Tomago Water Sampling 318001140	Date Samples Received	: 15-Apr-2021
Order number	: ----	Date Analysis Commenced	: 19-Apr-2021
C-O-C number	: ----	Issue Date	: 22-Apr-2021
Sampler	: JAKE BOURKE/NATHAN MCGUIRE		
Site	: ----		
Quote number	: EN/222		
No. of samples received	: 1		
No. of samples analysed	: 1		

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, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

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*
Edwandy Fadjar	Organic Coordinator	Sydney Organics, Smithfield, NSW
Sanjeshni Jyoti	Senior Chemist Volatiles	Sydney Organics, Smithfield, NSW

General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the 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

Key : Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
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
RPD = Relative Percentage Difference
# = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	*Sample ID*	*Method: Compound*	*CAS Number*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD (%)*	*Acceptable RPD (%)*
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 3625210)									
ES2113719-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
ES2113719-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 3625210)									
ES2113719-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
ES2113719-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 3625210)									
ES2113719-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
ES2113719-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit

Method Blank (MB) and Laboratory Control Sample (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Sample (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike	Spike Recovery (%)	Acceptable Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result	Concentration	LCS	Low	High
EP075(SIM)A: Phenolic Compounds (QCLot: 3625834)								
EP075(SIM): Phenol	108-95-2	1	µg/L	<1.0	5 µg/L	36.0	24.5	61.9
EP075(SIM): 2-Chlorophenol	95-57-8	1	µg/L	<1.0	5 µg/L	70.2	52.0	90.0
EP075(SIM): 2-Methylphenol	95-48-7	1	µg/L	<1.0	5 µg/L	66.3	51.0	91.0
EP075(SIM): 3- & 4-Methylphenol	1319-77-3	2	µg/L	<2.0	10 µg/L	63.3	44.0	88.0
EP075(SIM): 2-Nitrophenol	88-75-5	1	µg/L	<1.0	5 µg/L	74.1	48.0	100
EP075(SIM): 2.4-Dimethylphenol	105-67-9	1	µg/L	<1.0	5 µg/L	70.6	49.0	99.0
EP075(SIM): 2.4-Dichlorophenol	120-83-2	1	µg/L	<1.0	5 µg/L	74.2	53.0	105
EP075(SIM): 2.6-Dichlorophenol	87-65-0	1	µg/L	<1.0	5 µg/L	75.1	57.0	105
EP075(SIM): 4-Chloro-3-methylphenol	59-50-7	1	µg/L	<1.0	5 µg/L	77.9	53.0	99.0
EP075(SIM): 2.4.6-Trichlorophenol	88-06-2	1	µg/L	<1.0	5 µg/L	87.2	50.0	106
EP075(SIM): 2.4.5-Trichlorophenol	95-95-4	1	µg/L	<1.0	5 µg/L	94.8	51.0	105
EP075(SIM): Pentachlorophenol	87-86-5	2	µg/L	<2.0	10 µg/L	41.4	10.0	95.0
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons (QCLot: 3625834)								
EP075(SIM): Naphthalene	91-20-3	1	µg/L	<1.0	5 µg/L	76.7	50.0	94.0
EP075(SIM): Acenaphthylene	208-96-8	1	µg/L	<1.0	5 µg/L	82.9	63.6	114
EP075(SIM): Acenaphthene	83-32-9	1	µg/L	<1.0	5 µg/L	90.7	62.2	113
EP075(SIM): Fluorene	86-73-7	1	µg/L	<1.0	5 µg/L	88.3	63.9	115
EP075(SIM): Phenanthrene	85-01-8	1	µg/L	<1.0	5 µg/L	96.3	62.6	116
EP075(SIM): Anthracene	120-12-7	1	µg/L	<1.0	5 µg/L	93.8	64.3	116
EP075(SIM): Fluoranthene	206-44-0	1	µg/L	<1.0	5 µg/L	95.7	63.6	118
EP075(SIM): Pyrene	129-00-0	1	µg/L	<1.0	5 µg/L	97.2	63.1	118
EP075(SIM): Benz(a)anthracene	56-55-3	1	µg/L	<1.0	5 µg/L	90.8	64.1	117
EP075(SIM): Chrysene	218-01-9	1	µg/L	<1.0	5 µg/L	88.2	62.5	116
EP075(SIM): Benzo(b+j)fluoranthene	205-99-2 205-82-3	1	µg/L	<1.0	5 µg/L	95.4	61.7	119
EP075(SIM): Benzo(k)fluoranthene	207-08-9	1	µg/L	<1.0	5 µg/L	78.1	63.0	115
EP075(SIM): Benzo(a)pyrene	50-32-8	0.5	µg/L	<0.5	5 µg/L	96.5	63.3	117
EP075(SIM): Indeno(1.2.3.cd)pyrene	193-39-5	1	µg/L	<1.0	5 µg/L	98.3	59.9	118
EP075(SIM): Dibenz(a.h)anthracene	53-70-3	1	µg/L	<1.0	5 µg/L	91.0	61.2	117
EP075(SIM): Benzo(g.h.i)perylene	191-24-2	1	µg/L	<1.0	5 µg/L	97.0	59.1	118
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3625210)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	260 µg/L	82.5	75.0	127
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3625835)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	68.1	55.8	112

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report: Result	Laboratory Control Spike (LCS) Report: Spike Concentration	Spike Recovery (%): LCS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3625835) - continued								
EP071: C15 - C28 Fraction	----	100	µg/L	<100	600 µg/L	89.3	71.6	113
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	106	56.0	121
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3625210)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	310 µg/L	85.8	75.0	127
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3625835)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	500 µg/L	78.0	57.9	119
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	700 µg/L	78.5	62.5	110
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	300 µg/L	98.6	61.5	121
EP080: BTEXN (QCLot: 3625210)								
EP080: Benzene	71-43-2	1	µg/L	<1	10 µg/L	86.6	70.0	122
EP080: Toluene	108-88-3	2	µg/L	<2	10 µg/L	94.4	69.0	123
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	10 µg/L	94.4	70.0	120
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	10 µg/L	93.2	69.0	121
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	10 µg/L	99.1	72.0	122
EP080: Naphthalene	91-20-3	5	µg/L	<5	10 µg/L	97.0	70.0	120

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report: Spike Concentration	SpikeRecovery(%): MS	Acceptable Limits (%): Low	Acceptable Limits (%): High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 3625210)							
ES2113719-001	Anonymous	EP080: C6 - C9 Fraction	----	325 µg/L	130	70.0	130
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 3625210)							
ES2113719-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	375 µg/L	130	70.0	130
EP080: BTEXN (QCLot: 3625210)							
ES2113719-001	Anonymous	EP080: Benzene	71-43-2	25 µg/L	124	70.0	130
		EP080: Toluene	108-88-3	25 µg/L	122	70.0	130
		EP080: Ethylbenzene	100-41-4	25 µg/L	117	70.0	130
		EP080: meta- & para-Xylene	108-38-3 106-42-3	25 µg/L	114	70.0	130
		EP080: ortho-Xylene	95-47-6	25 µg/L	116	70.0	130
		EP080: Naphthalene	91-20-3	25 µg/L	96.9	70.0	130

ALS Environmental

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: **ES2113835**	Page	: 1 of 4
Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NATALIE GILBERT	Telephone	: +61 2 8784 8555
Project	: Tomago Water Sampling 318001140	Date Samples Received	: 15-Apr-2021
Site	: ----	Issue Date	: 22-Apr-2021
Sampler	: JAKE BOURKE/NATHAN MCGUIRE	No. of samples received	: 1
Order number	: ----	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type / Method	Count QC	Count Regular	Rate (%) Actual	Rate (%) Expected	Quality Control Specification
Laboratory Duplicates (DUP)					
PAH/Phenols (GC/MS - SIM)	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	5	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
PAH/Phenols (GC/MS - SIM)	0	6	0.00	5.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	5	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for ***VOC in soils*** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: × = Holding time breach ; ✓ = Within holding time.

Method / *Container / Client Sample ID(s)*	*Sample Date*	*Extraction / Preparation* Date extracted	Due for extraction	Evaluation	*Analysis* Date analysed	Due for analysis	Evaluation
EP075(SIM)A: Phenolic Compounds							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
MW2	**15-Apr-2021**	**19-Apr-2021**	22-Apr-2021	✓	**20-Apr-2021**	29-May-2021	✓
EP075(SIM)B: Polynuclear Aromatic Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP075(SIM))							
MW2	**15-Apr-2021**	**19-Apr-2021**	22-Apr-2021	✓	**20-Apr-2021**	29-May-2021	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
MW2	**15-Apr-2021**	**19-Apr-2021**	22-Apr-2021	✓	**20-Apr-2021**	29-May-2021	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
MW2	**15-Apr-2021**	**20-Apr-2021**	29-Apr-2021	✓	**20-Apr-2021**	29-Apr-2021	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
MW2	**15-Apr-2021**	**19-Apr-2021**	22-Apr-2021	✓	**20-Apr-2021**	29-May-2021	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
MW2	**15-Apr-2021**	**20-Apr-2021**	29-Apr-2021	✓	**20-Apr-2021**	29-Apr-2021	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
MW2	**15-Apr-2021**	**20-Apr-2021**	29-Apr-2021	✓	**20-Apr-2021**	29-Apr-2021	✓

Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: × = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type		Count		Rate (%)			Quality Control Specification
Analytical Methods	*Method*	*QC*	*Regular*	***Actual***	***Expected***	*Evaluation*	
Laboratory Duplicates (DUP)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**10.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	**10.00**	**10.00**	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	1	6	**16.67**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	5	**20.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	0	6	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	5	**0.00**	**5.00**	×	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	**5.00**	**5.00**	✓	NEPM 2013 B3 & ALS QC Standard

Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015 The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM Schedule B(3)
PAH/Phenols (GC/MS - SIM)	EP075(SIM)	WATER	In house: Referenced to USEPA SW 846 - 8270 Sample extracts are analysed by Capillary GC/MS in SIM Mode and quantification is by comparison against an established 5 point calibration curve. This method is compliant with NEPM Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260 Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for purging.

SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : **ES2113835**

Client	: **RAMBOLL AUSTRALIA PTY LTD**	Laboratory	: Environmental Division Sydney
Contact	: MS NATALIE GILBERT	Contact	: Loren Schiavon
Address	: EASTPOINT COMPLEX SUITE 19B, LEVEL 2 50 GLEBE ROAD THE JUNCTION NSW 2291	Address	: 277-289 Woodpark Road Smithfield NSW Australia 2164
E-mail	: ngilbert@ramboll.com	E-mail	: Loren.Schiavon@ALSGlobal.com
Telephone	: +61 02 9954 8114	Telephone	: +61 2 8784 8555
Facsimile	: ----	Facsimile	: +61-2-8784 8500
Project	: Tomago Water Sampling 318001140	Page	: 1 of 2
Order number	: ----	Quote number	: EB2017ENVIAUS0001 (EN/222)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: JAKE BOURKE/NATHAN MCGUIRE		

Dates

Date Samples Received	: 15-Apr-2021 12:18	Issue Date	: 16-Apr-2021
Client Requested Due Date	: 22-Apr-2021	Scheduled Reporting Date	: **22-Apr-2021**

Delivery Details

Mode of Delivery	: Undefined	Security Seal	: Not Available
No. of coolers/boxes	: ----	Temperature	: ----
Receipt Detail	:	No. of samples received / analysed	: 1 / 1

General Comments

- This report contains the following information:
  - Sample Container(s)/Preservation Non-Compliances
  - Summary of Sample(s) and Requested Analysis
  - Proactive Holding Time Report
  - Requested Deliverables
- **Please refer to the Proactive Holding Time Report table below which summarises breaches of recommended holding times that have occurred prior to samples/instructions being received at the laboratory. The absence of this summary table indicates that all samples have been received within the recommended holding times for the analysis requested.**
- Please direct any queries you have regarding this work order to the above ALS laboratory contact.
- Analytical work for this work order will be conducted at ALS Sydney.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months ± 1 week) from receipt of samples.
- Please be aware that APHA/NEPM recommends water and soil samples be chilled to less than or equal to 6°C for chemical analysis, and less than or equal to 10°C but unfrozen for Microbiological analysis. Where samples are received above this temperature, it should be taken into consideration when interpreting results. Refer to ALS EnviroMail 85 for ALS recommendations of the best practice for chilling samples after sampling and for maintaining a cool temperature during transit.

Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.
If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Sampling date / time	Sample ID	WATER - W-24 TRH/BTEXN/PAH/Phenols
ES2113835-001	15-Apr-2021 00:00	MW2	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE		
- A4 - AU Tax Invoice (INV)	Email	AsiaPac-Accounts@Ramboll.com
JAKE BOURKE		
- *AU Certificate of Analysis - NATA (COA)	Email	JBOURKE@ramboll.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	JBOURKE@ramboll.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	JBOURKE@ramboll.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	JBOURKE@ramboll.com
- A4 - AU Tax Invoice (INV)	Email	JBOURKE@ramboll.com
- Chain of Custody (CoC) (COC)	Email	JBOURKE@ramboll.com
- EDI Format - EQUIS_ENVIRON (EQUIS_ENVIRON)	Email	JBOURKE@ramboll.com
- EDI Format - XTab (XTAB)	Email	JBOURKE@ramboll.com
NATALIE GILBERT		
- *AU Certificate of Analysis - NATA (COA)	Email	ngilbert@ramboll.com
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)	Email	ngilbert@ramboll.com
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)	Email	ngilbert@ramboll.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)	Email	ngilbert@ramboll.com
- A4 - AU Tax Invoice (INV)	Email	ngilbert@ramboll.com
- Chain of Custody (CoC) (COC)	Email	ngilbert@ramboll.com
- EDI Format - EQUIS_ENVIRON (EQUIS_ENVIRON)	Email	ngilbert@ramboll.com
- EDI Format - XTab (XTAB)	Email	ngilbert@ramboll.com

CHAIN OF CUSTODY

ALS Laboratory: please tick →

☐ADELAIDE 21 Burma Road Pooraka SA 5095
Ph: 08 8359 0890 E: adelaide@alsglobal.com

☐BRISBANE 2 Byth Street Stafford QLD 4053
Ph: 07 3243 7222 E: samples.brisbane@alsglobal.com

☐GLADSTONE 46 Callemondah Drive Clinton QLD 4680
Ph: 07 7471 5600 E: gladstone@alsglobal.com

☐MACKAY 78 Harbour Road Mackay QLD 4740
Ph: 07 4944 0177 E: mackay@alsglobal.com

☐MELBOURNE 2-4 Westall Road Springvale VIC 3171
Ph: 03 8549 9600 E: samples.melbourne@alsglobal.com

☐MUDGEE 1/29 Sydney Road Mudgee NSW 2850
Ph: 02 6372 6735 E: mudgee.mail@alsglobal.com

☐NEWCASTLE 4/13 Geary Place North Nowra NSW 2541
Ph: 08 9209 7655 E: samples.perth@alsglobal.com

☐SYDNEY 277-289 Woodpark Road Smithfield NSW 2164
Ph: 02 8784 8555 E: environmental@alsglobal.com

☐TOWNSVILLE 14-15 Desma Court Bohle QLD 4818
Ph: 07 4796 0600 E: townsville.environmental@alsglobal.com

☐WOLLONGONG 99 Kenny Street Wollongong NSW 2500
Ph: 02 4225 3125 E: wollongong@alsglobal.com

LAB OF ORIGIN: NEWCASTLE

E-MAILED

CLIENT: Torque Projects	**TURNAROUND REQUIREMENTS :** (Standard TAT may be longer for some tests e.g., Ultra Trace Organics)	☐ Standard TAT (List due date):	**FOR LABORATORY USE ONLY (Circle)**
OFFICE: 50 Glebe Road, The Junction, NSW 2291		☐ Non Standard or urgent TAT (List due date):	Custody Seal Intact? Yes No N/A
PROJECT: Tomago Water Sampling **PROJECT NO. 318001140**	**ALS QUOTE NO.:**	**COC SEQUENCE NUMBER (Circle)**	Free ice / frozen ice bricks present upon receipt? Yes No N/A
ORDER NUMBER: **PURCHASE ORDER NO.:**	**COUNTRY OF ORIGIN: Australia**	COC: 1 2 3 4 5 6 7	Random Sample Temperature on Receipt: °C
PROJECT MANAGER: Natalie Gilbert	**CONTACT PH: 0467580473**	OF: 1 2 3 4 5 6 7	Other comment:
SAMPLER: Jake Bourke / Nathan McGuire	**SAMPLER MOBILE: 0467580473**	**RELINQUISHED BY:**	**RECEIVED BY:** MM **RELINQUISHED BY:** KS **RECEIVED BY:** Wamd
COC Emailed to ALS? (YES / NO)	**EDD FORMAT (or default):**	DATE/TIME:	DATE/TIME: 15/04/21 11:57am DATE/TIME: 15.4.21 3pm DATE/TIME: 15/04/21 09:34
Email Reports to (will default to PM if no other addresses are listed): ngilbert@ramboll.com; jbourke@ramboll.com			
Email Invoice to (will default to PM if no other addresses are listed): ngilbert@ramboll.com; jbourke@ramboll.com			

COMMENTS/SPECIAL HANDLING/STORAGE OR DISPOSAL:

ALS USE ONLY	SAMPLE DETAILS MATRIX: Solid(S) Water(W)			CONTAINER INFORMATION		ANALYSIS REQUIRED including SUITES (NB. Suite Codes must be listed to attract suite price) Where Metals are required, specify Total (unfiltered bottle required) or Dissolved (field filtered bottle required).									Phenol
LAB ID	SAMPLE ID	DATE / TIME	MATRIX	TYPE & PRESERVATIVE *(refer to codes below)*	TOTAL BOTTLES	BTEX	TRH	PAH	Phenols						
	MW2	15/04/2021	W		6	x	x	x	x						
				TOTAL											

Environmental Division
Sydney
Work Order Reference
ES2113835

Telephone : +61-2-8784 8555

Water Container Codes: P = Unpreserved Plastic; N = Nitric Preserved Plastic; ORC = Nitric Preserved ORC; SH = Sodium Hydroxide/Cd Preserved; S = Sodium Hydroxide Preserved Plastic; AG = Amber Glass Unpreserved; AP - Airfreight Unpreserved Plastic
V = VOA Vial HCl Preserved; VB = VOA Vial Sodium Bisulphate Preserved; VS = VOA Vial Sulfuric Preserved; AV = Airfreight Unpreserved Vial SG = Sulfuric Preserved Amber Glass; H = HCl preserved Plastic; HS = HCl preserved Speciation bottle; SP = Sulfuric Preserved Plastic; F = Formaldehyde Preserved Glass;
Z = Zinc Acetate Preserved Bottle; E = EDTA Preserved Bottles; ST = Sterile Bottle; ASS = Plastic Bag for Acid Sulphate Soils; B = Unpreserved Bag; LI = Lugols Iodine Preserved Bottles; STT = Sterile Sodium Thiosulfate Preserved Bottles.

