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Clark's wastewater treatment plant upgrade:

Pre-construction shellfish monitoring 2024/2025

for: Watercare Services Ltd

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Cover Illustration: Farmed oyster site at Karaka Point (K) looking west into the Waiuku estuary (August 2024)

EXECUTIVE SUMMARY

This report documents the results of the first year (June 2024 to June 2025) of pre-construction baseline monitoring for shellfish quality and population dynamics in the Waiuku Estuary. The monitoring establishes a baseline ahead of the planned upgrade to the Clark's Beach wastewater treatment plant, which includes a new outfall scheduled for completion in June 2026. The new outfall will eventually discharge up to 5,000 m^3/day of treated wastewater. The shellfish monitoring is part of the Receiving Environmental Monitoring Programme (REMP), which aims to identify and analyse noticeable patterns over time in water quality, shellfish quality, and marine ecology of the Southern Manukau Harbour in relation to the release of treated wastewater from the Clark's Beach new outfall..

Contaminant Monitoring of Farmed Oysters (August 2024 – May 2025)

Contaminant monitoring involved five sampling events across five sites (Matakawau M, Karaka K, Te Toro boat ramp R, Te Toro Settlement S, and Gordon's Landing G) using farmed Pacific oysters deployed for acclimation. Due to logistical constraints related to tides, laboratory capacity, and weather, the REMP requirement for collecting three wet samples and two dry samples was not met; only one wet sample (March 2025) and one dry sample (August 2024) were secured.

Metal concentrations revealed several elevated baseline levels:

• **Arsenic (Total)** concentrations ranged between 12 and 16 mg/kg dry weight (d.w.) and are comparable to the highest levels detected in the Manukau Harbour. The highest calculated inorganic arsenic concentration (0.2 mg/kg w.w.) was 20% of the 1 mg/kg w.w. guideline.

• **Copper** levels ranged from 200 to 600 mg/kg d.w., with one upstream site (Site G) reaching 944 mg/kg d.w. in May 2025. The highest replicate concentration (78.1 mg/kg w.w.) was higher than the Generally Expected Level (GEL) of 30 mg/kg w.w..

• **Zinc** concentrations were also high (1000 to 2000 mg/kg d.w.), reaching 2900 mg/kg d.w. at Site G in May 2025. However, the highest replicate value (250.7 mg/kg w.w.) was within the expected range compared to the GEL of 290 mg/kg w.w..

• **Lead** concentrations were low, with the highest replicate (0.06 mg/kg w.w.) measuring only 3% of the required Food Standard limit (2 mg/kg w.w.).

Overall, upstream Site G frequently showed the highest concentrations for Copper, Zinc, and Arsenic in later sampling events. All samples were below the regulatory limits for Polycyclic Aromatic Hydrocarbons (PAH4 and Benzo[a]pyrene), adopting European Union reference values in the absence of New Zealand guidelines.

Microbial analysis indicated compliance issues:

• **Faecal Coliforms** exceeded the marginal threshold of 230 MPN/100g in more than two replicates at Site M during the August, October 2024, and January 2025 sampling events, and at Site R in May 2025. High bacteria levels at Site M were significantly higher than other Waiuku estuary sites for several sampling events. The origin of these high bacteria levels remains unknown. No significant negative impact was observed during the single wet weather sampling event in March 2025.

• **Enterovirus** results were below minimum detection levels.

Shellfish Population Monitoring (October 2024 and February 2025)

Population monitoring of wild oysters and cockles was conducted in October 2024 and February 2025.

• **Wild Oysters (*Magallana gigas*):** Mean lengths ranged from 35mm to 51mm in October 2024 and 36mm to 43mm in February 2025. Densities ranged from 3 to 26 oysters/0.25m^2, showing small variation (<10%) between sampling periods, suggesting seasonal stability in population numbers.

• **Wild Cockles (*Austrovenus stutchburyi*):** Mean lengths (10mm to 20mm) were typically below the attractive edible size of 25mm. Densities ranged from 413 to 2251 per m^2 and generally increased between October and February. Observations suggested spatial variation and potential migration within the cockle beds at sites C3, C4, and C5, which requires further monitoring to determine if the shifts are seasonal or permanent.

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1 INTRODUCTION

1.1 Context

Watercare Services Ltd is upgrading the south-west wastewater treatment network to support future population growth in Auckland's south-west region. At Clarks Beach, the wastewater treatment plant will benefit from new technology to improve the quality of treated wastewater leaving the plant *via* a new outfall. The new outfall pipe will extend 100 m into the Waiuku estuary and is scheduled for completion in June 2026.

To comply with Condition 27 of the resource consent granted in 2018, a Receiving Environmental Monitoring Programme (REMP) was implemented to identify and analyse noticeable patterns over time in water quality, shellfish quality, and marine ecology of the Southern Manukau Harbour (Figure 1.1) in relation to the release of treated wastewater from the Clark's Beach new outfall. Environmental monitoring was scheduled to begin two years prior to the completion of the new outfall, *i.e.* in June 2024, to provide a baseline before the release of treated wastewater via the new outfall. The current volume of treated wastewater discharged from the Clark's beach plant is ~250 m^3/day, while that from the Waiuku plant is ~1,150 m^3/day. The discharge volume of treated wastewater via the new outfall will gradually increase in line with population growth, reaching a maximum of 5,000m^3/day.

A REMP was finalised in June 2024 (Watercare 2024). Bioresearches has been tasked with completing the contaminant monitoring of shellfish, and population monitoring of oysters (*Magallana gigas*, previously *Crassostrea gigas*) and cockles (*Austrovenus stutchburyi*).

This report presents the results from the first year of the baseline monitoring (June 2024 to June 2025).

1.2 Waiuku estuary catchment and pollution sources

The Waiuku estuary extends approximately 11km from its mouth at Clarks Beach upstream to the town of Waiuku. The catchment of the Waiuku estuary is predominantly rural, with dairy and dry stock farming as the main land uses (Mills 2014, Hart *et al.* 2025). During rainfall events, agricultural runoff is a significant contributor of diffuse sediment and nutrients into the estuary. Increased mud content in the sediment is impacting benthic ecosystem health (Bioresearches 2025a). A small but growing proportion of the catchment is urban with small townships such as Waiuku, Glenbrook and Clark's Beach. There are two wastewater treatment plants discharging treated effluent into the estuary: Waiuku, and Clark's Beach. The effluents introduce nutrients, suspended sediments and potential pathogens to the estuary. The New Zealand Steel mill at Glenbrook on the eastern side is one of the largest industrial sites in the Auckland region. It was identified as a source of zinc and copper in the environment (Bioresearches 2025a).

1.3 Previous records of oyster quality in the Waiuku estuary

Pacific oysters in the Waiuku estuary are being monitored as part of the consent conditions for the operations of the Waiuku wastewater treatment plant, and the New Zealand Steel plant at Glenbrook. At a larger scale, the Manukau Harbour benefits from regular monitoring run by the Auckland Council under the Shellfish Contaminant Monitoring Programme.

For the Waiuku wastewater treatment plant, bacteria levels in oysters are monitored annually in February at five sites, located upstream from the Clark's outfall monitoring sites, except for OYSE (Bioresearches

2025b). OYSE matches the Gordons site (Gordon's Landing) in the present study. Faecal coliforms were very low at a median of 20 mpn/100g during the past two surveys (Feb 2024 and 2025) when no rain had occurred in the week prior to sampling. Before 2024, the oyster sampling was conducted after significant rain events (>20 mm rain in the week prior to sampling), and high faecal coliform concentrations were detected in oyster flesh at OYSE site (MPN > 300/100g). It was concluded that rainfall significantly affects water quality in the Waiuku catchment, which is predominantly farmland. Farmed animals are a significant source of faecal coliforms which get transported into the Waiuku estuary via runoff. Elevated nutrient levels were highlighted during the monitoring programme of the Manukau estuary run by the Auckland Council, which regularly monitors water quality in the upper Waiuku estuary and at Clark's beach (Kelly and Kamke 2023).

For the New Zealand Steel plant, oysters are sampled annually for metal analysis from sites in the receiving environment of the plant outfalls, and from a control site in the Taihiki river, which joins the Waiuku estuary further North. Copper and zinc in oyster flesh are markedly higher than in the Taihiki river, especially for zinc. It was concluded the NZ Steel discharge is the source of these contaminants in the receiving environment near the outfalls (Bioresearches 2025a). The metal results from the Taihiki river site is used as a comparative reference for the present study's results. During the past five years, the copper concentrations in oysters ranged from 177 to 313 mg/kg dry weight, while the zinc concentrations ranged from 1683 to 2150 mg/kg dry weight.

The shellfish Contaminant Monitoring Programme run by the Auckland Council has no regular oyster monitoring sites in the Waiuku estuary (Stewart *et al.* 2013). The closest sites are Cornwallis and Mill Bay on the northern side of the Manukau Harbour entrance, south of the Waitakere Ranges. These sites are considered control points for contaminants as direct human activities are minimal, with only light urbanisation and surroundings catchments dominated by native forest. Copper, lead, and zinc concentrations in oyster flesh were the lowest among Manukau monitoring sites (median values between 2009 and 2011 were 110, 0.2, 1500 mg/kg dry weight respectively at Cornwallis as per Auckland Council's most recent published report; Stewart *et al.* 2013). Arsenic, however, showed a high median concentration in oysters (13.0 mg/kg), which could be related to historical sediment contamination from timber treatment activities in the Waitakere Ranges. PAH showed a similar profile to lead in the Manukau Harbour. Their concentrations at Cornwallis were low (17 µg/kg dry weight).

Figure 1.1 ***Waiuku Estuary in relation to the Manukau Harbour. The star marks the position of the Clark's new outfall***

2 CONTAMINANT MONITORING OF OYSTERS

2.1 Methodology

As outlined by the REMP, contaminant monitoring was conducted at five locations within the Waiuku Estuary. These sites were identified as Matakawau Headland (M), Karaka Point (K), Te Toro Boat Ramp (R), Te Toro Road Settlement (S), and Gordons Landing (G)(Figure 2.1). This allows for samples taken near the discharge location (Sites K and R) as well as locations further away from the discharge point (Sites M, S, and G). The GPS coordinates of the sites are shown in

At these five sites, bags of farmed Pacific oysters from the Mahurangi oyster farm were deployed the 18th of July 2024 to sustain the sampling regime of the monitoring plan and limit the impact on wild oyster populations. These bags of oysters were replenished after each sampling event. After a minimum of a month of acclimation to the new environment, the farmed oysters were able to be collected for contaminant testing.

Figure 2.1 *Map showing the Farmed Oyster sites. The star marks the position of the Clark's new outfall*

Figure 2.2 Example of oyster bags installed on the reef. Here at Te Toro Road Settlement

The REMP states that monitoring of contaminants will be carried out over the two years prior to the commencement of discharge from the outfall. Sampling was to be undertaken a minimum of 5 times throughout the first year of monitoring, with at least two months between sampling events to allow for seasonal monitoring. Weather event related sampling should also be conducted in addition to the seasonal sampling but may also be represented by the seasonal sampling if it meets the weather event sampling conditions.

If feasible during this first year of monitoring (2024/2025), two samples should be collected after 2 weeks of dry weather where the average rainfall/day is <5mm and three samples should be collected after significant rainfall where there has been >15mm of rain in the preceding 24 hours. Rainfall was determined using data from Auckland Council, specifically looking at the 4 sites Awhitu @ Brook Road (741611), Waitangi @ Diver Road (742736), Waiuku @ Cosmopolitan Club (742740), and Waiuku Rain @ Waiuku-Otaua Road (742739)(Appendix 1).

2.1.1 Condition Index of Oysters

Condition Index was determined using the oyster tissue from metal and PAH analyses. The REMP specifies a size range of 60 to 70 mm. However, the size of oysters was sometimes smaller than 60 mm due to the stock availability from the oyster farm. Ten samples (five from metals and five from PAH) of six oysters were collected from each site. Upon return to the laboratory, the oysters were thoroughly cleaned by scrubbing the shells and removing any major fouling organisms. Any broken or damaged shellfish were discarded. The total volume of each replicate was then measured, and the oysters were frozen in separate plastic containers for later processing. The oysters were then thawed and shucked into a pre-weighed clean plastic vial. While thawing, the oysters were placed cupped side facing up to minimise the loss of fluid. The total tissue sample per replicate was then weighed to obtain a wet weight. The total volume of

the empty shells was also measured. Tissue samples were re-frozen as soon as possible after shucking. Frozen tissue samples were delivered to Watercare Laboratory Services to determine a dry weight.

The Condition Index (an indicator of how well an oyster has utilised the internal shell volume available for tissue growth) was calculated as follows:

$$Conditon\ Index = \frac{Dry\ Weight * 100}{Internal\ shell\ volume}$$

2.1.2 Metal Concentrations in Oysters

Five samples of six oysters were collected per site for metals analysis and processed for condition index (see above). Frozen tissue samples were then delivered to the Watercare Laboratory Services for metal analysis. Concentrations of arsenic, copper, lead, and zinc were tested to total recoverable trace levels dry weights with the additional percentage moisture measured, so that wet weight can be calculated. The laboratory analysis followed the standardised analytical procedure APHA 3125 B with digestion of shellfish tissue in strong acid, then the determination of metal concentrations using Inductively Coupled Plasma Mass Spectrometry (ICP-MS) (APHA 2017).

2.1.3 Polycyclic Aromatic Hydrocarbons in Oysters

Five samples of six oysters were collected per site for Polycyclic Aromatic Hydrocarbon (PAH) analysis and processed for condition index (see above). Frozen tissue samples were then delivered to the Watercare Laboratory Services for PAH analysis. There is no analytical standard for PAHs in New Zealand (refer to Watercare Laboratory Services Certificates of Analysis). PAHs in oysters were extracted with organic solvents, then detected and quantified *via* Gas Chromatography coupled with Mass Spectrometry (GC-MS).

2.1.4 Microbial Contaminants in Oysters

Five samples of twelve oysters were collected per site for Enterococci and Faecal Coliform analysis. The oysters were shucked using sterile equipment and the tissue was placed in sterile plastic vials. The equipment was sterilised between sites. Tissue samples were placed in the fridge until they were delivered to the Watercare Laboratory within 4 hours of being opened in the case of bacteria and within 24 hours of being open in the case of virus.