APPENDIX 5
BACKGROUND INFORMATION ON NITROGEN

Nitrogen is one of many nutrients required by plants and animals in freshwater systems.

The most common forms of nitrogen found in waterbodies are:

- The oxides of nitrogen - nitrate (NO3-) and nitrite (NO2-), together often written as NOx.
- Ammonia (NH3)/ammonium (NH4+).
- Organic Nitrogen (ON) (particulate and dissolved) derived from the breakdown of plant and animal tissue within the water body.

Sampling results include concentrations of TKN, TN, NO3-, NO2-, and NH3.The following equations are useful in assessing and describing the various nitrogen forms and combinations:

- NOx = NO3 - + NO2 –
- TKN = ON + NH3/NH4 +
- TN = TKN + NOx

Nitrogen can be converted between forms, depending on the concentration of each form and the environmental conditions. For example, **Figure 1** shows that a higher ratio of NO3 - to NO2 - is typically indicative of greater oxygen availability. Higher proportions of NH3 /NH4 + are indicative of very low oxygen availability, which coincides with the sampling results at MW2. Similarly, higher pH levels will tend to result in more NH4 + being converted to NH3.

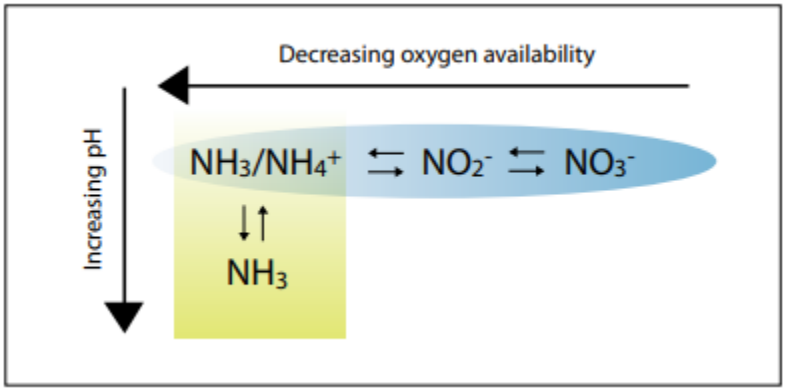

Figure 1: Forms of nitrogen in response to environmental conditions.

Increased inputs of nitrogen to waterways can include:

- Organic nitrogen associated with eroded soil that is deposited as sediment.
- NOx and NH3/NH4+ from fertiliser that has reached the groundwater.
- Discharges from sewage treatment plants (mostly NOx and NH3 /NH4+).
- Stormwater runoff (ON/TKN).
- Discharges from intensive agriculture/dairying (ON, NOx and NH3/NH4+).
- Stock access to streams and poor land management.
- Landfill leachate.
- Decay of natural organic material.
- Organic nitrogen that has been converted to ammonia by other bacteria.
- Dissolved organic nitrogen.

Appendix D – Vegetation Monitoring Report

2021 Annual Wetland Monitoring

Tomago Road, Tomago NSW

20213768

19 May 2021

KLEINFELDER
Bright People. Right Solutions.

Suite 3, 240-244 Pacific Highway,
Charlestown, NSW 2290

Phone: +61 2 4949 5200

2021 Annual Wetland Monitoring

Conservation Area, Northbank Enterprise Hub
Tomago Road, Tomago, NSW

Kleinfelder Project: 20213768

Kleinfelder Document: NCA21R123864

Prepared for:

Northbank Enterprise Hub Pty Ltd
C/- TORQUE PROJECTS PTY LTD
PO Box 1398
West Perth WA 6872

Prepared by:

Kleinfelder Australia Pty Ltd

Suite 3, 240-244 Pacific Highway, Charlestown, NSW 2290
Phone: +61 2 4949 5200
ABN: 23 146 082 500

Document Control:

Version	Description	Date
2.0	Final to Client	19 May 2021
1.0	Draft to Client	27 April 2021
Prepared by Ben Stewart	Reviewed by Dr. Daniel O'Brien	Endorsed on 19 May 2021

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TABLES

FIGURES

APPENDICES

1 INTRODUCTION

1.1 SCOPE

Kleinfelder was commissioned by Torque Projects Pty Ltd, on behalf of Northbank Enterprise Hub (NEH) Pty Ltd (formerly WEPL Investments Pty Ltd), to undertake annual wetland monitoring in accordance with the Wetland Management and Monitoring Plan (WMMP). Kleinfelder (formerly ecobiological) prepared the WMMP (2009) for WEPL Investments Pty Ltd specifically related to the approved development site and adjoining wetland area on Lot 22 DP 1150980, Tomago Road, Tomago, in the Port Stephens LGA (**Figure 1).**

1.2 BACKGROUND

The Project Approval (dated 7 August 2009) describes the development as the subdivision of the site for industrial purposes, bulk earthworks across the site and the establishment of Northbank Enterprise Hub Development and associated infrastructure. The approval area includes a 22-hectare (ha) Conservation Area (CA) in the southeast portion of the site, where any development is excluded (collectively referred to as the 'subject site'). This CA has been dedicated by NEH to the Hunter Wetlands National Park managed by the NSW National Parks and Wildlife Service (NPWS). The extent of development, the adjoining National Park boundary and the CA are shown in **Figure 2**. The wetlands adjoining the subject site are part of a larger system that includes an area protected by the Ramsar Convention.

It should also be noted that the original Project Approval (MP 07_0086) granted on 7 August 2009, was modified on 18 May 2017 (MP 07_0086 MOD 2). In regards to this monitoring project, Condition 4B of MP07_0086 MOD2 makes reference to the vegetation communities monitored annually, whereby the proponent must implement contingency measures to drainage flows, if there is a decline in Phragmites Rushland vegetation cover of greater than 20% in extent, and Swamp Oak Sedge Forest greater than 10% in extent on the NPWS reserve to the south of the site, when compared against the Kleinfelder 2010 baseline report. This is further discussed in **Section 4.1.1.**

The WMMP prepared by ecobiological in 2009 outlines three phases to ensure adequate baseline data collection and monitoring of the CA. These phases are Phase 1 – Existing Vegetation Status, Phase 2 – Establish Baseline Benchmark Data, and Phase 3 – Monitoring. These phases are discussed in further detail in the Section 2. Two key parameters that will be monitored in accordance with the WMMP methods include: (1) Edge Effects and Weed Infestation; and (2) Variation in Native Vegetation. On-site and regional baseline data collected in 2009 and 2010 survey events will allow for future comparisons to assess any substantial changes to vegetation communities present within the CA. The two key factors that are monitored are discussed in further detail below.

1.2.1 Edge Effects and Weed Infestation

Weed infestation along the whole development and CA interface is compared to baseline data, and a ranking system is used to trigger whether or not preparation of a Weed Management Plan (WMP) is required. The provision of exotic plant cover measurements within the survey plots gives a quantitative measurement of weed infestation. Any substantial increase in weed cover within the survey plots highlights the requirement for appropriate actions.

If weed management is required, the weed management actions for control of weed infestations at the development and CA interface will be detailed in a WMP prepared specifically for the subject site.

1.2.2 Variation in Native Vegetation

Vegetation Extent

Vegetation community boundary areas mapped in the baseline monitoring survey (December 2009) are compared against ongoing monitoring surveys. Minor boundary variations are to be expected year-to-year as the vegetation communities are dynamic and respond to environmental pressures. Any substantial boundary change over time will be highlighted through map comparison and the potential causes will be investigated.

Potential causes for variations in vegetation extent and condition include erosion and sedimentation, soil and water chemical changes, nutrient deficiencies and/or excess loading of nutrients (e.g. nitrogen), increased light penetration, changes in the hydrological regime, changes in fire frequency, edge effects from development, changes in land use (e.g. exclusion/introduction of grazing), and natural variation in vegetation community composition through ecological processes such as competition and succession.

Biometric Status

If the data collected during the annual monitoring surveys from permanent quadrats is within the established benchmark measurements (determined in April 2010), no action is required. If data for any benchmark attribute is outside benchmark parameters, potential causes will be investigated, and actions recommended to mitigate the potential causes. This may require further surveys to determine the cause, and specific action plans prepared to mitigate the issues. Future findings and recommendations will be presented in an annual report to be incorporated into the Annual Environmental Management Reports (AEMR) required for the development.

1.3 Current Status of Adjoining Development

Stage 1 of the development (WesTrac) was constructed and fully operational in 2012. NEH sold Stages 1 and 2 to Industria Company No. 2 Pty Ltd in 2016 (**Figure 2**).

Figure 1 - Locality Map

Legend

- Subject Site
- National Parks
- Major roads

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Project Ref:	20213768
Plot Date:	2021/04/01 10:39
Revision:	001 (GJoyce)

Map Projection:
GDA 1994 MGA Zone 56

Data Sources:
NSW DFSI - 2019
Nearmap - 2021

Disclaimer:This is not an official or a legal map but is for informational use only. All data was compiled from the best sources available. All boundaries, scale and geographic points are approximate.