2.1.5 Statistical procedures

Contaminant data were summarised using the arithmetic mean and 95% confidence intervals, or the median and quartiles in tables and figures. The use of the mean or median depended on the distribution characteristics of the data. Normality was assessed with a Shapiro-wilk test. Most metal and PAH concentrations from each sampling event followed a normal distribution and were summarised by the mean and 95% confidence intervals. Bacteria and virus data did not follow a normal distribution and were instead summarised by a median and quartiles. For univariate comparison between sites, ANOVA was performed on metal and PAH concentrations after checking for the homogeneity of variance (Levene tests). Post-hoc Tukey's test was used for multiple comparison. The Kruskal-Wallis test was performed on bacteria and

virus data, with a Dunn post-hoc test for multiple comparisons (p-values adjusted with the Benjamini-Hochberg method). The significance level (alpha) was set at 0.05.

A multivariate approach was explored by assessing all contaminants simultaneously for each site, as well as variability between sampling events using PRIMER7 (Primer-e, Quest Research ltd). A metric MDS (multi-dimensional scaling) was applied to a resemblance matrix generated using Euclidian distances. Contaminant variables (As, Cu, Pb, Zn, PAH, Enterococci and Faecal coliforms) were normalised beforehand to have them on a common scale (the mean is subtracted from each metal value, and the result is divided by the standard deviation).

2.1.6 Food standards

2.1.6.1 Metal Contaminants in shellfish

New Zealand ensures shellfish safety through regulatory limits on metal contaminants, using Maximum Levels (MLs), Generally Expected Levels (GELs), and internationally aligned standards. MLs, set under the Australia New Zealand Food Standards Code (ANZFA 2001), are legally enforceable limits that define the maximum allowable concentrations of certain metal contaminants in food. During a scientific, risk-based review of legacy standards, many older MLs were found not justified on public health grounds and were removed. To address the resulting information gap, GELs were introduced. GELs are non-enforceable guidance values that represent the typical contaminant levels found in food. All contaminant limits are expressed on a wet weight basis (i.e. the food as eaten). The wet weight for the replicate with the highest contaminant concentration was calculated using the percentage moisture associated with that replicate (Appendix 2).

The summary of current regulations for metal contaminants in shellfish across the regulatory frameworks is presented in Table 2.1.

Table 2.1 New Zealand and International Food Standards for Metals in Shellfish (mg/kg w. w.)

Chemical / Compound	ANZFA		
	Standard	GEL[2]	GEL[2]
	1.4.1[1]	(median)	(90 percentile)
Arsenic (inorganic)*	1	-	-
Copper	-	5	30
Lead	2	-	-
Zinc	-	130	290

* Inorganic arsenic is conservatively estimated to be 10% of the total arsenic (USFDA 1993).

2.1.6.2 Polycyclic Aromatic Hydrocarbon Contaminants in shellfish

New Zealand currently does not have specific regulatory guidelines for PAH concentrations in shellfish. In the absence of national limits, reference values will be adopted from the European Union Regulation No. 835/2011 (European Commission 2011), which established a limit in shellfish of 2µg/kg wet weight for benzo{a}pyrene (BaP) and 30 µg/kg wet weight for the sum of four key carcinogenic PAHs (benzo[a]pyrene, chrysene, benzo[a]anthracene, and benzo[b]fluoranthene) collectively referred to as PAH4.

The laboratory results for this study report benzo[b]fluoranthene and benzo[k]fluoranthene as a combined result of benzo[f+k]fluoranthene. To estimate the concentration of benzo[b]fluoranthene for the PAH4 calculation, benzo[b]fluoranthene is assumed to be 70% of the combined benzo[b+k]fluoranthene value (FSANZ 2014).

Many of the PAHs returned concentrations below the minimum detection level. For the purposes of this study, these values have been considered as zero. Additionally, because the laboratory results are reported on a dry weight basis, a moisture content of 85% has been assumed to convert results to a wet weight basis for comparison with regulatory limits. This moisture value is a conservative estimate based on the moisture content calculated from the replicate samples used for metal contaminant analysis.

2.1.6.3 Microbial Contaminants in Shellfish

The Ministry of Health (1995) established criteria for faecal coliform bacteria in untreated shellfish. These guidelines require five samples, each comprising of no less than twelve oysters. Of these replicates, no more than two samples should exceed the marginal threshold of 230 MPN/100g and none may exceed the maximum limit of 330 MPN/100g.

There are currently no standards or regulations in New Zealand or Internationally that regulate the acceptable level of enterococci and enterovirus in shellfish flesh. Positive findings of virus in shellfish typically result in area closures rather than compliance-based regulatory decisions.

2.2 Results and Discussion

The results presented below correspond to the first year of baseline monitoring of the South West Clark's WWTP upgrade project.

2.2.1 Sampling and limitations

The REMP described the conditions for sampling oysters in the Waiuku estuary. The protocol aims to detect:

1) any seasonal variation with sampling events spaced through the year,
2) weather effects with an attempt to match sampling with dry or wet weather conditions,

on contaminant concentrations in the environment using oysters as bioindicators.

During the year 2024/2025, farmed oysters placed at sites M, K, R, S, and G for at least a month were collected in August 2024, October 2024, January 2025, March 2025 and May 2025 (Table 2.2).

Table 2.2 Characteristics of the sampling events 2024/2025

Sampling event	Days oysters are in the Waiuku estuary	Amount of rain within 2 weeks before	Amount of rain within the last 48h	Type of event	Notes
15/08/2024	28 days	5 mm	0 mm	Dry	
30/10/2024	103 days except for M 76 days	16 mm	5 mm	Dry -	Oysters stolen at M (only 30 left)
22/01/2025	84 days	8 mm	8 mm	Dry -	Oysters stolen at K & R (replaced 5/02)
6/03/2025	43 days for M, S and G. 30 days for K and R	23.5 mm	17 mm	Wet	
20/05/2025	76 days except for R 106 days	39.5 mm	6 mm	Dry -	Oysters stolen at K (1 bag)

The requirement to collect at least three wet samples and two dry samples could not be met due to practical constraints organising fieldwork (see Appendix 1 Table A1.4). The first constraint was the tide, as sampling required a low tide during daytime hours (between 10am and 4.30pm). The second constraint was the limited capacity of Watercare laboratory during weekends and public holidays, which has reduced staffing. Consequently, samples could not be collected towards the end of the week (from Thursday onwards) because there was insufficient laboratory staff to process the 25 bacteria samples immediately. Once these two constraints were addressed, the weather forecast was monitored to attempt sampling under "wet" conditions. Only one sampling event, in March 2025, matched a significant rainfall (>15mm/day). The "dry" conditions of <5mm during the two weeks prior to sampling were met only once, in August 2024. The other events were labelled "Dry – ", meaning no significant rainfall during the two days before sampling but >5mm during the two weeks before sampling.

In addition to the fieldwork challenges presented above, bags of farmed oysters were stolen on several occasions, resulting in the loss of samples. The repeated theft of oysters at the Karaka site led to the relocation of the site to a more difficult-to-access location.

2.2.2 Condition of Oysters

The mean condition index based on dry weight is presented in Figure 2.3 and the raw data are presented in Appendix 2 Tables A2.5 to A2.9.

The condition Index is an indicator of how well an oyster has utilised the internal volume available for tissue and shell growth. Condition of farmed oysters is known to fluctuate seasonally due to the cycles of tissue growth and reproduction, with higher values in winter and spring, and lower values in summer and autumn. This trend was observed during the first year of monitoring, with condition indices ranging from 5 to 8 in August and October 2024, and from 4 to 6 in January, March and May 2025 (Figure 2.3).

During each sampling event, there was significant variation in the condition indices, with a similar trend between sites: sites closer to the estuary mouth (Sites M and K) typically had a higher condition index than sites further upstream (Site G). Since the condition index is influenced by long-term environmental conditions such as food availability and sediment load in the water column, it is not expected to be affected by

short-term rainfall events, as they occur over a relatively short period of time. The lower condition indices at G could be attributed to the high sediment layer at the site situated along the mangroves fringe.

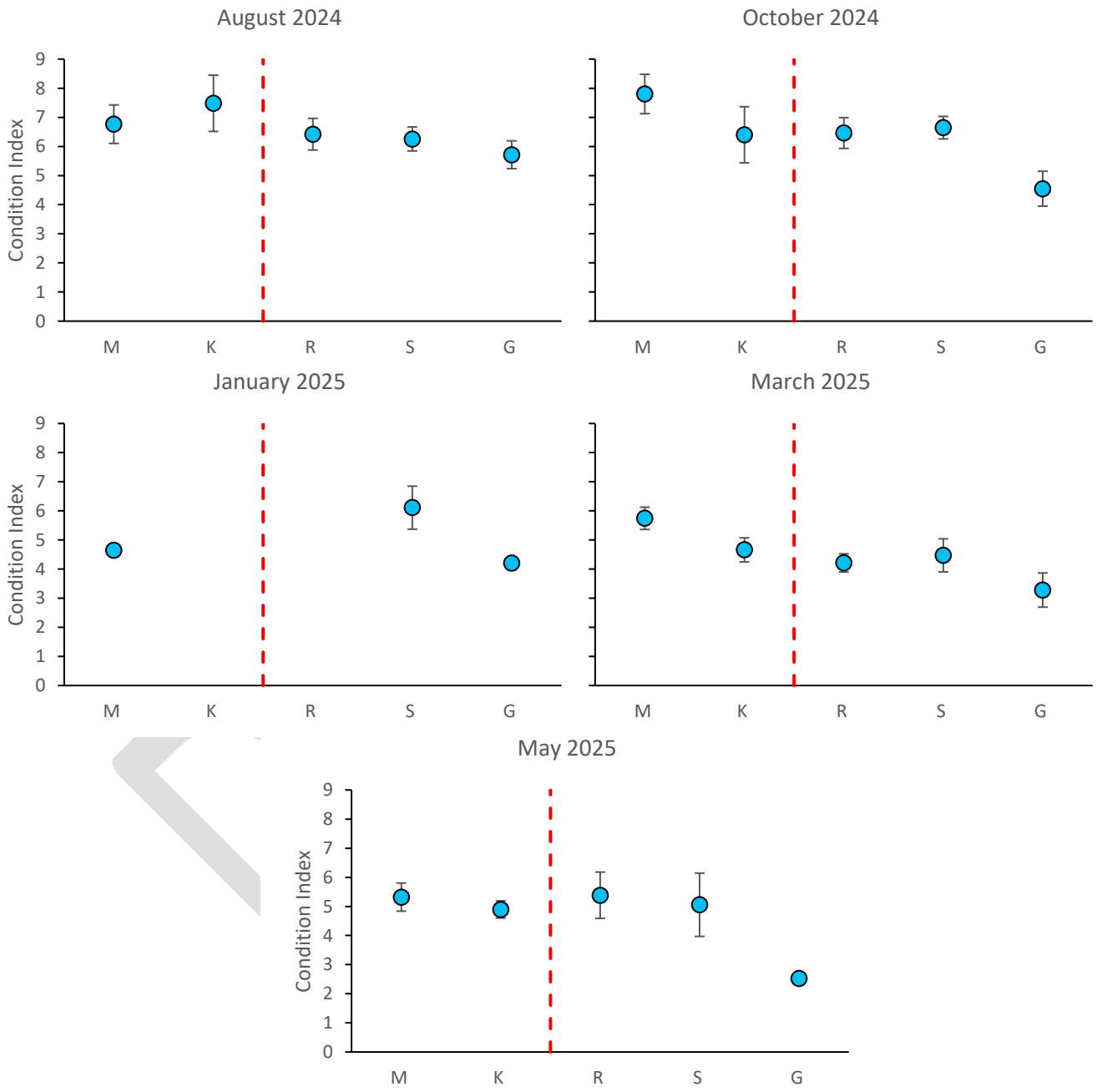

Figure 2.3 ***Mean ± 95% CI Condition Index in Farmed Oysters from August 2024 to May 2025. Outfall indicated by ---.***

2.2.3 Metal Contaminants in Oysters

2.2.3.1 Arsenic in oysters

The concentration of Total Arsenic was analysed from five replicates from each of the five sites, across five sampling events. The results are presented in Appendix 3 Tables A3.10 to A3.14.

The mean concentrations of arsenic in the farmed oysters were consistent across sampling events with values ranging from 12 to 14 mg/kg (d.w.), except for May 2025, which showed slightly higher values ranging from 14 to 16 mg/kg (d.w.) (Figure 2.4). ANOVA tests revealed significant variation between sites G or S and M in August and October 2024 with site M having higher arsenic values. In May 2025, the trend differed with site G showing the highest arsenic concentrations.

The only sampling undertaken under wet conditions (rainfall in the preceding 24 hours <15mm) occurred in March, and there did not appear to be any significant impact on arsenic concentration in the farmed oysters. The arsenic concentrations are at the highest levels detected in oysters in the Manukau Harbour by the Auckland Council monitoring programme (Stewart *et al.* 2013). These values might be related to historical sediment contamination from timber treatment activities in the region.

There are currently no food standards concerning Total arsenic, however the guidelines for Inorganic Arsenic state that it should not exceed 1 mg/kg (w.w.). Inorganic arsenic, if not directly tested for, is conservatively estimated to be 10% of the total Arsenic in shellfish (USFDA 1993). Across all the sampling events, the replicate with the highest concentration of arsenic was at Site S in January 2025, with an inorganic arsenic concentration of 0.2mg/kg wet weight. It is 20% of the guideline (Table 2.3).

Table 2.3 Comparison of Food Standards with the highest replicates from August 2024 to May 2025

Contaminant	Standard/Guideline (mg/kg w.w.)	Highest value in study (mg/kg w.w.)
Arsenic (Inorganic)	1	0.2
Copper	30	78.1
Lead	2	0.06
Zinc	290	250.7

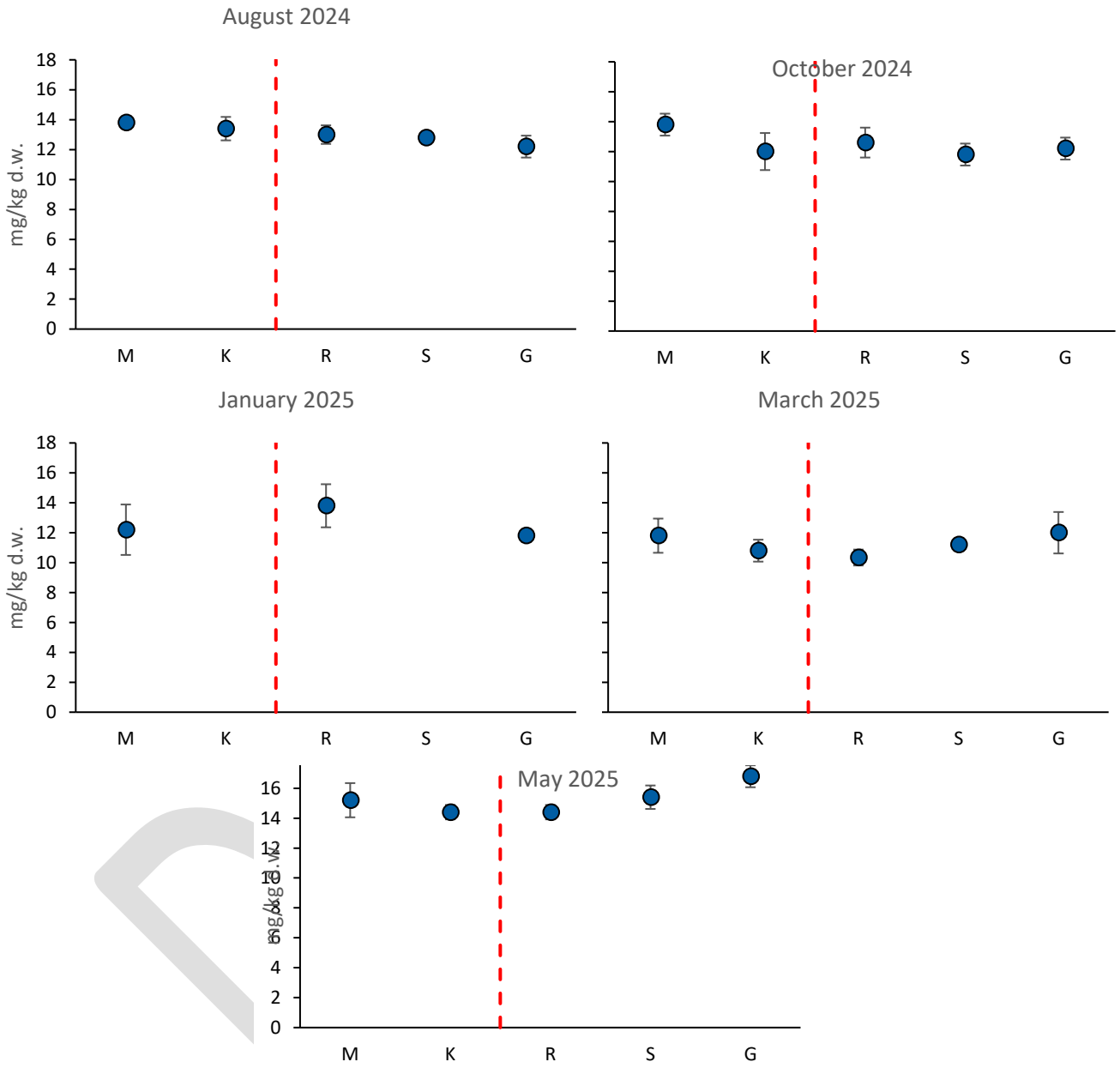

Figure 2.4 ***Mean ± 95% CI Total Arsenic concentration in Farmed Oysters between August 2024 and May 2025 (mg/kg dry weight). Position of proposed outfall relative to monitoring sites is illustrated with the dashed line ---.***

2.2.3.2 Copper in oysters

The concentration of copper was analysed from five replicates from each of the five sites, across five sampling events. The results are presented in Figure 2.5 and the raw data are presented in Appendix 3 Tables A3.10 to A3.14.

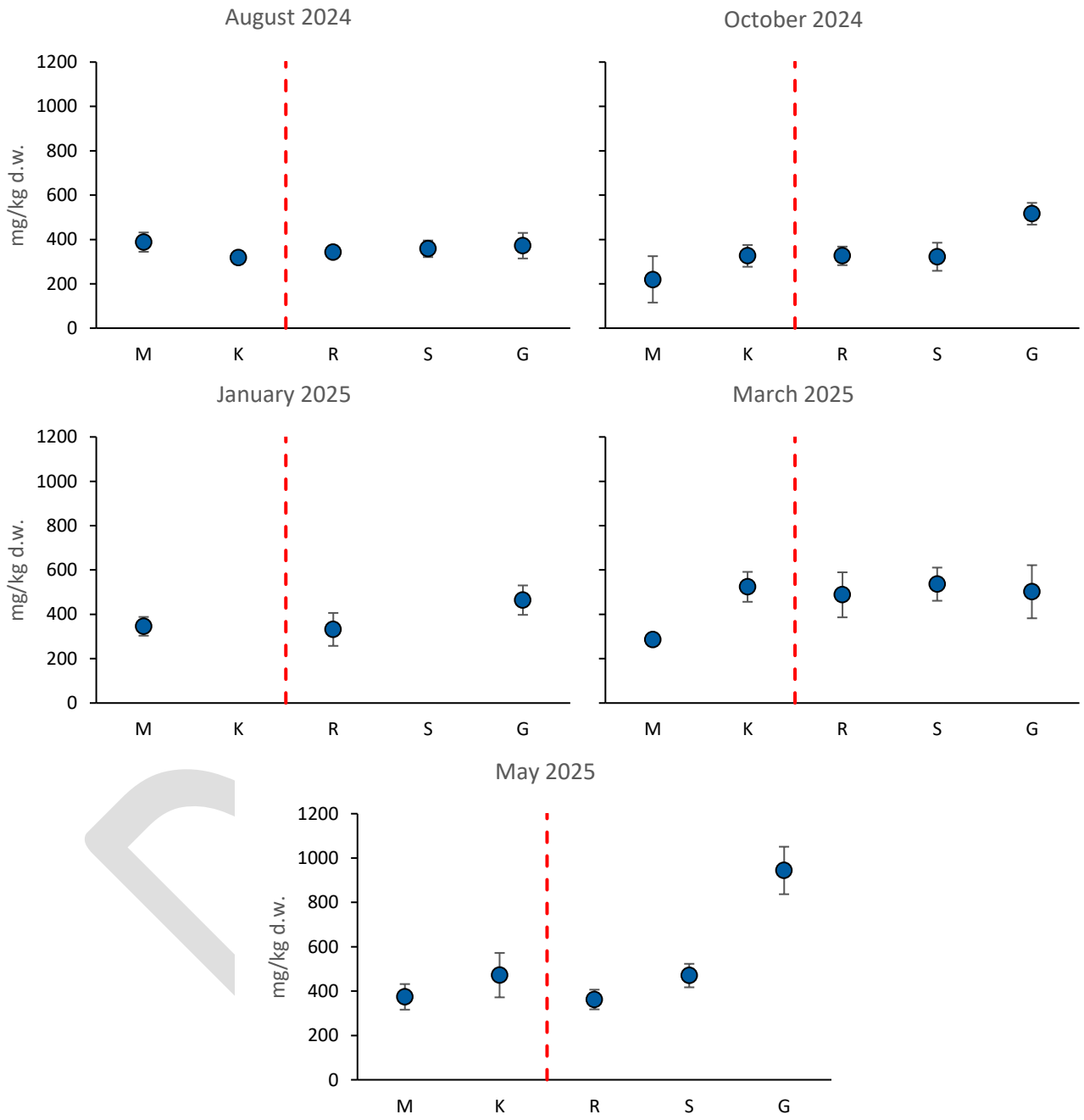

Figure 2.5 ***Mean ± 95% CI Copper concentration in Farmed Oysters between August 2024 and May 2025 (mg/kg dry weight). Position of proposed outfall relative to monitoring sites is illustrated with the dashed line ---.***

The mean concentrations of copper in the farmed oysters were consistent across sampling events with values ranging from 200 to 600 mg/kg d.w, except for site G in May 2025, which showed much higher values at 944 mg/kg d.w (Figure 2.5). ANOVA tests revealed significant variation between sites G and M in October 2024, March 2025 and May 2025 with site M having lower copper values.

The only sampling undertaken under wet conditions (rainfall in the preceding 24 hours <15mm) occurred in March, and there did not appear to be any significant impact on copper concentration in the farmed oysters. The copper concentrations found during the first year of monitoring showed higher values than those found in front of the New Zealand Steel outfalls (Bioresearches 2025a). Further sampling may clarify the origin of elevated copper values.

There are currently no limits concerning copper concentration in shellfish, however the GELs established by ANZFA have found a 90th percentile value of 30 mg/kg (w.w.). The highest replicate found during sampling had a value of 78.1 mg/kg (w.w.) (Table 2.3). This indicates that baseline levels can reach higher than generally expected, however, most replicates had values similar to the GELs.

2.2.3.3 Lead in oysters

The concentration of lead was analysed from five replicates from each of the five sites, across five sampling events. The results are presented in Figure 2.6 and the raw data are presented in Appendix 3 Tables A3.10 to A3.14.

The mean concentrations of lead in the farmed oysters were consistent across sampling events with values ranging from 0.2 to 0.4 mg/kg (d.w.), except for site K in August 2024, which showed a significantly higher value of 0.45 mg/kg (d.w.) (Figure 2.6). ANOVA tests revealed significant variation between sites K and the other sites in August and October 2024, with site K having higher lead values. During the Autumn sampling events, lead in oysters were significantly lower at site R.

The only sampling undertaken under wet conditions (rainfall in the preceding 24 hours <15mm) occurred in March, and there did not appear to be any significant impact on lead concentration in the farmed oysters.

The Food Standards require shellfish to contain less than 2mg/kg (w.w.) of lead. The highest concentration found was 0.06 mg/kg (w.w.), which is 3% of the standard (Table 2.4).

2.2.3.4 Zinc in oysters

The concentration of zinc was analysed from five replicates from each of the five sites, across five sampling events. The results are presented in Figure 2.7 and the raw data are presented in Appendix 3 Tables A3.10 to A3.14.

The mean concentrations of zinc in the farmed oysters were consistent across sampling events with values ranging from 1000 to 2000 mg/kg (d.w.), except for site G in March and May 2025, which showed significantly higher values at 2300 and 2900 mg/kg (d.w.) respectively (Figure 2.7). ANOVA tests revealed no significant variation between sites during the first three sampling events.

The only sampling undertaken under wet conditions (rainfall in the preceding 24 hours <15mm) occurred in March, and there did not appear to be any significant impact on zinc concentration in the farmed oysters. The zinc concentrations found during the first year of monitoring showed similar values to that found in front of the New Zealand Steel outfalls (Bioresearches 2025a).

There are currently no limits concerning zinc concentration in shellfish, however the GELs established by ANZFA have found a 90th percentile value of 290 mg/kg (w.w.). The highest replicate found during sampling had a value of 250.7 mg/kg (w.w.) which is within the expected range (Table 2.3).

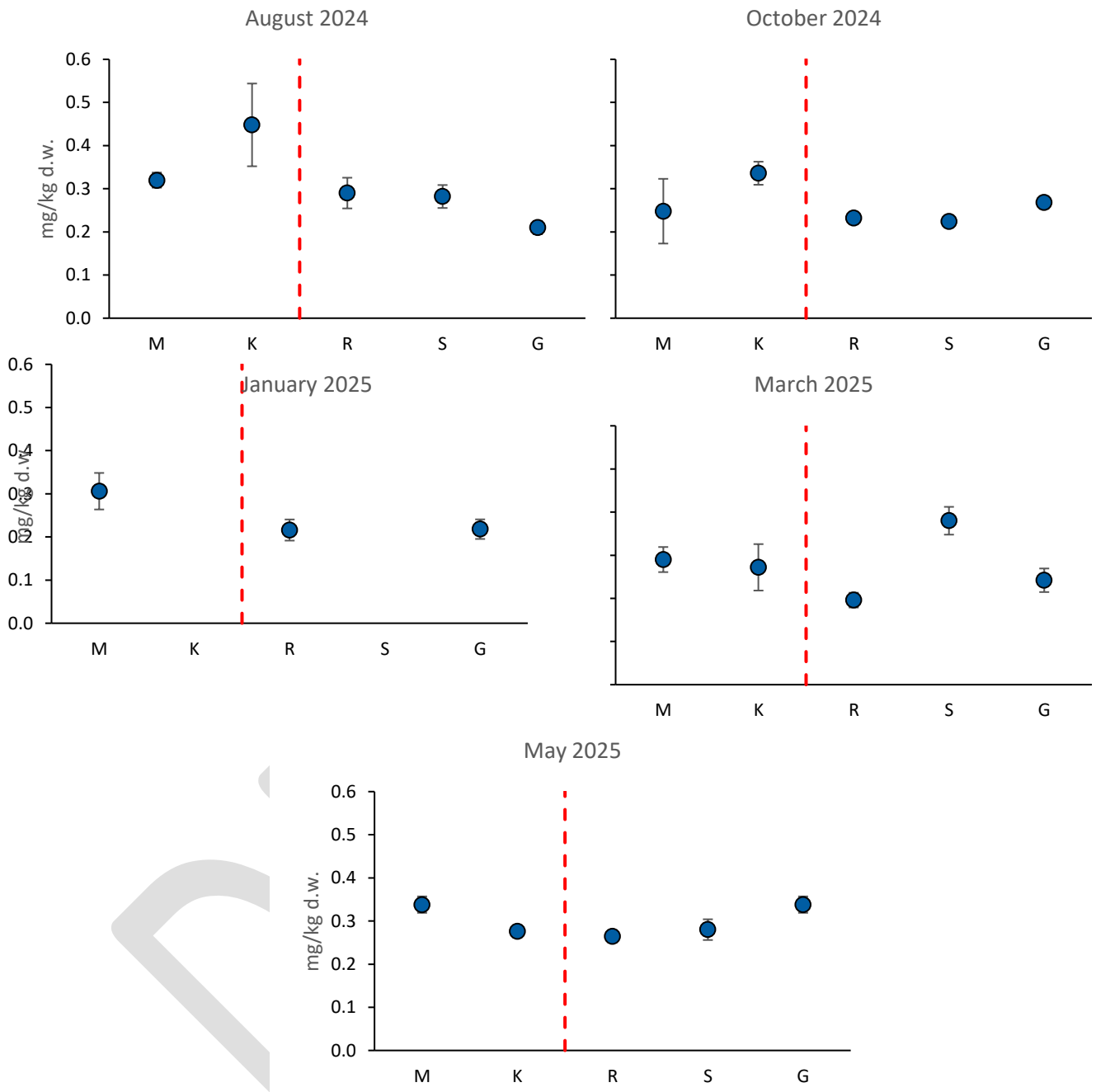

Figure 2.6 ***Mean ± 95% CI Lead concentration in Farmed Oysters between August 2024 and May 2025 (mg/kg dry weight). Position of proposed outfall relative to monitoring sites is illustrated with the dashed line ---.***