L:\GIS FOLDER\00 CLIENT FILES\128107_WesTrac\20213768_NEH_WetlandMonitoring2021\Mapping\20213768_2021_Fig1_Locality.mxd

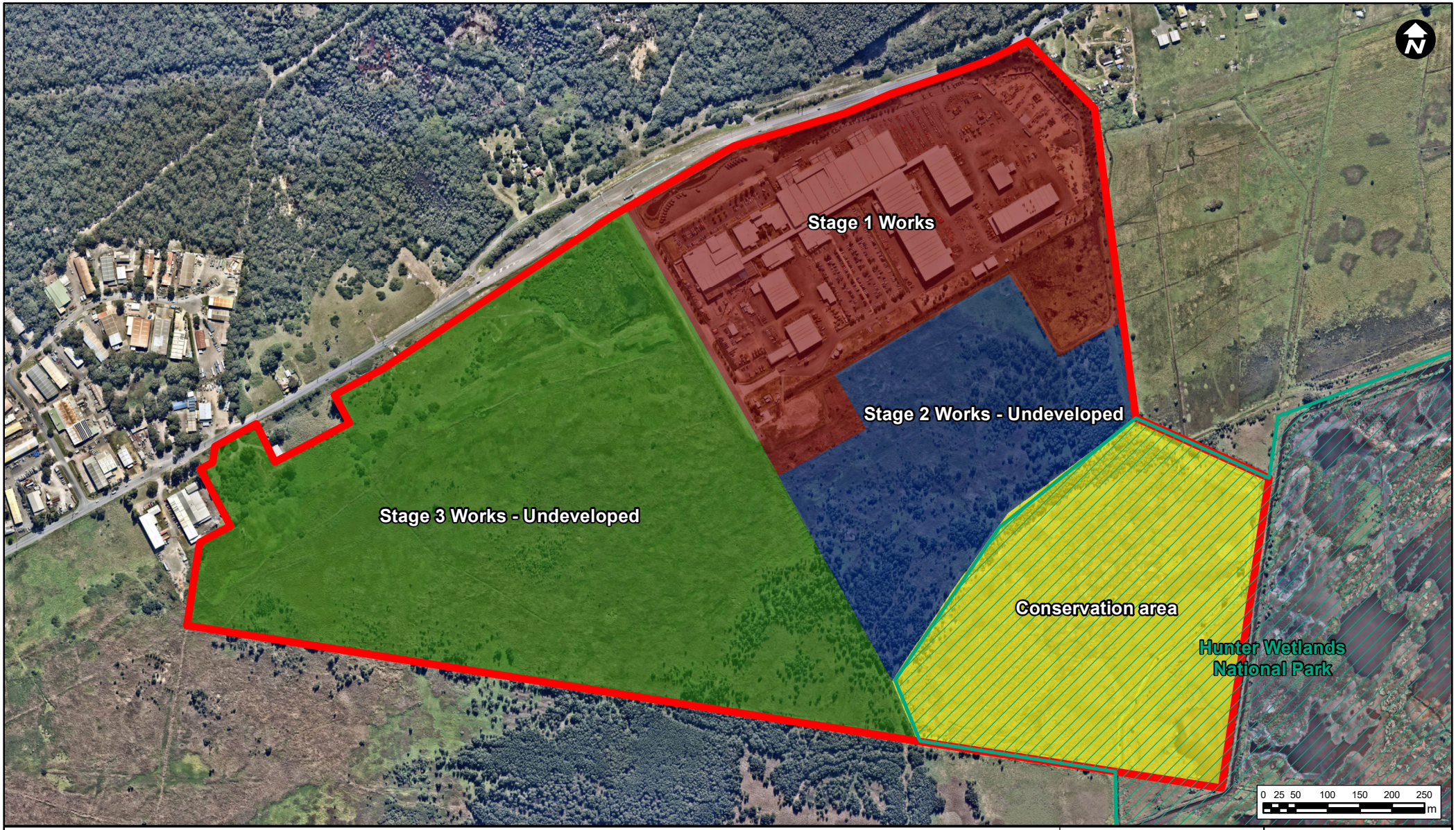

Figure 2 - Conservation Area & Works Stages

Legend

- Subject site
- National Park Boundary
- Conservation area
- Stage 1 Works
- Stage 2 Works - Undeveloped
- Stage 3 Works - Undeveloped

KLEINFELDER
Bright People. Right Solutions.

Project Ref:	20213768
Plot Date:	2021/05/20 08:53
Revision:	002 (GJoyce)

Map Projection:
GDA 1994 MGA Zone 56

Data Sources:
Nearmap - 2021
NSW DFSI - 2019

Disclaimer:This is not an official or a legal map but is for informational use only. All data was compiled from the best sources available. All boundaries, scale and geographic points are approximate.

L:\GIS FOLDER\00 CLIENT FILES\128107_WesTrac\20213768_NEH_WetlandMonitoring2021\Mapping\20213768_2021_Fig2_ConservationAreaWorksStages.mxd

2 METHODOLOGY

In October 2009 and April 2010, Kleinfelder surveyed the CA and a number of sites in the general locality of the proposed development (**Figure 3**). These surveys were conducted to gather data on existing vegetation condition and extent within the site, and to determine vegetation condition against specific vegetation biometric benchmark data collected from similar vegetation communities present within the locality. Discussion of differences between the baseline biometric data collected from the CA and the DECCW benchmarks is provided in the baseline report (ecobiological 2010).

Data were collected using methods outlined in the WMMP (ecobiological 2009). Phase 1 established the vegetation extent of the wetland area; Phase 2 collated benchmark data for future comparison during monitoring events; and Phase 3 involves ongoing monitoring of the CA through collection of data on vegetation extent and condition, and comparison with data collected during Phases 1 and 2, and previous annual monitoring events. For further details on the methods used during Phases 1 and 2, refer to the WMMP (ecobiological 2009).

Annual monitoring commenced in 2011 and this report represents the eleventh annual monitoring event after the baseline report. The preferred period for annual monitoring is between December and April. This period has been selected to allow annual weed growth and infestation identification and is considered a suitable time to identify the majority of plant species within the 0.04 ha plots.

The methods used to monitor edge effects and weed infestation, and variation in native vegetation extent and condition are outlined below.

2.1 EDGE EFFECTS AND WEED INFESTATION

Three permanent survey plots (20 m x 20 m, including a 20 m x 50 m plot for biometric data collection) were established in three vegetation community types (i.e. one in each community) in the CA. Data were collected in accordance with **Appendix 2** of the BioBanking Assessment Methodology Operation Manual (field methodology for measuring condition attributes and site values), a method prepared by the Department of Environment and Climate Change (Seidel & Briggs, 2009).

Data collected from these permanent survey plots during the annual monitoring events are then analysed and compared against the established baseline benchmark data and previous annual monitoring events. Impact on the vegetation communities adjacent to the development area will be considered substantial if the measured variance for any benchmark attribute is less than 25% of the lower benchmark or greater than 25% of the upper benchmark. Measurements outside benchmark values would initiate the requirement to investigate and manage any disturbance which may be impacting on the vegetation within the CA.

A weed infestation assessment was also undertaken by a qualified botanist walking the interface between the development and CA and marking the location and extent of weed infestation with a hand-held global positioning system (GPS). The location and extent of weed infestations recorded are then compared to previous annual monitoring events to determine if the infestations are increasing, stable or declining.

2.2 VARIATION IN NATIVE VEGETATION

Identification of the extent of the vegetation community types within the CA was undertaken by a qualified botanist walking the boundary between vegetation communities and marking a series of Rapid Data Points (RDPs) as well as tracking the location walked using a GPS. The boundary tracks and RDPs are then uploaded into a Geographic Information System (GIS) program and overlaid on aerial photography to confirm the extent of each vegetation type.

The annual mapping of vegetation community boundaries is compared against the baseline maps and any substantial vegetation community boundary changes are highlighted and discussed.

Figure 3 - Baseline Benchmark Quadrat Data

Legend

- Subject Site
- Benchmark Quadrat - Forested Wetlands
- Benchmark Quadrat - Freshwater Wetlands
- Benchmark Quadrat - Saline Wetlands

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Project Ref:	20213768
Plot Date:	2021/04/01 10:44
Revision:	001 (GJoyce)

Map Projection:
GDA 1994 MGA Zone 56

Data Sources:
Nearmap - 2021

Disclaimer:This is not an official or a legal map but is for informational use only. All data was compiled from the best sources available. All boundaries, scale and geographic points are approximate.

L:\GIS FOLDER\00 CLIENT FILES\128107_WesTrac\20213768_NEH_WetlandMonitoring2021\Mapping\20213768_2021_Fig3_BaselineBenchmarkQuadratData.mxd

3 RESULTS

The eleventh annual monitoring event for Phase 3 was undertaken on 23 February 2021. Data was collected and compared to the 2009/10 (baseline) data established in Phase 2 and data from previous annual monitoring events.

3.1 EXTENT OF VEGETATION COMMUNITIES

Boundaries for all vegetation communities within the CA were mapped and updated in February 2021 (**Figure 7**). The areas of each community recorded in the 2009/10 (baseline), previous 2020 and current (2021) surveys are provided below in **Table 1**. No significant changes to the area of each vegetation community were observed in the current monitoring year (**Table 1**). An increase in total area of the forested wetland community, from 1.88 ha to 2.05 ha (9%), was observed in the current monitoring year. Both of the freshwater wetland and saline wetland communities have declined in area, by 0.66% and 5.17% respectively, in comparison to the previous monitoring year. No change in area was observed for the open-water saline community in comparison to the previous year. Total area of exotic species decreased from 0.75 ha in the previous monitoring year to 0.73 ha in the current monitoring year.