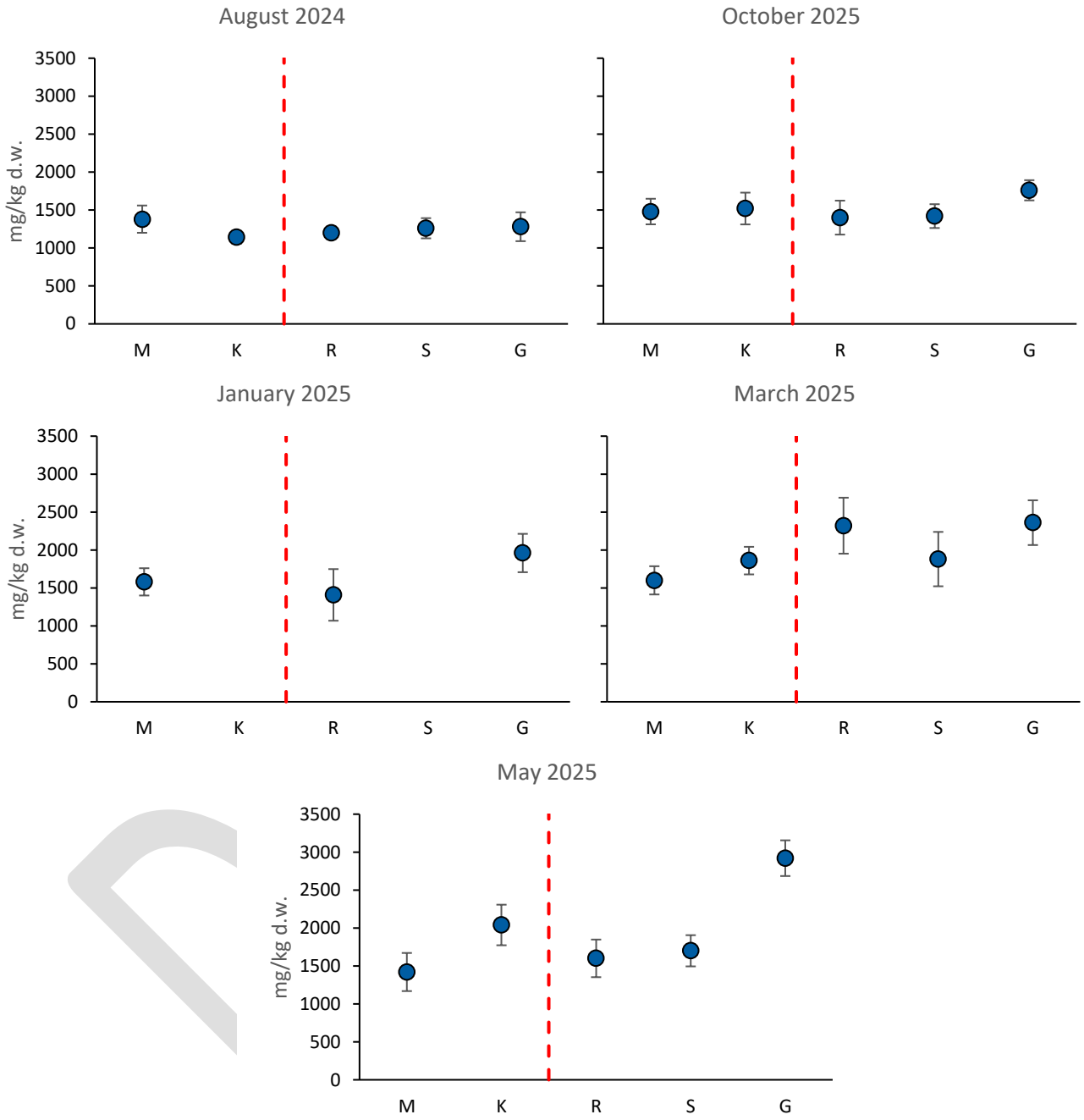

Figure 2.7 ***Mean ± 95% CI Zinc concentration in Farmed Oysters between August 2024 and May 2025 (mg/kg dry weight). Position of proposed outfall relative to monitoring sites is illustrated with the dashed line ---.***

2.2.4 Polycyclic Aromatic Hydrocarbon contaminants in oysters

The results of for PAH4 and BaP concentrations are presented in Figure 2.8 and raw data are presented in Appendix 3 Tables A3.15 to A3.19. Any results that were below the detection limit were considered to have a value for zero.

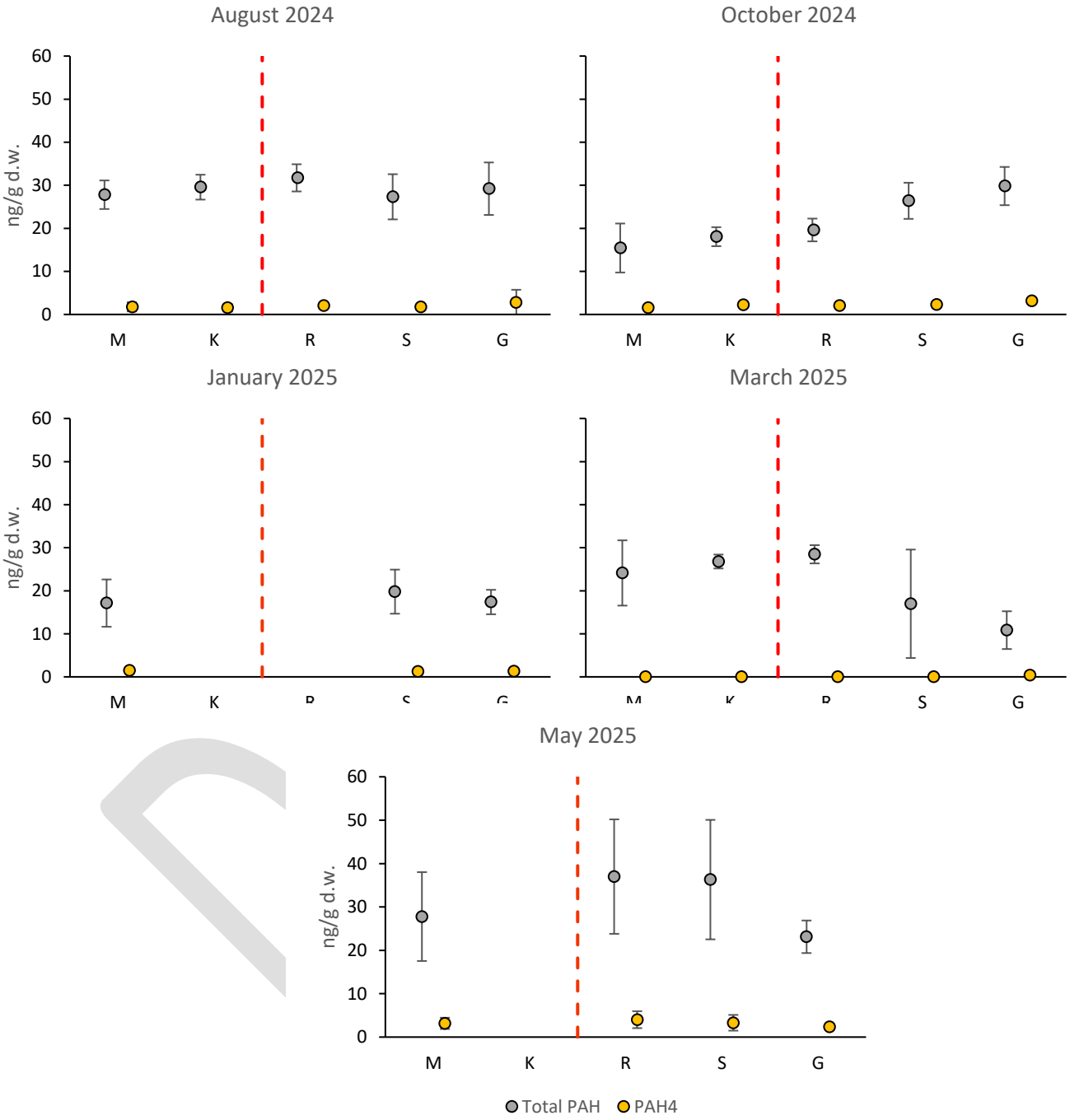

Figure 2.8 Differences in PAH contamination across the five sites over the five sampling events.

The mean concentrations of Total PAH in the farmed oysters were consistent across sampling events with values ranging from 10 to 30 ng/kg (d.w.), except in May 2025, which showed higher mean values at site R and S with high variation between replicates (Figure 2.8). ANOVA tests revealed significant variation between site G and sites M, K and R in October 2024 and in March 2025, but with opposite trends. In October

2024, site G showed the highest PAH values, while in March 2025, site G showed the lowest values in oyster flesh.

Due to the nature of shellfish flesh as a testing media, some replicates may need more dilution to reduce the interference during analysis. This resulted in the August replicates having higher detection limits than later sampling events and therefore gave a result of <2.0 ng/g for BaP. The technique for cleaning up the replicates for analysis has improved over the first year of baseline sampling and therefore replicates at the end of the sampling may have lower detection limits than earlier sampling events.

All of the replicates are below the regulatory limit for PAH4 and BaP (Table 2.4). The highest mean PAH4 was recorded at Site R in May with a value of 8.52 ng/g (d.w.), which when converted to wet weight using an estimated moisture content of 85%, is 1.28 ng/g (w.w.) or 4.27% of the regulatory limit of 30ng/g. The highest level of BaP detected was found in a replicate from Site R during the May sampling. When converted to wet weight, this replicate had a value of 0.285 ng/g (w.w.), 14.25% of the regulatory limit of 2 ng/g.

Table 2.4 Comparison of regulatory limits with the highest replicates from August 2024 to May 2025

Contaminant	Standard	ML (µg/kg w.w.)	Highest Replicate (ng/g w.w.)
PAH4	EU No. 835/2011	30	1.28
Benzo[a]pyrene	EU No. 835/2011	2	0.285

2.2.5 Microbial contaminants in oysters

2.2.5.1 Bacteria in Oysters

The results of faecal coliforms and Enterococci in the farmed oysters are presented in Figure 2.9 and the raw data are presented in Appendix 3 Table A3.20 and A3.21.

The faecal coliforms and enterococci concentrations at Site M were significantly higher than at other sites in October 2024 and January 2025 (Figure 2.9). Moreover, faecal coliforms at site M were higher than at other Waiuku estuary sites in August 2024 (Kruskall-Wallis tests). There was however no statistical difference detected between sites in March and May 2025. During the wet event sampling in March 2025, no significant impact was observed as the results were within a similar range to dry sampling events.

The standards for faecal coliforms in shellfish require no more than two replicates out of five to exceed 230 MPN/100g and no replicates to exceed 330 MPN/100g. As presented in Table A3.20, Site M exceeded the standard during August 2024, October 2024, and January 2025 sampling events, and Site R exceeded the standard in May 2025. No replicates in March 2025 when rainfall in the preceding 24-hours exceeded 15mm, tested above the 230 MPN/100g guideline, suggesting that recent rainfall had no negative impact on faecal coliform contamination during this sampling. The origin of the high bacteria levels in oyster tissue remains unknown.

2.2.5.2 Virus in Oysters

All results were below the minimum detection levels and therefore no trends can be determined.

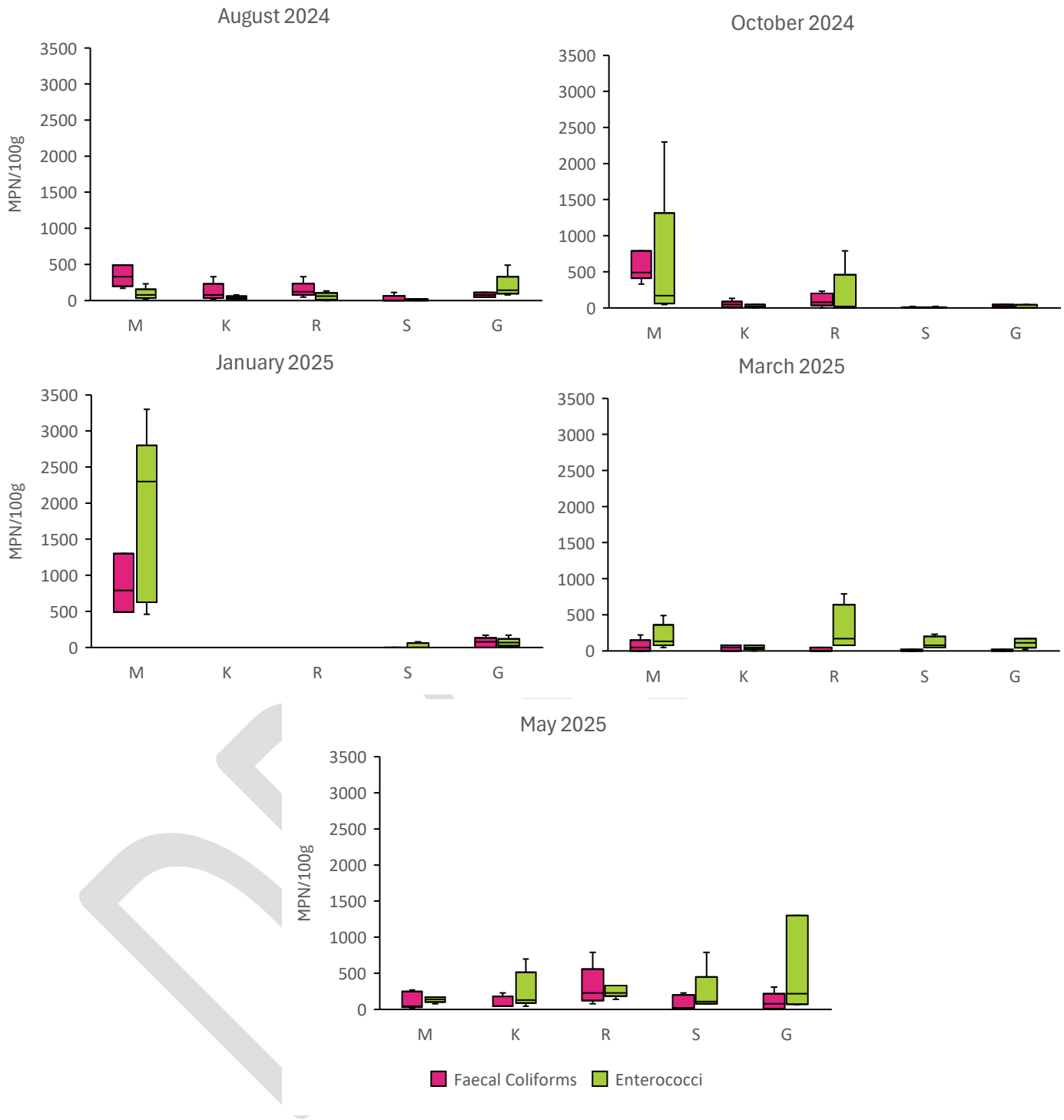

Figure 2.9 ***Boxplot showing the concentration of faecal coliforms and enterococci in farmed oysters from August 2024 to May 2025.***

3 SHELLFISH POPULATION MONITORING

3.1 Oyster Abundance and Size

3.1.1 Methodology

The REMP specifies that the wild oyster populations are to be monitored at five sites (Figure 3.1). These sites will be monitored every six months in February and August, starting two years prior to discharge. Due to an initial attempt to match time periods between shellfish population monitoring and benthic biota monitoring, the first sampling in 2024 was undertaken in October[1].

Shellfish stations have been permanently marked with pegs. Each sample station consists of an area measuring 50 m long by 3m wide, parallel to the low or high tide mark.

Thirty 0.25 m^2 quadrats were located in the sampling area using random numbers to generate X and Y co-ordinates. A minimum of one hundred oysters (*Magallana gigas*) per station were measured in the field and the individuals returned to the sample quadrat. All oysters were measured in the initial quadrat and the measurement of oysters in the entire quadrat was repeated until at least 100 individuals were measured. The 30 density quadrats were also counted in the field with as little disturbance as possible. In the instance where there were less tha n100 oysters in the 30 random quadrats, additional random quadrats were assessed to ensure that at least 100 oysters were measured at each site.

It is important to note that C3Oys has been renamed from C3 to differentiate it from the cockle population monitoring site C3.

[1] The monitoring in 2025 will be in August 2025, and not October 2025, following a discussion with Watercare Services highlighting the importance of more demarked seasons (winter and summer sampling, instead of spring and summer sampling)

Figure 3.1 Monitoring sites for wild oyster populations and wild cockle populations.

3.1.2 Results and Discussion

Table 3.1 presents the length and abundance data of wild oysters at each site over the two sampling periods. Oyster size/frequency data are presented in Appendix 4 Tables A4.1 and A4.2.

Table 3.1 Summary of length and abundance of Pacific Oyster (Magallana gigas) in October 2024 and February 2025.

Station	Date	Size (mm)			Density (0.25m²)		
		n	mean	95% CL	n	mean	95% CL
K1	Oct-24	121	37.3	2.0	31	3.9	2.5
	Feb-25	104	36.5	2.0	31	3.4	3.2
K2	Oct-24	158	34.9	1.9	30	22.9	9.2
	Feb-25	105	37.9	1.8	30	19.6	7.0
C3Oys	Oct-24	132	36.0	1.8	30	17.0	9.4
	Feb-25	105	42.6	2.4	30	18.7	13.6
K3	Oct-24	114	51.2	2.2	33	3.5	2.5
	Feb-25	100	41.7	2.4	31	3.2	3.5
K4	Oct-24	113	38.8	1.9	30	26.2	12.2
	Feb-25	124	39.0	2.0	30	21.2	8.7

The mean length of the wild oysters across the five sites ranged from 35mm to 51mm in the October sampling and 36mm to 43mm in the February sampling (Table 3.1). The largest variation between the two periods occurred at C3Oys where the mean length increased by 18.4% and in K3 where the mean length decreased by 18.6%.

The densities of oysters at the five sites ranged from 3 oysters/0.25m^2 to 26 oysters/0.25m^2 during the October sampling and ranged between 3 oysters/0.25m^2 and 21 oysters/0.25m^2 in the February sampling. K1 and K3 showed a low density of oysters with means at 3 oysters/0.25m^2. K2 and K4 were the most populated sites with mean densities at or >20/0.25m^2 (Table 3.1). Variation between sampling events was small (<10%) reflecting a certain seasonal stability of population numbers. This hypothesis will be assessed with subsequent monitoring surveys.

As this is the first year of monitoring, there is no previous data to determine any trend in fluctuations.

3.2 Cockle Abundance and Size

3.2.1 Methodology

The REMP specifies that the wild cockle populations will be monitored at five sites (Figure 3.1). These sites will be monitored every six months in February and August, starting two years prior to discharge. Due to an initial attempt to match time periods between shellfish population monitoring and benthic biota monitoring, the first sampling in 2024 was undertaken in October.

At each of the five sites, an area of 75m*100m was marked using GPS coordinates. The area was divided into 12 cells, with two 0.25m^2 quadrats randomly placed in each cell, excavated to at least 10cm, sieved though a 3mm sieve, and the number of live cockles were recorded. All cockles were measured in the initial quadrat, and the measurement of cockles in the entire quadrat was repeated until at least 100 individuals were measured to the nearest mm. As outlined in the REMP, if the number of cockles were >500/m^2

then the quadrat size could be halved and if the number of cockles were >1000/m^2 then the size of the quadrat could be quartered. All cockles ≤3mm were excluded from the data.

3.2.2 Results and Discussion

3.2.2.1 Population characteristics per site

Table 3.2 presents the mean length and density of cockles at each site over the two sampling periods. Cockle size/frequency data are presented in Appendix 4 Tables A4.3 and A4.4.

Table 3.2 Summary of the length and abundance of cockle (Austrovenus stutchburyi) in October 2024 and February 2025

Station	Date	Size (mm)			Density				Percentage of Edible Size
		n	mean	95% CL	n	Mean 0.25m^2	95% CL	per m^2	
C1	Oct-24	172	16.2	0.7	24	320.0	45.1	1280.0	0.6
	Feb-25	100	16.3	1.2	24	427.0	66.9	1708.0	1.0
C2	Oct-24	132	10.2	0.9	24	103.3	45.0	413.2	1.5
	Feb-25	160	19.7	0.7	24	149.9	51.0	599.7	13.8
C3	Oct-24	124	12.2	0.7	24	497.2	112.9	1988.7	0
	Feb-25	170	12.9	0.6	24	562.8	122.2	2251.4	0
C4	Oct-24	232	16.5	0.6	24	348.2	88.7	1392.7	0.4
	Feb-25	124	16.7	0.6	24	362.7	104.2	1450.7	0
C5	Oct-24	183	13.8	0.7	24	416.0	93.2	1664.0	0.6
	Feb-25	205	16.0	0.6	24	517.3	102.7	2069.3	0.5

The mean length of the wild cockles across the five sites ranged from 10mm to 17mm in the October monitoring and 13mm to 20mm in the February monitoring (Table 3.2). The largest variation between the two periods occurred at Site C2 where the mean length increased by 92%. The other sites showed very little size variation between seasons. Most of the recorded cockle lengths were well below the minimum attractive edible size of 25mm. Site C2 had the largest number of edible size cockles, with 14% in February 2025.

The mean density of cockle at the five sites ranged from 413 to 1989 per m^2 in the October 2024 monitoring and 600 to 2251 per m^2 in the February 2025 sampling. Site C2 had the lowest density of cockles in both monitoring events and Co3 had the highest density in both monitoring events (Table 3.2). For all cockle sites, there was an increase in numbers between October and February, which could reflect natural population variation.

3.2.2.2 Spatial variation

Spatial variation in the abundance of cockles across the five cockle population sites is shown in Figure 3.2-Figure 3.6 and the raw data are presented in Table A 4.4. This was done by calculating the mean abundance of cockles (m^2) per cell to show how the cockle bed fluctuates over time.

The distribution of cockles at **Site C1** shows similar distribution patterns between October and February with most of the cells containing a similar or higher abundance in the February monitoring (Figure 3.2). Only one of the cells in the Southeast of the site had a noticeable decrease in abundance.

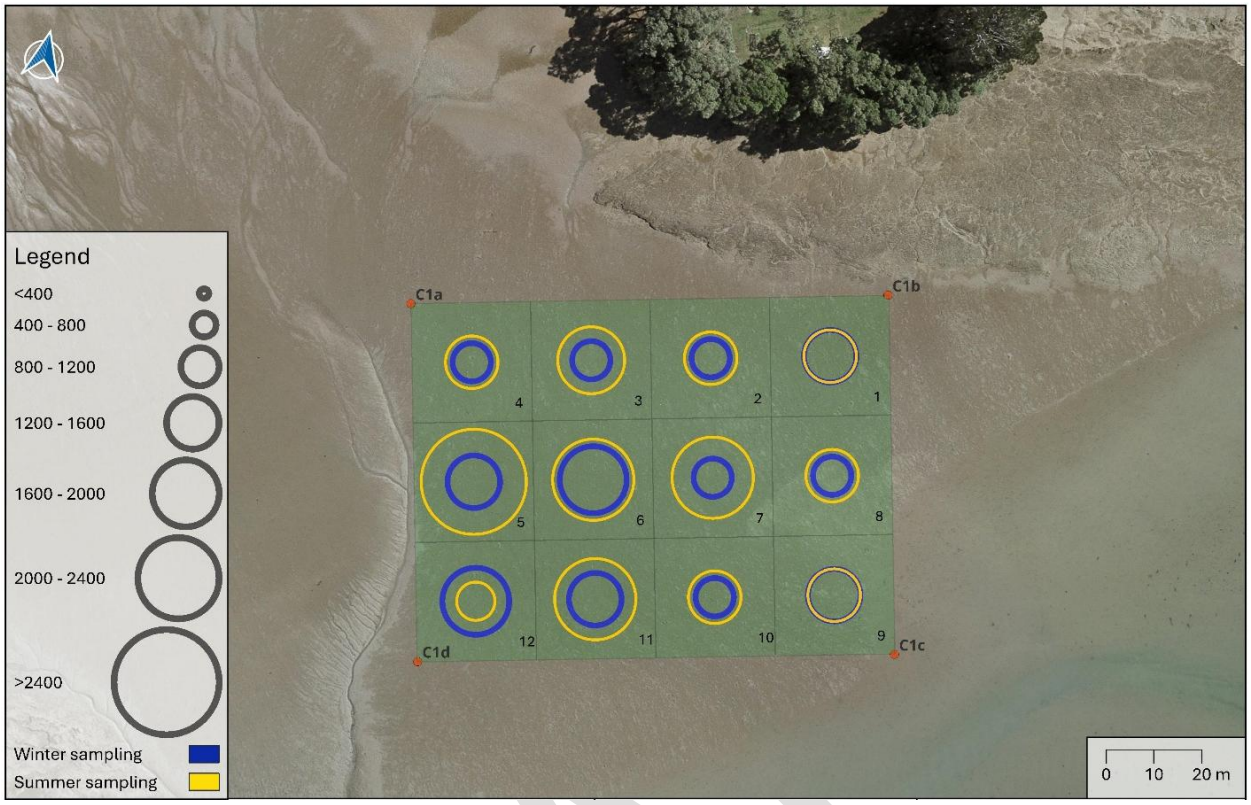

Figure 3.2 Cockle abundance at Site C1 for October 2024 and February 2025

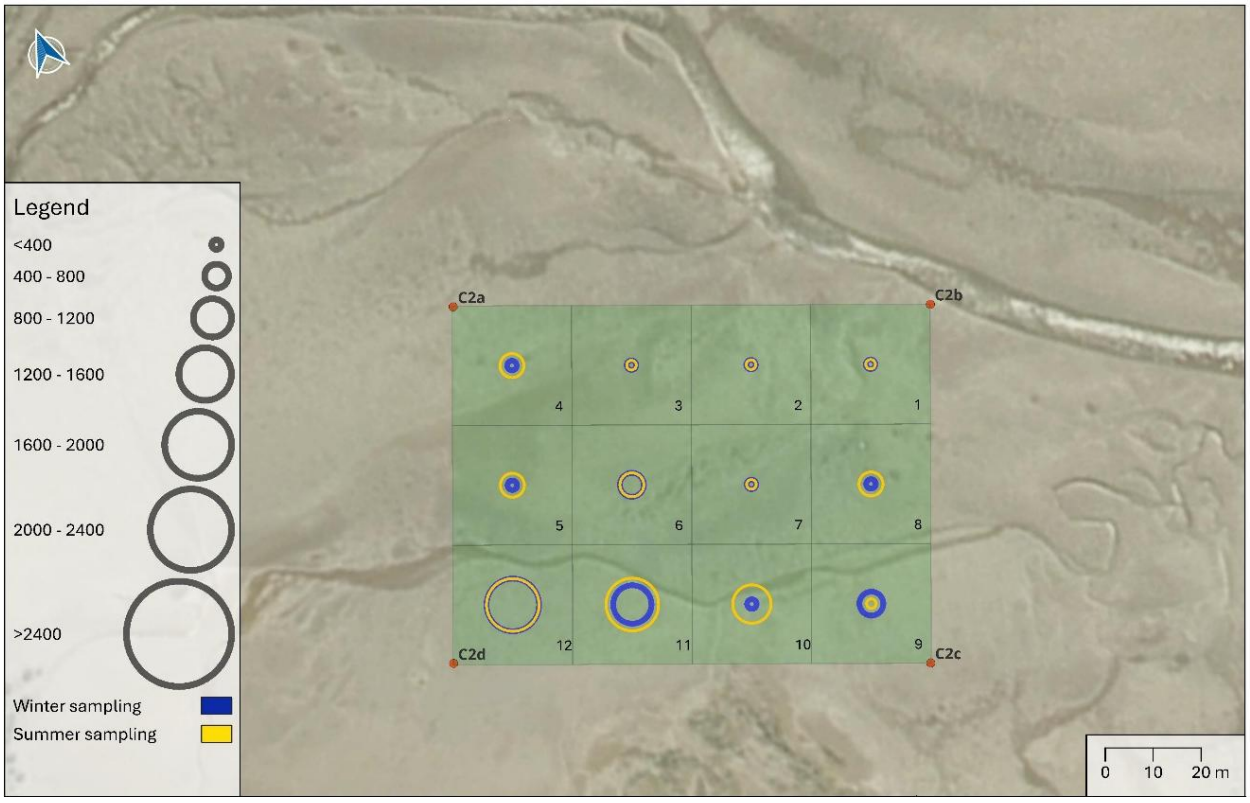

Figure 3.3 Cockle abundance at Site C2 for October 2024 and February 2025

The majority of **Site C2** experienced little change in the distribution of cockles between the two sampling events (Figure 3.3). The cockles were distributed mostly south of the small channel cutting the area into two.

Site C3 showed substantial variation between the two sampling events (Figure 3.4). There was a large decrease in cockle abundance in cells 3 and 7 as well as further south in cell 12. In contrast, neighbouring cells between these declines exhibited large increases in abundance. This pattern may indicate a compression of the cockle bed, forming a concentrated band running between west and east through cells 4, 5, 6, 10 and 11.