Compared to the 2009/10 Baseline data for each vegetation community, both forested wetlands and freshwater wetlands have increased in area, while the saline wetland community has decreased (**Table 1**). The open-water saline community was not evident in the baseline surveys and has since increased to its current area of 0.84 ha (**Table 1**). Total cover of exotic species has significantly decreased from 1.40 ha in the baseline survey, to 0.73 in the current monitoring year.

Table 1 Comparison of areas (ha) of each vegetation community within the CA from 2019, 2020 and 2021 to the baseline areas 2009/10.

Year	Area of Vegetation Communities (ha) [(Percentage Change from 2009/10 baseline and to previous years (2019/20)]					Comments
	Forested Wetlands	Freshwater Wetlands	Saline Wetlands	Open Water - Saline	Exotics	
2009/10 (baseline)	1.99	17.86	1.17	0	1.40	Vegetation survey prior to boundaries confirmed by surveyor.
2019	1.69 (-15%)	17.51 (-2%)	0.63 (-46%)	0.81 (>100%)	1.52 (+9%)	-
2020a	1.88 (-5%)	17.38 (-3%)	0.58 (-51%)	0.81 (>100%)	1.52 (+9%)	Before mapping adjustments
2020b	1.88 (-5%)	18.11 (+1%)	0.58 (-51%)	0.84 (>100%)	0.75 (-46%)	After mapping adjustments
2021	2.05 (+9%)	17.99 (-0.66%)	0.55 (-5.17%)	0.84 (0%)	0.73 (-2.66%)	After mapping adjustments

Note: due to changes to the surveyed boundary of the CA, which occurred after the 2009/10 (baseline) surveys, there is a slight discrepancy in the total areas of approximately 0.1 ha between the baseline and subsequent surveys.

Figure 4 outlines the change in the key vegetation communities; Forested Wetlands, Freshwater Wetlands, and Saline Wetlands as well as the Exotic area cover within the CA over all monitoring years. Discussion of the results are described in Section 4.1.

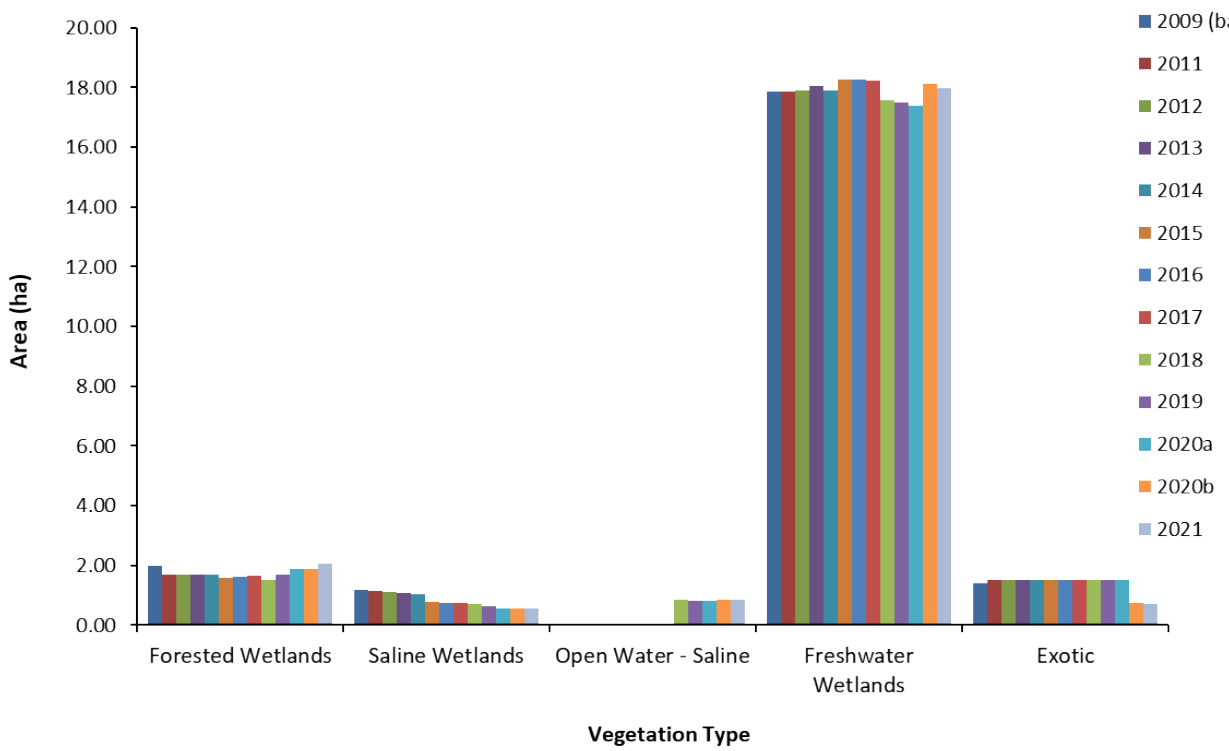

Figure 4 Area (ha) of the vegetation communities within the Conservation Area from the 2009/10 Baseline assessment to the current (2021) monitoring round.

3.2 QUADRAT MONITORING

A comparison of the structure, composition (i.e. biometric data) and species diversity of the three vegetation communities within the CA with the 2009/10 (baseline) data and DECCW benchmarks is provided in **Appendix B**.

Figure 5 shows the number of native species recorded during each annual survey event within the three vegetation communities (i.e. representative quadrats) since the 2009/10 (baseline) survey. No significant differences in species richness were observed in the forested wetland community and saline wetland community within the current round of monitoring, compared to the previous year (2020) of monitoring. A 50% decline in native species richness was observed within the freshwater wetland community (Q3). As it has been noted in previous monitoring reports, Quadrat 2 is no longer representative of the saline wetland community. The previous round of monitoring mapped the vegetation community, in which Quadrat 2 occurs in, as freshwater wetland. Current vegetation community mapping and floristic data shows that Quadrat 2 is most representative of a freshwater wetland community.

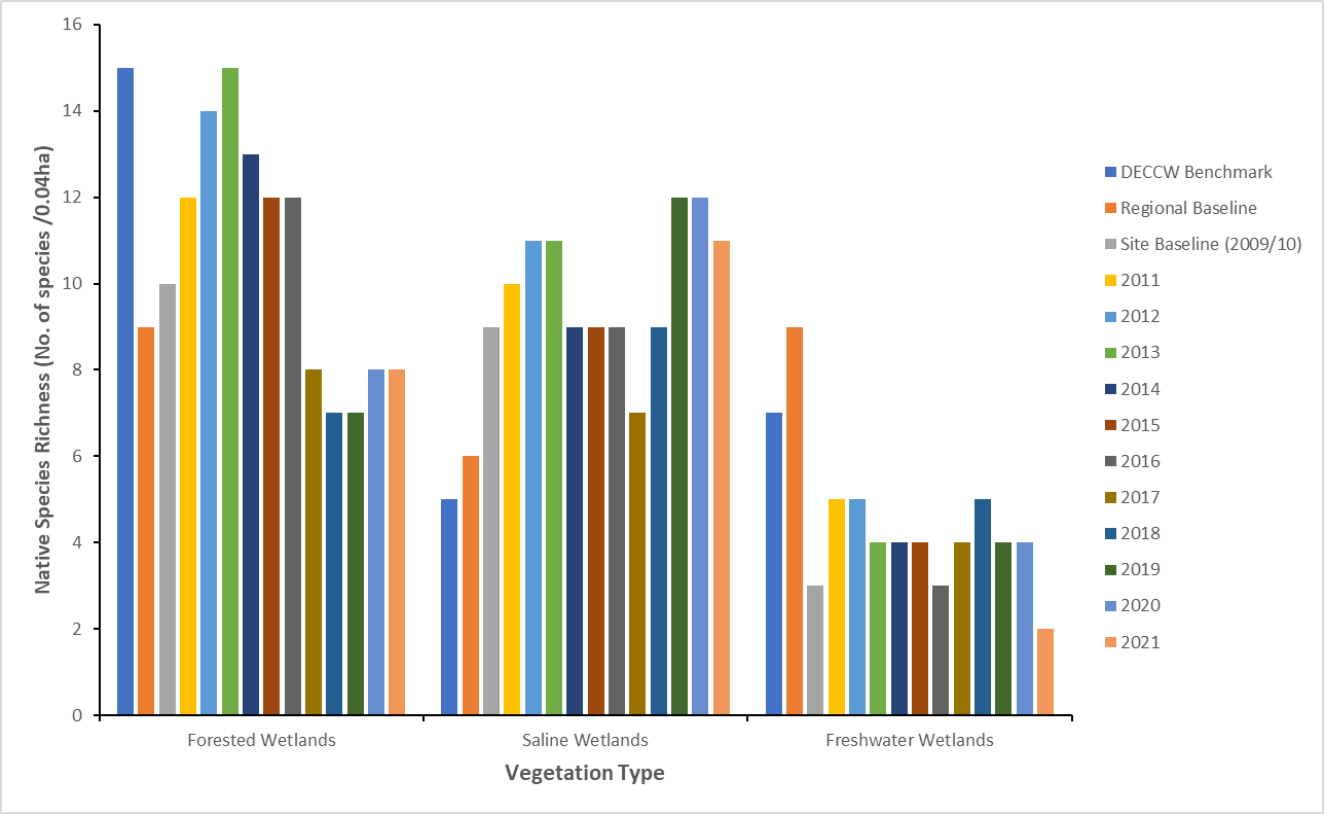

Figure 5 Observed native species richness within each monitoring quadrat (0.04 ha) and vegetation community across all years of monitoring. DECCW Benchmark and Regional Baseline data also included.