Site C4 showed similar changes in cockle distribution as Site C3 on a smaller scale (Figure 3.5). There was a decrease on cockle abundance in the northern and southern cells, with an increase in abundance in the cells between them, forming a concentrated band running between west and east.

Site C5 showed a decrease in the western cells of the monitoring site and an increase in the eastern cells (Figure 3.6). This could indicate an eastern migration of the cockle bed. As this is the first year of the baseline monitoring, additional sampling is needed to establish whether this is seasonal fluctuation within the cockle bed or a permanent migration.

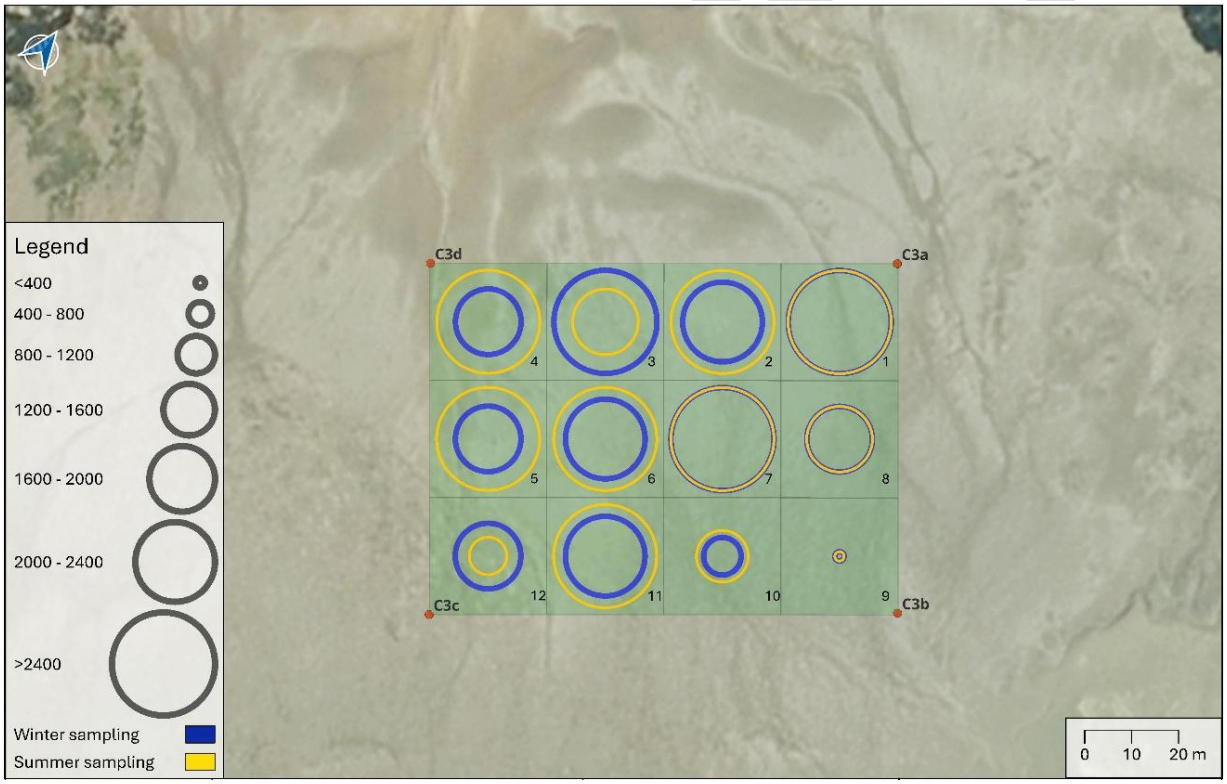

Figure 3.4 Cockle abundance at Site C3 for October 2024 and February 2025

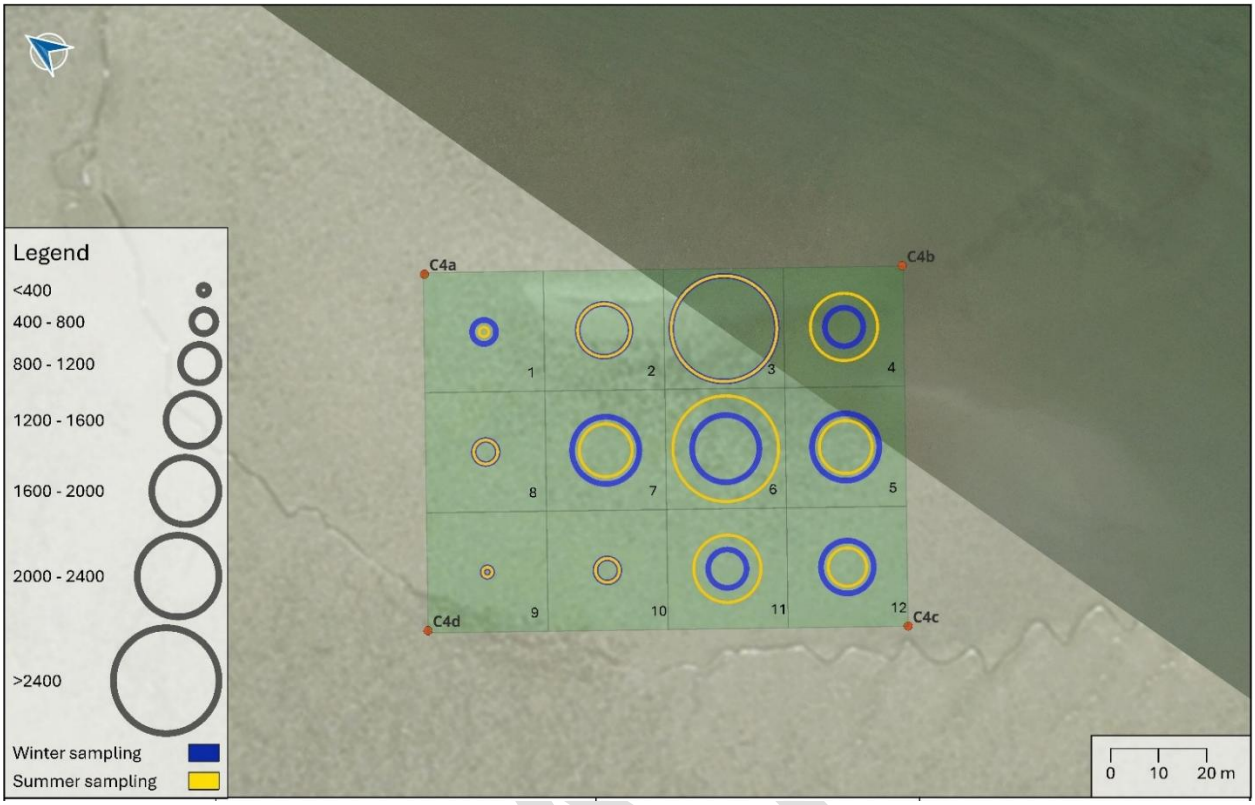

Figure 3.5 Cockle abundance at Site C4 for October 2024 and February 2025

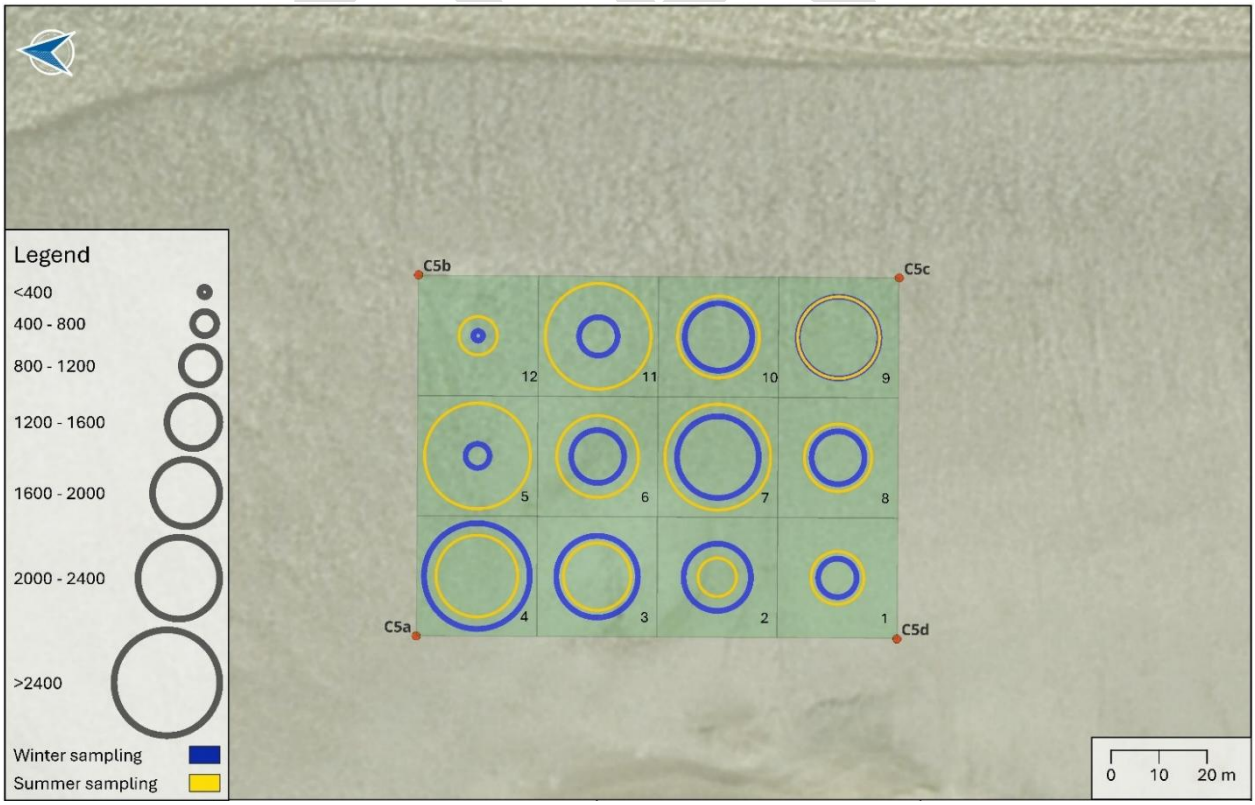

Figure 3.6 Cockle abundance at Site C5 for October 2024 and February 2025

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APPLICABILITY AND LIMITATIONS

Restrictions of Intended Purpose

This report has been prepared solely for the benefit of Watercare Services Ltd Services as our client with respect to the brief. The reliance by other parties on the information or opinions contained in the report shall, without our prior review and agreement in writing, be at such party's sole risk.

Legal Interpretation

Opinions and judgements expressed herein are based on our understanding and interpretation of current regulatory standards and should not be construed as legal opinions. Where opinions or judgements are to be relied on, they should be independently verified with appropriate legal advice.

Maps and Images

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APPENDIX 1 SITE INFORMATION AND PAST WEATHER DATA

Table A1.1 Geographic Coordinates of Farmed Oyster Bags (WGS84)

Site	Description	Longitude	Latitude
M	Matakawau Headland	E174.66768	S37.10898
K	Karaka Point	E174.69014	S37.14211
R	Te Toro Boat Ramp	E174.69939	S37.15141
S	Te Toro Road Settlement	E174.69710	S37.15895
G	Gordons Landing	E174.70354	S37.18424

Table A 1.2 Geographic Coordinates of oyster population monitoring sites (WGS84)

Site	Description	Transect Point	Longitude	Latitude
K1	Opposite Ngahere Bay on the rocky-reef	Start	E174.68199	S37.13994
		End	E174.68147	S37.13981
K2	Southern side of entrance of the Taihiki River	Start	E174.72660	S37.15304
		End	E174.72612	S37.15311
C3Oys	Southern Shore of Te Toro Settlement	Start	E174.69594	S37.15826
		End	E174.69604	S37.15870
K3	Ngahere Bay	Start	E174.69031	S37.14201
		End	E174.69083	S37.14185
K4	Clarks Beach western end	Start	E174.68746	S37.13918
		End	E174.68716	S37.13944

Table A1.3 Geographic Coordinates of cockle population monitoring sites (WGS84)

Site	Description	Corner Points			
		a	b	c	d
C1	Matakawau Point	E174.66547	E174.66655	E174.66677	E174.66569
		S37.10959	S37.10936	S37.11001	S37.11024
C2	Rangiriri Spit	E174.66915	E174.67020	E174.66988	E174.66884
		S37.13888	S37.13922	S37.13984	S37.13951
C3	Southern Shore of Te Toro Settlement	E174.69347	E174.69398	E174.69310	E174.69258
		S37.15887	S37.15940	S37.15996	S37.15943
C4	Pukewhau Creek	E174.69728	E174.69795	E174.69728	E174.69661
		S37.16618	S37.16690	S37.16730	S37.16658
C5	Gordons Landing	E174.70372	E174.70456	E174.70465	E174.70381
		S37.18246	S37.18240	S37.18330	S37.18336

Figure A 1.1 Map showing the rainfall sites used to determine wet and dry events.

Table A 1.4 Past weather data in relation to the collection of oysters

Weekday	Date	Rain (mm)	Low tide time	Low tide height	Notes
Thursday	18/07/2024	0	13:56	1.3	Deployment T0
Friday	19/07/2024	13	14:55	1.1	
Saturday	20/07/2024	10.5	15:48	0.9	
Sunday	21/07/2024	2.5	16:37	0.7	
Monday	22/07/2024	6	17:23	0.6	
Tuesday	23/07/2024	2.5	18:08	0.5	
Wednesday	24/07/2024	3	06:35	0.5	
Thursday	25/07/2024	0.5	07:21	0.5	
Friday	26/07/2024	0.5	08:07	0.6	
Saturday	27/07/2024	0	08:55	0.7	
Sunday	28/07/2024	0	09:46	0.9	
Monday	29/07/2024	16	10:42	1	
Tuesday	30/07/2024	14.5	11:44	1.2	
Wednesday	31/07/2024	10.5	12:52	1.2	
Thursday	1/08/2024	14	14:00	1.2	
Friday	2/08/2024	0	15:00	1.1	
Saturday	3/08/2024	0	15:52	1	
Sunday	4/08/2024	0	16:37	0.9	
Monday	5/08/2024	0	17:17	0.8	
Tuesday	6/08/2024	0	17:53	0.8	
Wednesday	7/08/2024	0	06:16	0.8	
Thursday	8/08/2024	1	06:50	0.9	
Friday	9/08/2024	1.5	07:23	0.9	
Saturday	10/08/2024	0	07:56	1	
Sunday	11/08/2024	0	08:32	1.1	
Monday	12/08/2024	2.5	09:12	1.2	
Tuesday	13/08/2024	0	09:59	1.4	
Wednesday	14/08/2024	0	10:56	1.5	
Thursday	15/08/2024	0	12:06	1.5	Collection 1 & redeployment
Friday	16/08/2024	1	13:24	1.4	
Saturday	17/08/2024	20	14:31	1.2	
Sunday	18/08/2024	9.5	15:27	0.9	
Monday	19/08/2024	5	16:17	0.6	
Tuesday	20/08/2024	1.5	17:03	0.4	
Wednesday	21/08/2024	0.5	17:48	0.3	
Thursday	22/08/2024	0	06:14	0.3	
Friday	23/08/2024	0	06:58	0.3	
Saturday	24/08/2024	4	07:42	0.5	
Sunday	25/08/2024	0	08:28	0.7	
Monday	26/08/2024	0	09:17	0.9	
Tuesday	27/08/2024	10	10:12	1.2	
Wednesday	28/08/2024	1.5	11:18	1.4	
Thursday	29/08/2024	10.5	12:33	1.4	
Friday	30/08/2024	0	13:45	1.4	
Saturday	31/08/2024	1.5	14:45	1.2	
Sunday	1/09/2024	19.5	15:34	1	
Monday	2/09/2024	0	16:15	0.9	still within a month
Tuesday	3/09/2024	2.5	16:53	0.8	
Wednesday	4/09/2024	1	17:27	0.7	
Thursday	5/09/2024	0	17:59	0.8	
Friday	6/09/2024	3	06:19	0.7	
Saturday	7/09/2024	0	06:50	0.8	
Sunday	8/09/2024	5.52	07:22	0.9	
Monday	9/09/2024	0	07:56	1	
Tuesday	10/09/2024	0	08:34	1.2	
Wednesday	11/09/2024	2.5	09:20	1.3	
Thursday	12/09/2024	0	10:17	1.5	One month of deployment

Friday	13/09/2024	0	11:33	1.5	
Saturday	14/09/2024	18	12:56	1.4	
Sunday	15/09/2024	2.5	14:06	1.2	WE
Monday	16/09/2024	10	15:03	0.8	
Tuesday	17/09/2024	5.5	15:54	0.5	
Wednesday	18/09/2024	0.5	16:41	0.3	
Thursday	19/09/2024	8	17:26	0.2	
Friday	20/09/2024	26.5	18:10	0.3	
Saturday	21/09/2024	0.5	06:33	0.3	WE
Sunday	22/09/2024	0	07:17	0.5	
Monday	23/09/2024	0.5	08:01	0.7	
Tuesday	24/09/2024	1	08:49	1	
Wednesday	25/09/2024	0	09:44	1.3	
Thursday	26/09/2024	0	10:53	1.5	
Friday	27/09/2024	2.5	12:12	1.6	
Saturday	28/09/2024	0	13:24	1.5	
Sunday	29/09/2024	0	15:21	1.3	
Monday	30/09/2024	0	16:00	1.1	
Tuesday	1/10/2024	0	16:49	0.9	
Wednesday	2/10/2024	16	17:25	0.8	
Thursday	3/10/2024	14	17:59	0.8	Late tide
Friday	4/10/2024	0	06:16	0.7	
Saturday	5/10/2024	4.5	06:48	0.7	
Sunday	6/10/2024	22	07:20	0.7	
Monday	7/10/2024	4.5	07:53	0.9	Early tide
Tuesday	8/10/2024	0	08:29	1	
Wednesday	9/10/2024	5.5	09:08	1.2	
Thursday	10/10/2024	3.5	09:54	1.3	
Friday	11/10/2024	0.5	10:53	1.4	
Saturday	12/10/2024	0	12:08	1.5	
Sunday	13/10/2024	9.5	13:28	1.4	
Monday	14/10/2024	5	14:37	1.1	
Tuesday	15/10/2024	1.5	15:36	0.8	
Wednesday	16/10/2024	0	16:28	0.5	
Thursday	17/10/2024	0	17:17	0.4	
Friday	18/10/2024	0	18:03	0.3	
Saturday	19/10/2024	0	06:26	0.2	
Sunday	20/10/2024	0	07:10	0.4	
Monday	21/10/2024	0	07:54	0.6	
Tuesday	22/10/2024	2.5	08:38	0.8	
Wednesday	23/10/2024	0	09:25	1.1	
Thursday	24/10/2024	0	10:19	1.4	
Friday	25/10/2024	0	11:25	1.5	
Saturday	26/10/2024	7	12:39	1.6	
Sunday	27/10/2024	1.5	13:49	1.5	
Monday	28/10/2024	1	14:47	1.4	
Tuesday	29/10/2024	4	15:35	1.2	
Wednesday	30/10/2024	11	16:17	1	Collection 2 & redeployment
Thursday	31/10/2024	0.5	16:55	0.9	
Friday	1/11/2024	0.5	17:30	0.8	
Saturday	2/11/2024	8.5	18:05	0.8	
Sunday	3/11/2024	0	06:21	0.7	
Monday	4/11/2024	0	06:56	0.8	
Tuesday	5/11/2024	0	07:32	0.8	
Wednesday	6/11/2024	0	08:10	1	
Thursday	7/11/2024	0	08:52	1.1	
Friday	8/11/2024	0	09:40	1.2	
Saturday	9/11/2024	0	10:38	1.3	
Sunday	10/11/2024	1.5	11:47	1.4	
Monday	11/11/2024	8.5	12:59	1.3	

Tuesday	12/11/2024	0.5	14:06	1.1	
Wednesday	13/11/2024	0	15:07	0.9	
Thursday	14/11/2024	1	16:03	0.7	
Friday	15/11/2024	41	16:55	0.5	
Saturday	16/11/2024	0.5	17:44	0.5	still within a month
Sunday	17/11/2024	0	18:31	0.5	
Monday	18/11/2024	0	06:51	0.5	
Tuesday	19/11/2024	0	07:35	0.7	
Wednesday	20/11/2024	2	08:19	0.9	
Thursday	21/11/2024	3.5	09:04	1.1	
Friday	22/11/2024	0	09:53	1.3	
Saturday	23/11/2024	0.5	10:48	1.5	
Sunday	24/11/2024	0	11:52	1.6	
Monday	25/11/2024	0	12:57	1.6	
Tuesday	26/11/2024	0	13:59	1.5	
Wednesday	27/11/2024	0	14:53	1.4	One month of deployment
Thursday	28/11/2024	5.5	15:41	1.2	
Friday	29/11/2024	0	16:23	1.1	
Saturday	30/11/2024	12.5	17:03	1	
Sunday	1/12/2024	5.5	17:42	0.9	
Monday	2/12/2024	0	18:21	0.9	
Tuesday	3/12/2024	0	06:37	0.8	
Wednesday	4/12/2024	0	07:17	0.8	
Thursday	5/12/2024	0	07:58	0.9	
Friday	6/12/2024	0	08:42	0.9	
Saturday	7/12/2024	0	09:29	1	
Sunday	8/12/2024	1	10:23	1.1	
Monday	9/12/2024	7	11:23	1.2	
Tuesday	10/12/2024	0.5	12:28	1.2	
Wednesday	11/12/2024	0.5	13:34	1.1	
Thursday	12/12/2024	5	14:40	1	
Friday	13/12/2024	2	15:41	0.9	
Saturday	14/12/2024	0	16:37	0.8	
Sunday	15/12/2024	0	17:29	0.7	
Monday	16/12/2024	4	18:17	0.7	
Tuesday	17/12/2024	0	06:35	0.6	
Wednesday	18/12/2024	0	07:19	0.7	
Thursday	19/12/2024	0	08:01	0.9	
Friday	20/12/2024	0	08:42	1	
Saturday	21/12/2024	19.5	09:24	1.2	
Sunday	22/12/2024	1	10:07	1.3	WE
Monday	23/12/2024	15	10:56	1.5	
Tuesday	24/12/2024	0	11:52	1.5	Day off
Wednesday	25/12/2024	1.5	12:54	1.6	
Thursday	26/12/2024	7	13:59	1.6	
Friday	27/12/2024	0	14:59	1.5	
Saturday	28/12/2024	0	15:51	1.3	
Sunday	29/12/2024	0	16:38	1.2	
Monday	30/12/2024	1	17:22	1	
Tuesday	31/12/2024	0.5	18:05	0.9	
Wednesday	1/01/2025	0	06:22	0.7	
Thursday	2/01/2025	0	07:03	0.7	
Friday	3/01/2025	5.5	07:45	0.7	
Saturday	4/01/2025	14	08:29	0.7	
Sunday	5/01/2025	5.5	09:14	0.8	
Monday	6/01/2025	0	10:03	0.9	
Tuesday	7/01/2025	0	10:57	1	
Wednesday	8/01/2025	0	11:58	1.1	
Thursday	9/01/2025	0	13:05	1.2	
Friday	10/01/2025	0	14:16	1.2	

Saturday	11/01/2025	0	15:23	1.1	
Sunday	12/01/2025	0	16:23	1	
Monday	13/01/2025	0	17:16	0.9	
Tuesday	14/01/2025	0	18:04	0.8	
Wednesday	15/01/2025	0	06:21	0.7	
Thursday	16/01/2025	0	07:02	0.7	
Friday	17/01/2025	0	07:40	0.8	
Saturday	18/01/2025	0	08:17	0.9	
Sunday	19/01/2025	0	08:52	1	
Monday	20/01/2025	4	09:28	1.1	
Tuesday	21/01/2025	4	10:06	1.3	
Wednesday	22/01/2025	3	10:50	1.5	Collection 3 & redeployment
Thursday	23/01/2025	0	11:45	1.6	
Friday	24/01/2025	0	12:53	1.7	
Saturday	25/01/2025	4	14:10	1.6	
Sunday	26/01/2025	18.5	15:18	1.5	
Monday	27/01/2025	3	16:13	1.2	still within a month
Tuesday	28/01/2025	0	17:01	1	
Wednesday	29/01/2025	0	17:46	0.8	
Thursday	30/01/2025	0	18:29	0.6	
Friday	31/01/2025	0	06:46	0.5	
Saturday	1/02/2025	0	07:28	0.5	
Sunday	2/02/2025	0	08:11	0.5	
Monday	3/02/2025	0	08:55	0.6	
Tuesday	4/02/2025	0	09:42	0.8	
Wednesday	5/02/2025	0	10:33	1	
Thursday	6/02/2025	0	11:32	1.2	
Friday	7/02/2025	0	12:42	1.3	
Saturday	8/02/2025	0	13:59	1.4	
Sunday	9/02/2025	0	15:10	1.3	
Monday	10/02/2025	0	16:11	1.1	
Tuesday	11/02/2025	0	17:01	0.9	
Wednesday	12/02/2025	0	17:46	0.8	
Thursday	13/02/2025	0	06:02	0.7	
Friday	14/02/2025	1	06:40	0.7	
Saturday	15/02/2025	0	07:15	0.7	
Sunday	16/02/2025	0	07:48	0.8	
Monday	17/02/2025	0.5	08:20	0.9	
Tuesday	18/02/2025	2	08:52	1	
Wednesday	19/02/2025	0	09:26	1.2	One month of deployment
Thursday	20/02/2025	6	10:05	1.4	
Friday	21/02/2025	0	10:54	1.5	
Saturday	22/02/2025	0	11:58	1.7	
Sunday	23/02/2025	0	13:22	1.7	
Monday	24/02/2025	0	14:43	1.5	
Tuesday	25/02/2025	0	15:45	1.2	
Wednesday	26/02/2025	0	16:36	0.9	
Thursday	27/02/2025	0	17:22	0.7	
Friday	28/02/2025	0.5	18:06	0.4	
Saturday	1/03/2025	0	18:49	0.3	
Sunday	2/03/2025	0	07:08	0.3	
Monday	3/03/2025	0	07:51	0.4	
Tuesday	4/03/2025	17	08:35	0.5	
Wednesday	5/03/2025	0	09:21	0.7	
Thursday	6/03/2025	0	10:12	1	Collection 4 & redeployment
Friday	7/03/2025	0	11:12	1.3	
Saturday	8/03/2025	0	12:2	1.4	
Sunday	9/03/2025	0	13:45	1.5	
Monday	10/03/2025	0	14:54	1.3	
Tuesday	11/03/2025	0	15:51	1.1	

Wednesday	12/03/2025	1.5	16:39	1	
Thursday	13/03/2025	0	17:21	0.8	
Friday	14/03/2025	0	17:59	0.7	
Saturday	15/03/2025	0	06:14	0.7	
Sunday	16/03/2025	0	06:47	0.7	
Monday	17/03/2025	8	07:19	0.8	
Tuesday	18/03/2025	6.5	07:50	0.9	
Wednesday	19/03/2025	14	08:21	1	
Thursday	20/03/2025	0	08:55	1.1	
Friday	21/03/2025	0	09:34	1.3	
Saturday	22/03/2025	0	10:21	1.5	
Sunday	23/03/2025	0	11:25	1.6	
Monday	24/03/2025	0	12:47	1.6	
Tuesday	25/03/2025	0	14:07	1.4	
Wednesday	26/03/2025	0	15:11	1.2	
Thursday	27/03/2025	0	16:05	0.8	
Friday	28/03/2025	0	16:54	0.6	
Saturday	29/03/2025	0	17:40	0.3	
Sunday	30/03/2025	0	18:25	0.3	
Monday	31/03/2025	0	06:46	0.3	
Tuesday	1/04/2025	0	07:30	0.4	
Wednesday	2/04/2025	0.5	08:16	0.5	
Thursday	3/04/2025	13	09:03	0.8	One month of deployment
Friday	4/04/2025	65.5	09:56	1.1	
Saturday	5/04/2025	1	10:58	1.3	WE
Sunday	6/04/2025	4.5	11:11	1.5	
Monday	7/04/2025	0.5	12:24	1.4	
Tuesday	8/04/2025	14	13:29	1.3	
Wednesday	9/04/2025	0.5	14:23	1.2	
Thursday	10/04/2025	0	15:09	1	
Friday	11/04/2025	0	15:50	0.8	
Saturday	12/04/2025	0	16:28	0.8	
Sunday	13/04/2025	0	17:03	0.7	
Monday	14/04/2025	0	17:36	0.7	
Tuesday	15/04/2025	0	18:08	0.8	
Wednesday	16/04/2025	0.5	06:24	0.9	
Thursday	17/04/2025	6.5	06:57	1	
Friday	18/04/2025	1.5	07:33	1.1	
Saturday	19/04/2025	53.5	08:14	1.3	
Sunday	20/04/2025	23.5	09:04	1.4	
Monday	21/04/2025	2	10:06	1.5	
Tuesday	22/04/2025	2.5	11:20	1.4	
Wednesday	23/04/2025	0.5	12:32	1.3	
Thursday	24/04/2025	0	13:35	1	
Friday	25/04/2025	0	14:32	0.8	
Saturday	26/04/2025	0	15:24	0.5	
Sunday	27/04/2025	11.5	16:13	0.4	
Monday	28/04/2025	15	17:01	0.3	
Tuesday	29/04/2025	2	17:47	0.4	Late tide
Wednesday	30/04/2025	7.5	06:12	0.5	
Thursday	1/05/2025	16	06:59	0.7	
Friday	2/05/2025	4	07:49	0.9	WE
Saturday	3/05/2025	0	08:43	1.1	
Sunday	4/05/2025	0	09:43	1.3	
Monday	5/05/2025	0	10:48	1.4	
Tuesday	6/05/2025	0	11:53	1.4	
Wednesday	7/05/2025	0	12:52	1.3	
Thursday	8/05/2025	2	13:45	1.2	
Friday	9/05/2025	28	14:33	1.1	
Saturday	10/05/2025	0	15:16	0.9	WE