3.3 WEED ASSESSMENT

The north-west portion of the forested wetland community was not surveyed for exotic weed species in 2021. Additionally, weed control was not undertaken for species such as Pampas Grass (*Cortaderia selloana*) and Blackberry (*Rubus fruticosus* sp. agg.) in 2020. As such, it is assumed that the small infestation and individuals of Blackberry and individuals of Pampas Grass are still currently present in the forested wetland area.

Surveys for weed infestations within the Conservation Area showed that the infestation of Blackberry along the western boundary of the CA (between Q2 and Q3) has increased in area. Additionally, it was noted that a small area of Tobacco Bush (*Solanum mauritianum*) is present along the north-eastern corner of the CA. One other exotic species encountered during the walkover was Paddy's Lucerne (*Sida rhombifolia*), which occurred in small isolated patches along the north-eastern boundary of the CA and exotic grassland areas. No exotic species were encountered during a walkover of the southern portion of the freshwater wetland community.

Figure 6 displays the percentage of exotic species identified within each vegetation community across all years of monitoring.

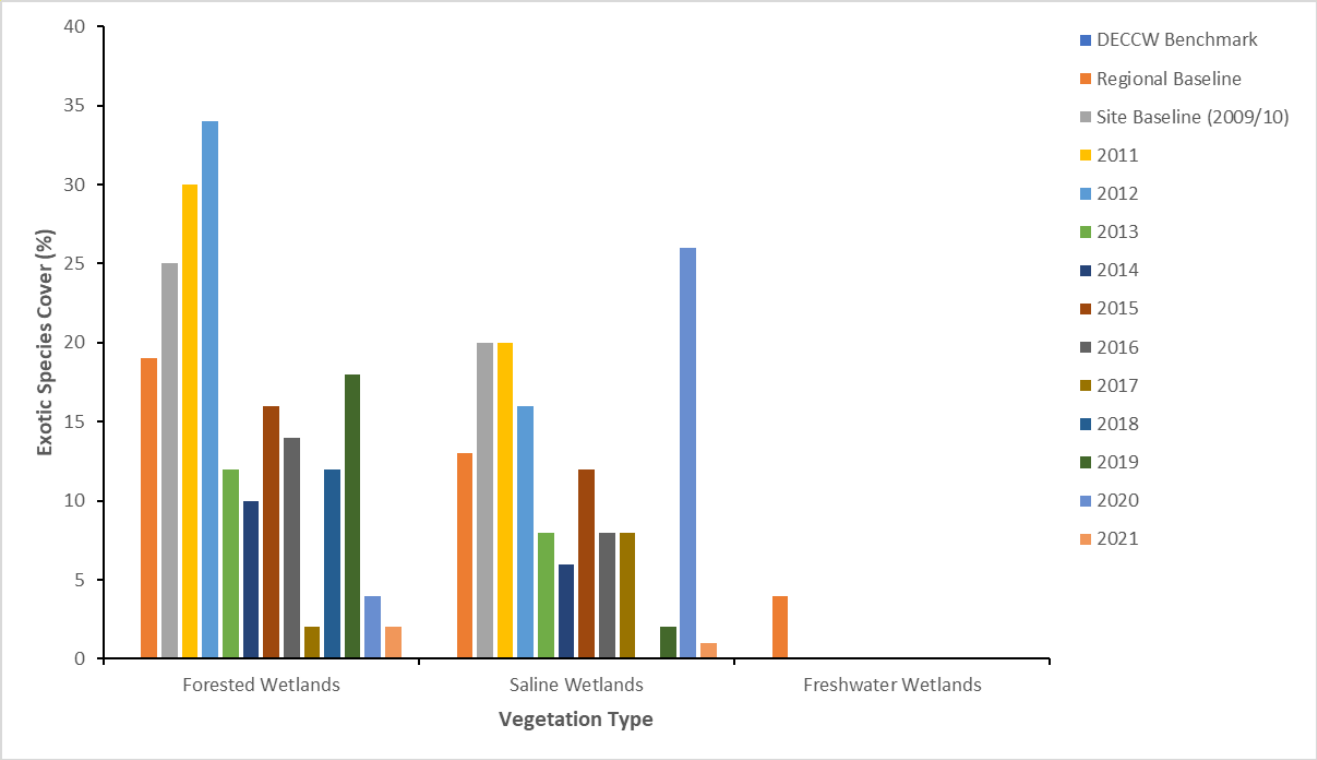

Figure 6 **Percentage cover of exotic species within each vegetation type across all years of monitoring.**

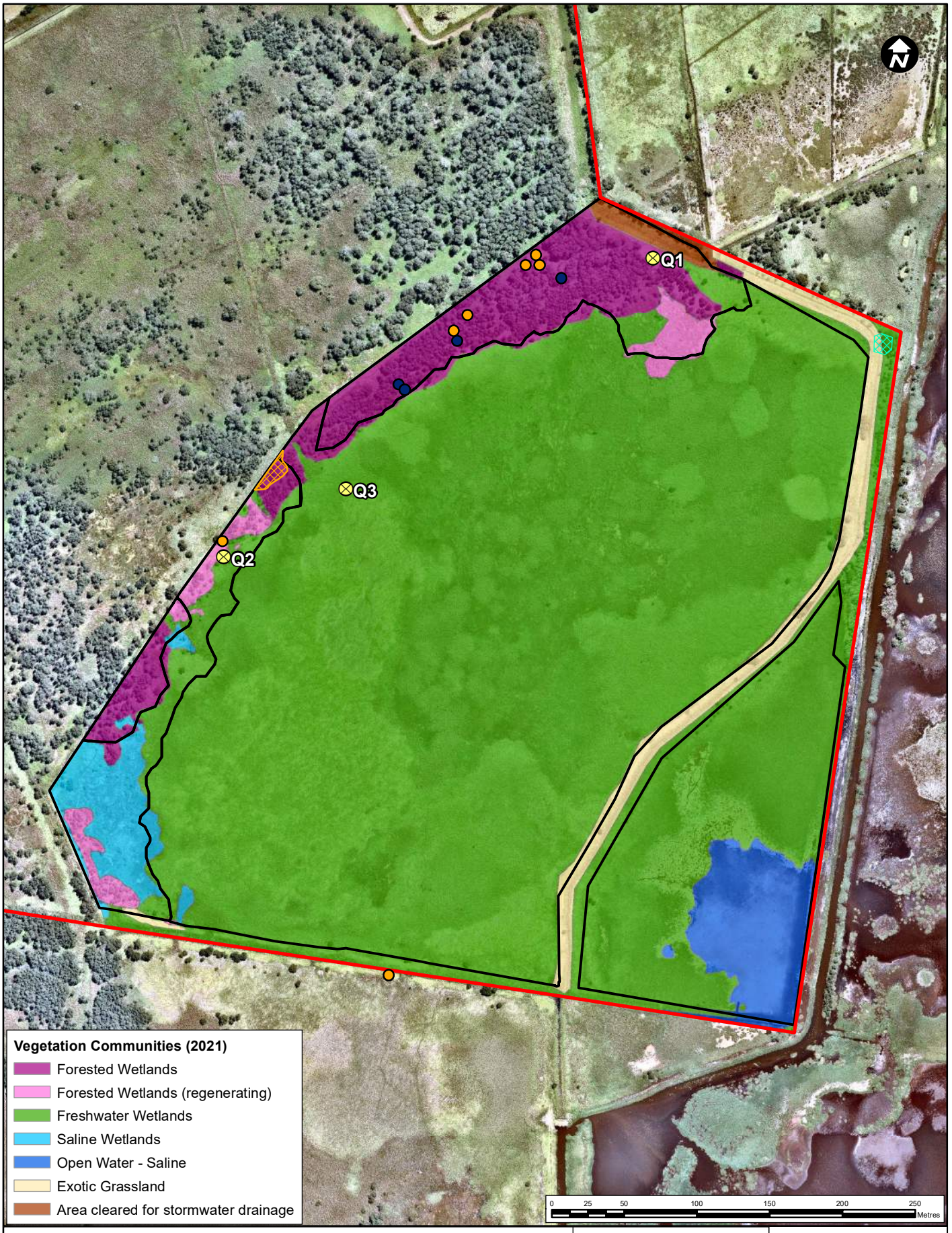

Figure 7 - Vegetation Community Extent and Weed Areas Within the Conservation Area - February 2021

Legend

- Subject Site
- 2009 Baseline Vegetation Boundaries
- Monitoring Quadrats
- Tobacco bush Infestation Area
- Blackberry Infestation Area
- Blackberry Location
- Pampas Grass Location

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Project Ref:	20213768
Plot Date:	2021/04/27 16:21
Revision:	001 (GJoyce)

Map Projection:
GDA 1994 MGA Zone 56

Data Sources:
NSW DFSI - 2019
Nearmap - 2021

Disclaimer:This is not an official or a legal map but is for informational use only. All data was compiled from the best sources available. All boundaries, scale and geographic points are approximate.

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4 DISCUSSION

Vegetation extent surveys within the CA were conducted in February 2021. Changes and trends observed in vegetation extent and floristic composition are discussed below.

4.1 VEGETATION EXTENT

In comparison to the previous monitoring round, no significant changes to the extent of each vegetation community was observed in the current monitoring round.

An increase in the total area of the forest wetland community in the current monitoring round can be attributed to the newly mapped area of regenerating Swamp Oak (*casuarina glauca*) forested wetland in the north of the CA, adjacent to Q1. This area is characterized by immature individuals of regenerating Swamp Oak **(Plate 1**) occurring adjacent to existing Swamp Oak forested wetland. Minor spatial changes to the ecotonal boundary of the forested wetland is evident in the current monitoring round and is likely due to natural variation in vegetation communities over time.

No major changes in the area to the saline wetland community was observed in the current monitoring survey, only minor spatial changes of its ecotonal boundary between other vegetation communities. This is likely due to natural variations in water salinity over time which would affect the floristic structure within these communities, i.e. the ratio of *Typha orientalis* (a less saline-tolerant species) to *Juncus kraussii* (more saline-tolerant species). This can be seen within the floristic data collected for Quadrat 2, which is discussed in Section 4.2.

The open-water saline community has remained relatively consistent since the previous monitoring round. Contraction and expansion of this area over time may coincide with large rainfall events. These events have the potential to flood the areas exposed to tidal influence. Additionally, these events would change floristic composition at the open water-vegetation boundaries due to salinity and extended periods of water inundation.

The freshwater wetland community is the largest vegetation community by area within the CA, which has remained relatively unchanged since the baseline assessment, apart from the mapping updates in 2020. Minor changes to the ecotonal boundaries between other communities is likely a result of natural environmental variation over time.

The cover and abundance of exotic species has decreased substantially since the baseline surveys and up until 2020, where areas mapped as exotic where re-mapped as freshwater wetland community, based on ground-truthed data. As such, this re-mapping of the exotic and freshwater wetland boundaries accounts or the significant decrease in total exotic area. Regardless, exotic species such as Blackberry and Pampas Grass are still present within the CA. Additionally, new observations of exotic species, such as Tobacco bush, were recorded along the eastern boundary. While these exotic areas along the eastern boundary are not extensive, it is recommended that weed control rounds are undertaken to prevent further spread throughout the CA.

The results also indicate that there has been a progressive decrease in the area of saline wetlands in the CA since the 2009/10 (baseline) survey, with a notable decrease between the 2014 and 2015 surveys. Conversely, the freshwater wetland (Phragmites Rushland) over time has shown small consecutive increases in the northern portion of the CA since the 2009/10 (baseline) survey. The progressive encroachment of freshwater wetland species within the areas previously mapped as saline wetlands is likely to have resulted from several factors primarily relating to land use change. The saline wetlands mapped along the northern boundary of the CA are distant from the floodgates and levee. The CA and surrounding wetlands were effectively isolated from tidal inflows since the installation of the flood levee and drainage system by NPWS in the 1970s to protect and promote agriculture in these areas (NSW National Parks and Wildlife Service 1998) as well as limiting tidal inundation to privately owned land upstream. While tidal flows have been re-introduced to the Tomago wetlands since 2007, tidal inundation modelling indicates that many parts of the wetlands still remain tidally isolated, including the CA (Rayner and Glamore 2011). Additionally, the low structure of saltmarsh vegetation makes it susceptible to displacement from freshwater wetland species (e.g. *Phragmites australis*), particularly in areas that are not subject to regular tidal inundation (Saintilan 2009). The gradual retreat of saline wetlands, and subsequent replacement by freshwater wetlands within the area is therefore an expected outcome. This trend is likely to continue into the future due to the installation of the alternative discharge point in August 2017 (Approved

Modification). This discharge point will result in more regular freshwater flows occurring over the vegetated area of the CA, potentially accelerating this change of vegetation rather than the direct connection to existing drainage through the CA, occurring previously.

Prior to 2009, the CA was subject to livestock grazing. Although grazing can often have a detrimental impact on the condition of saltmarsh vegetation, it is considered likely that the area of relic saltmarsh mapped in the CA was effectively preserved by livestock grazing during this period through the suppression of freshwater wetland species (despite the lack of tidal inundation). The subsequent removal of this grazing pressure in 2009 is likely to have enabled fast-growing freshwater species (i.e. *Phragmites australis, Bolboschoenus caldwellii* and *Isachne globosa*) to out-compete the smaller species characteristic of saltmarsh. This also helps to explain the relatively low diversity within the freshwater wetland areas. Similarly, the areas currently mapped as saline wetlands are primarily represented by only one characteristic saltmarsh species (*Juncus kraussii*), with other saltmarsh species having declined such that they are now entirely absent or present only in very low abundance. As such, based on the trends observed to date, it is considered likely that freshwater wetland species will continue to increase in abundance throughout the saline wetlands such that the floristic composition of these areas will not be representative of a saline community. No management actions are recommended to reverse or stabilize this transition of saline to freshwater wetland vegetation in the CA as this is considered an inevitable result of land use change (i.e. removal of grazing) and lack of tidal inundation.

4.1.1 Compliance

Condition 4B of MP 07_0086 MOD 2 states that the proponent must implement contingency measures to drainage flows, if there is a decline in Phragmites Rushland vegetation cover of greater than 20% in extent, and Swamp Oak Sedge Forest greater than 10% in the CA, when compared to the Kleinfelder 2010 baseline report. **Table 2** presents the current changes in the two vegetation communities between the 2009/2010 baseline and the recent 2021. As of the current monitoring survey, there has been a 3% increase in the cover of Forested Wetlands, and a 0.7% increase in Freshwater Wetlands from the Baseline surveys.

Table 2 Comparison, presented as area (ha) and percent change, of the 2009/10 baseline data and the current 2021 monitoring survey for the forested wetland community and freshwater wetland community.

Survey Period	Forested Wetlands (ha)	Freshwater Wetlands (ha)
2009/10 Baseline	1.99	17.86
2021	2.05	17.99
% Change	+3%	+0.7%

4.2 QUADRAT MONITORING

This year's annual monitoring surveys have reiterated that the vegetation community, in which Quadrat 2 is located within, has changed floristically over time from a saline wetland community to now align more with a freshwater wetland community. This can be seen through the decreasing abundance and cover of *Juncus kraussii* and the increase of *Phragmites australis* since the baseline surveys. Some saline influence is still present, i.e. *Paspalum vaginatum* (Saltwater Couch) is still present as of the current monitoring survey. As such, it is recommended that Quadrat 2 be relocated to the south-western portion of the CA to align with the saline wetland community. This will allow for a more accurate collection of cover and abundance of species within that community and therefore, more accurate monitoring data in subsequent monitoring events.

Both Quadrat 1 and 3 have remained relatively consistent in terms of floristic structure, compared to the previous monitoring year. Any minor floristic differences are likely attributed to natural environmental variation.

Most of the biometric data obtained from the quadrats is substantially higher or lower than the DECCW biometric benchmarks provided for each vegetation community, particularly for Q2 and Q3 (see **Appendix 2**). However, the results for each community have been relatively consistent since 2009/10 (baseline) surveys, prior to the development in Stage 1. Also, the results from quadrat surveys across the region in 2009 produced similar results,

with many of these outside the DECCW biometric benchmarks. Therefore, the results for the quadrat monitoring are not considered to represent substantial vegetation change as a result of the development.

4.3 Weed Assessment

Both Pampas Grass and Blackberry are particularly invasive in wetland environments. Pampas Grass spreads by producing large quantities of windborne seed, while Blackberry grows vigorously and can infest large areas, quickly resulting in the degradation of natural environments by displacing native plants and reducing habitat for native animals (DPI, 2015). Blackberry and Pampas Grass still occur in the north-west portion of the CA, albeit in small numbers. Additionally, it was noted that the Blackberry infestation along the western boundary of the CA (in between Quadrat 2 and 3) has increased in size since the previous round of monitoring. As such, it is recommended that weed control be undertaken to control their spread. As the CA contains wetland habitat, control of these species should be appropriate for the habitat, i.e. if chemicals are used, herbicides need to be appropriate for use around wetland and/or aquatic species, such as amphibians. Information on control methods for these species can be obtained from the NSW Department of Primary Industries (WeedWise) website (DPI, 2015). Weed control should be undertaken by a qualified and experienced Bush Regenerator. As the current level of infestation of these species is relatively small, compared to the area of the CA, it is recommended that weed control be undertaken as soon possible and before Pampas Grass flowers (Summer-Autumn).

The Tobacco Bush (*Solanum mauritianum*) identified along the eastern boundary of the CA is not extensive, however, control of this species is still recommended as it dispersed easily through seed. Control methods for this species should be obtained from the NSW WeedWise (DPI, 2015) and only suitable methods, appropriated for the wetland habitat, should be used.

Follow-up weed control should be implemented for all species after the initial control. This should primarily be done once a year.

4.4 Water Levels

Water levels have remained consistent with last year's survey. Repairs to the levee have shown stable water levels with no large fluctuations.

4.5 Conclusion

Overall, the vegetation communities have shown little change and some notable improvement over the past year. While the results indicate that the areas of saline wetlands have decreased over the last several years due to an increased dominance of freshwater wetland species, no management actions relating to these changes are required. No adverse impacts from Stage 1 of the development have been observed with changes to the vegetation communities viewed as either naturally occurring or due to the past leak in the levee.

It is recommended that Quadrat 2 be relocated to the south-western corner of the CA. This would better align the monitoring to suit the saline wetland community, opposed to the freshwater wetland community in which Quadrat 2 is currently situated.

Both the forested wetland community and the freshwater wetland community have increased in area since the baseline surveys, which were conducted in 2009/10. As there has not been an observed decline in Phragmites Rushland vegetation cover of greater than 20% in extent and Swamp Oak Sedge Forest greater than 10% in the CA, contingency measures to alter the drainage flow to the CA as per Condition 4B of MP 07_0086 MOD 2 are not needed.

One management issue to be actioned by NPWS has been recommended following this, and previous, annual monitoring events: the control of isolated Pampas Grass and Blackberry plants, to ensure these weed species do not spread and become established in other parts of the CA or adjacent lands (Section 4.3). It is noted that Pampas Grass and Blackberry were identified in the CA every year since 2015 and are similarly discussed in previous annual reports (Kleinfelder 2015-2020).

5 REFERENCES

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APPENDIX A:QUADRAT DATA FOR THE 2009/10 (BASELINE), 2019 (PREVIOUS) AND 20120 (CURRENT) MONITORING SURVEYS

CA denotes cover abundance:

1 less than 1% cover
2 cover between 1-5%
3 cover between 6-25%
4 cover between 26-50%
5 cover between 51-75%
6 cover between 76-100%

Family	Scientific Name	Common Name	Q1 Forested Wetland				Q2 Freshwater Wetlands (formerly saline)				Q3 Freshwater Wetlands			
			2010	2019	2020	2021	2010	2019	2020	2021	2010	2019	2020	2021
Amaranthaceae	*Alternanthera denticulata*	Lesser joy weed	1			1		1	1	1				
Apiaceae	**Hydrocotyle bonariensis*	Pennywort	2	1	2	1								
Araliaceae	*Trachymene incisa*	-												
Asteraceae	**Ambrosia tenuifolia*	Lacy Ragweed						2	2					
Asteraceae	**Aster subulatus*	Wild Aster		1		1								
Asteraceae	**Conyza parva*	-												
Asteraceae	**Cotula coronopifolia*	Water Buttons	2				3							
Asteraceae	**Crassocephalum crepidioides*	Thickhead	1											
Asteraceae	*Eclipta platyglossa*	-						1		1				
Asteraceae	*Enydra fluctuans*	-												
Asteraceae	**Senecio madagascariensis*	Fireweed	2	1										
Caryophyllaceae	*Spergularia marina*	Lesser Sea-spurrey					1							

Family	Scientific Name	Common Name	Q1 Forested Wetland				Q2 Freshwater Wetlands (formerly saline)				Q3 Freshwater Wetlands			
Casuarinaceae	*Casuarina glauca*	Swamp Oak	5	5	5	5		2	2	3				
Chenopodiaceae	*Einadia trigonos* subsp. *stellulata*	Fishweed	2	1	1		2							
Chenopodiaceae	*Sarcocornia quinqueflora*	Glasswort												
Commelinaceae	*Commelina cyanea*	Native Wandering Jew												
Cyperaceae	*Bolboschoenus caldwellii*	-	2	2	2	2	2	4	3	2	4	2	2	
Euphorbiaceae	**Ricinus communis*	Castor Oil Plant	1											
Juncaceae	**Juncus acutus* subsp. *acutus*	Sharp Rush	1				1							
Juncaceae	*Juncus kraussii* subsp. *australiensis*	Sea Rush	3	3	3	3	4	2	2	3				
Juncaceae	*Juncus usitatus*	Common Rush	2											
Juncaginaceae	*Triglochin procera*	Water Ribbons				1								
Juncaginaceae	*Triglochin striata*	Streaked Arrowgrass					3							
Lobeliaceae	*Lobelia anceps*	-						1	1	1				
Poaceae	*Cynodon dactylon*	Couch							2					
Poaceae	**Echinochloa crus-galli*	Barnyard Grass												
Poaceae	**Paspalum dilatatum*	Paspalum	2											
Poaceae	**Pennisetum clandestinum*	Kikuyu	1						2					

Family	Scientific Name	Common Name	Q1 Forested Wetland				Q2 Freshwater Wetlands (formerly saline)				Q3 Freshwater Wetlands			
Poaceae	*Isachne globosa*	Swamp Millet	3		2			2	2		6			
Poaceae	*Lachnagrostis billardierei* subsp. *billardierei*	Coast Blowngrass	2				2							
Poaceae	*Paspalum vaginatum*	Saltwater Couch		5	4	4		3	3	3		5	4	
Poaceae	*Phragmites australis*	Common Reed	2	3	3	3	3	6	5	6	3	6	6	6
Poaceae	*Polypogon monspeliensis*	Annual Beardgrass					2							
Poaceae	*Sporobolus virginicus*	Sand Couch		2	2	1	4	2	2					
Polygonaceae	*Persicaria decipiens*	Slender Knotweed						2	1					
Polygonaceae	*Persicaria strigosa*	Spotted Knotweed						2	1	1				
Polygonaceae	**Polygonum aviculare*	Wireweed	2				2							
Polygonaceae	*Rumex brownii*	-								2				
Polygonaceae	**Rumex conglomeratus*	Clustered Dock	1					2	1					
Ranunculaceae	*Ranunculus inundatus*	Water Buttercup	1							1				
Rosaceae	**Rubus fruticosus*	Blackberry	1											
Solanaceae	**Solanum nigrum*	Blackberry Nightshade	1					1	1					

Family	Scientific Name	Common Name	Q1 Forested Wetland				Q2 Freshwater Wetlands (formerly saline)				Q3 Freshwater Wetlands			
Typhaceae	*Typha orientalis*	Broadleaf Cumbungi										2	3	2
Verbenaceae	**Verbena bonariensis*	Purpletop						2		1				
Total Native			**10**	**7**	**8**	**8**	**9**	**12**	**12**	**11**	**3**	**4**	**4**	**2**
Total Exotic			**11**	**3**	**1**	**2**	**3**	**4**	**4**	**1**	**0**	**0**	**0**	**0**

APPENDIX B:COMPARISON OF 2009/10 (BASELINE), 2019 (PREVIOUS) AND 2020 (CURRENT) BIOMETRIC DATA WITH REGIONAL BASELINE (2009) AND DECCW BENCHMARKS

Blue = DECCW 2008 Biometric Benchmark data
Red = Average of data taken from regional baseline quadrats
Green = On-site quadrat data from 2010 (baseline), 2020 (previous) and 2021 (current) surveys

Keith Formation Name	Keith Class (2004)	Quadrat number	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of trees with hollows	Total length of fallen logs	Exotic cover
			Richness in 0.04ha Plot	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper	Lower	Upper			
Forested Wetlands	Coastal Floodplain Wetlands		15	15	65	0	50	0	90	1	15	2	90	0.8	10	
Forested Wetlands			9	25		0		25		0		83		4	6	19
Forested Wetlands		Baseline (Q1)	10	60		0		90		10		50		0	0	25
Forested Wetlands		2020 (Q1)	8	37.5		0		76		0		80		0	0	4
Forested Wetlands		2021 (Q1)	8	60		0		50		0		25		0	0	2
Saline Wetlands	Saltmarshes		5	0	0	0	0	0	10	0	40	30	70	0	0	
Saline Wetlands			6	0		0		81		0		82		0	0	13
Saline Wetlands		Baseline (Q2)	9	0		0		50		0		70		0	0	20
Saline Wetlands		2020 (Q2)	12	0		0		100		0		90		0	0	26
Saline Wetlands		2021 (Q2)	11	7.5		0		90		0		10		0	0	1

Keith Formation Name	Keith Class (2004)	Quadrat number	Native plant species richness	Native over-storey cover		Native mid-storey cover		Native ground cover (grasses)		Native ground cover (shrubs)		Native ground cover (other)		Number of trees with	Total length of	Exotic cover
Freshwater Wetlands	Coastal Freshwater Lagoons		7	3	90	0	5	1	5	0	0	60	95	0	0	
Freshwater Wetlands			9	0		0		42		0		72		0	0	4
Freshwater Wetlands		Baseline (Q3)	3	0		0		90		0		50		0	0	0
Freshwater Wetlands		2020 (Q3)	4	0		0		100		0		80		0	0	0
Freshwater Wetlands		2021 (Q3)	2	0		0		85		0		5		0	0	0

APPENDIX C: SITE PHOTOS

Plate 1 **Swamp Oak (*Casuarina glauca*) regenerating within the CA.**

APPENDIX D: STAFF CONTRIBUTION

The following staff were involved in the compilation of this report.

Name	Qualification	Title/Experience	Contribution
Ben Stewart	M MSC&Mgmt	Ecologist (Botanist)	Field surveys and report writing
David Martin	MSc	Ecologist (Botanist)	Field surveys
Gayle Joyce	BForestry Mgt (Hons)	GIS Specialist	GIS mapping and figure preparation
Dr. Daniel O'Brien	BEnvSc&Mgmt (Hons), PhD	Senior Ecologist (Zoologist)	Report Review