Sunday	11/05/2025	0	15:55	0.9	
Monday	12/05/2025	0	16:32	0.8	
Tuesday	13/05/2025	2.5	17:08	0.8	
Wednesday	14/05/2025	1	17:43	0.8	
Thursday	15/05/2025	0	18:18	0.9	
Friday	16/05/2025	0	06:40	1	
Saturday	17/05/2025	0	07:19	1.1	
Sunday	18/05/2025	6	08:03	1.2	
Monday	19/05/2025	0	08:53	1.3	
Tuesday	20/05/2025	0	09:50	1.3	Collection 5 & redeployment
Wednesday	21/05/2025	0	10:53	1.2	
Thursday	22/05/2025	0	11:57	1.1	
Friday	23/05/2025	1	12:59	1	

APPENDIX 2 CONDITION INDEX DATA

Table A 2.5 Condition Index of Farmed Oysters - August 2024

Site	Replicate	Entire Oysters (ml)	Empty Shells (ml)	Shell Volume (ml)	Jar Weight (g)	Combined Weight (g)	Flesh wet weight (g)	Moisture (%)	Dry Weight (g)	Condition Index
Matakawau Headland	Matakawau MET24AUGUST1	140	61	79	23.35	67.49	44.14	88.8	4.94	6.26
	Matakawau MET24AUGUST2	136	57	79	23.2	70.62	47.42	88.3	5.55	7.02
	Matakawau MET24AUGUST3	121	53	68	23.31	65.49	42.18	87.3	5.36	7.88
	Matakawau MET24AUGUST4	133	58	75	23.32	62.95	39.63	88.8	4.44	5.92
	Matakawau MET24AUGUST5	159	72	87	23.24	71.74	48.5	87.9	5.87	6.75
	Mean	**137.80**	**60.20**	**77.60**	**23.28**	**67.66**	**44.37**	**88.22**	**5.23**	**6.76**
	SD	**13.81**	**7.19**	**6.91**	**0.06**	**3.62**	**3.66**	**0.64**	**0.56**	**0.75**
	CI	**12.10**	**6.30**	**6.06**	**0.05**	**3.17**	**3.21**	**0.56**	**0.49**	**0.66**
Karaka Point	Karaka MET24AUGUST1	131	56	75	23.1	74.66	51.56	88.4	5.98	7.97
	Karaka MET24AUGUST2	134	58	76	23.21	87.87	64.66	89.3	6.92	9.10
	Karaka MET24AUGUST3	130	55	75	23.44	67.63	44.19	87.8	5.39	7.19
	Karaka MET24AUGUST4	142	59	83	23.42	73.38	49.96	88.5	5.75	6.92
	Karaka MET24AUGUST5	144	60	84	22.88	70.4	47.52	89	5.23	6.22
	Mean	**136.20**	**57.60**	**78.60**	**23.21**	**74.79**	**51.58**	**88.60**	**5.85**	**7.48**
	SD	**6.42**	**2.07**	**4.51**	**0.23**	**7.80**	**7.82**	**0.58**	**0.66**	**1.10**
	CI	**5.63**	**1.82**	**3.95**	**0.20**	**6.84**	**6.86**	**0.51**	**0.58**	**0.97**
Te Toro Boat Ramp	Te Toro Ramp MET24AUGUST1	151	60	91	23.07	77.38	54.31	88.7	6.14	6.74
	Te Toro Ramp MET24AUGUST2	131	51	80	23.43	72.34	48.91	90	4.89	6.11
	Te Toro Ramp MET24AUGUST3	131	54	77	23.41	68.15	44.74	89.7	4.61	5.98
	Te Toro Ramp MET24AUGUST4	130	52	78	23.22	69.25	46.03	90	4.60	5.90
	Te Toro Ramp MET24AUGUST5	133	55	78	23.16	74.87	51.71	88.9	5.74	7.36
	Mean	**135.20**	**54.40**	**80.80**	**23.26**	**72.40**	**49.14**	**89.46**	**5.20**	**6.42**
	SD	**8.90**	**3.51**	**5.81**	**0.16**	**3.84**	**3.95**	**0.62**	**0.70**	**0.62**
	CI	**7.80**	**3.07**	**5.09**	**0.14**	**3.36**	**3.46**	**0.54**	**0.62**	**0.54**
Te Toro Road Settlement	Te Toro Settlement MET24AUGUST1	128	54	74	23.31	65.36	42.05	87.8	5.13	6.93
	Te Toro Settlement MET24AUGUST2	152	60	92	23.3	69.43	46.13	88.1	5.49	5.97
	Te Toro Settlement MET24AUGUST3	136	59	77	23.27	60.82	37.55	87.7	4.62	6.00
	Te Toro Settlement MET24AUGUST4	152	60	92	23.33	70.77	47.44	88.7	5.36	5.83
	Te Toro Settlement MET24AUGUST5	116	53	63	23.19	55.49	32.3	87.2	4.13	6.56
	Mean	**136.80**	**57.20**	**79.60**	**23.28**	**64.37**	**41.09**	**87.90**	**4.95**	**6.26**
	SD	**15.59**	**3.42**	**12.46**	**0.05**	**6.30**	**6.25**	**0.55**	**0.56**	**0.47**
	CI	**13.67**	**3.00**	**10.92**	**0.05**	**5.53**	**5.48**	**0.48**	**0.49**	**0.41**
Gordons Landing	Gordons MET24AUGUST1	133	51	82	23.03	69.43	46.4	91.1	4.13	5.04
	Gordons MET24AUGUST2	120	48	72	22.82	65.47	42.65	90.9	3.88	5.39
	Gordons MET24AUGUST3	159	66	93	23.09	79.29	56.2	90.2	5.51	5.92
	Gordons MET24AUGUST4	153	63	90	23.09	78.78	55.69	90.7	5.18	5.75
	Gordons MET24AUGUST5	141	62	79	23.02	83.18	60.16	91.5	5.11	6.47
	Mean	**141.20**	**58.00**	**83.20**	**23.01**	**75.23**	**52.22**	**90.88**	**4.76**	**5.72**
	SD	**15.59**	**7.97**	**8.47**	**0.11**	**7.44**	**7.35**	**0.48**	**0.71**	**0.54**
	CI	**13.67**	**6.98**	**7.42**	**0.10**	**6.52**	**6.45**	**0.42**	**0.62**	**0.48**

Table A 2.6 Condition Index of Farmed Oysters - October 2024

Site	Replicate	Entire Oysters (ml)	Empty Shells (ml)	Shell Volume (ml)	Jar Weight (g)	Combined weight (g)	Flesh wet weight (g)	Percentage Moisture	Dry Weight (g)	Condition Index
Matakawau Headland	Matakawau MET24OCTOBER1	138	76	62	22.87	62.06	39.19	87.1	5.06	8.15
	Matakawau MET24OCTOBER2	120	68	52	23.21	59.37	36.16	87.1	4.66	8.97
	Matakawau MET24OCTOBER3	122	51	71	23.31	64.83	41.52	87.3	5.27	7.43
	Matakawau MET24OCTOBER4	127	49	78	23	69	46	88.1	5.47	7.02
	Matakawau MET24OCTOBER5	134	59	75	23.38	68.75	45.37	87.7	5.58	7.44
	Mean	**128.20**	**60.60**	**67.60**	**23.15**	**64.80**	**41.65**	**87.46**	**5.21**	**7.80**
	SD	**7.69**	**11.41**	**10.60**	**0.21**	**4.19**	**4.15**	**0.43**	**0.36**	**0.77**
	CI	**6.74**	**10.01**	**9.29**	**0.19**	**3.67**	**3.64**	**0.38**	**0.32**	**0.68**
Karaka Point	Karaka MET24OCTOBER1	100	42	58	23.35	57.24	33.89	86.8	4.47	7.71
	Karaka MET24OCTOBER2	112	48	64	23.07	61.75	38.68	88.3	4.53	7.07
	Karaka MET24OCTOBER3	119	52	67	23.36	59.6	36.24	89.2	3.91	5.84
	Karaka MET24OCTOBER4	103	38	65	23.27	54.02	30.75	89.7	3.17	4.87
	Karaka MET24OCTOBER5	110	46	64	23.14	56.74	33.6	87.6	4.17	6.51
	Mean	**108.80**	**45.20**	**63.60**	**23.24**	**57.87**	**34.63**	**88.32**	**4.05**	**6.40**
	SD	**7.53**	**5.40**	**3.36**	**0.13**	**2.94**	**2.99**	**1.17**	**0.55**	**1.10**
	CI	**6.60**	**4.74**	**2.95**	**0.11**	**2.58**	**2.62**	**1.03**	**0.48**	**0.96**
Te Toro Boat Ramp	Te Toro Ramp MET24OCTOBER1	126	51	75	23.03	64.38	41.35	88.3	4.84	6.45
	Te Toro Ramp MET24OCTOBER2	114	41	73	23.32	58.78	35.46	88.5	4.08	5.59
	Te Toro Ramp MET24OCTOBER3	118	50	68	23.15	61.31	38.16	87.2	4.88	7.18
	Te Toro Ramp MET24OCTOBER4	110	44	66	23.12	61.61	38.49	88.3	4.50	6.82
	Te Toro Ramp MET24OCTOBER5	117	47	70	23.5	57.75	34.25	87.2	4.38	6.26
	Mean	**117.00**	**46.60**	**70.40**	**23.22**	**60.77**	**37.54**	**87.90**	**4.54**	**6.46**
	SD	**5.92**	**4.16**	**3.65**	**0.19**	**2.60**	**2.78**	**0.64**	**0.33**	**0.60**
	CI	**5.19**	**3.65**	**3.20**	**0.16**	**2.28**	**2.44**	**0.56**	**0.29**	**0.53**
Te Toro Road Settlement	Te Toro Settlement MET24OCTOBER1	128	58	70	23.1	69.77	46.67	89.4	4.95	7.07
	Te Toro Settlement MET24OCTOBER2	142	60	82	23.21	72.49	49.28	89.7	5.08	6.19
	Te Toro Settlement MET24OCTOBER3	130	53	77	23.31	70.69	47.38	89.7	4.88	6.34
	Te Toro Settlement MET24OCTOBER4	144	58	86	23.09	74.84	51.75	88.1	6.16	7.16
	Te Toro Settlement MET24OCTOBER5	124	48	76	23.34	69.72	46.38	89.4	4.92	6.47
	Mean	**133.60**	**55.40**	**78.20**	**23.21**	**71.50**	**48.29**	**89.26**	**5.20**	**6.64**
	SD	**8.88**	**4.88**	**6.10**	**0.12**	**2.18**	**2.24**	**0.67**	**0.54**	**0.44**
	CI	**7.78**	**4.28**	**5.35**	**0.10**	**1.91**	**1.96**	**0.58**	**0.48**	**0.39**
Gordons Landing	Gordons MET24OCTOBER1	119	40	79	23.26	62.69	39.43	90.4	3.79	4.79
	Gordons MET24OCTOBER2	135	70	65	22.9	60.37	37.47	90.4	3.60	5.53
	Gordons MET24OCTOBER3	121	36	85	23.12	55.22	32.1	90.2	3.15	3.70
	Gordons MET24OCTOBER4	104	45	59	23.37	48.38	25.01	90.1	2.48	4.20
	Gordons MET24OCTOBER5	124	51	73	23.06	56.73	33.67	90.2	3.30	4.52
	Mean	**120.60**	**48.40**	**72.20**	**23.14**	**56.68**	**33.54**	**90.26**	**3.26**	**4.55**
	SD	**11.15**	**13.32**	**10.45**	**0.18**	**5.49**	**5.59**	**0.13**	**0.50**	**0.68**
	CI	**9.77**	**11.67**	**9.16**	**0.16**	**4.82**	**4.90**	**0.12**	**0.44**	**0.60**

Table A 2.7 Condition Index of Farmed Oyster - January 2025

Site	Replicate	Entire Oysters (ml)	Empty Shells (ml)	Shell Volume (ml)	Jar Weight (g)	Combined weight (g)	Flesh wet weight (g)	Percentage Moisture	Dry Weight (g)	Condition Index
Matakawau Headland	Matakawau MET25JANUARY1	193	70	123	22.9	78.77	55.87	89.3	5.98	4.86
	Matakawau MET25JANUARY2	212	84	128	23.08	86.58	63.5	90.9	5.78	4.51
	Matakawau MET25JANUARY3	200	78	122	23.28	79.48	56.2	90.1	5.56	4.56
	Matakawau MET25JANUARY4	202	76	126	23.12	80.17	57.05	90.4	5.48	4.35
	Matakawau MET25JANUARY5	207	85	122	23.13	92.1	68.97	91.3	6.00	4.92
	Mean	**202.80**	**78.60**	**124.20**	**23.10**	**83.42**	**60.32**	**90.40**	**5.76**	**4.64**
	SD	**7.19**	**6.15**	**2.68**	**0.14**	**5.77**	**5.75**	**0.77**	**0.24**	**0.24**
	CI	**6.30**	**5.39**	**2.35**	**0.12**	**5.06**	**5.04**	**0.67**	**0.21**	**0.21**
Karaka Point	Karaka MET25JANUARY1	-	-	-	-	-	-	-	-	-
	Karaka MET25JANUARY2	-	-	-	-	-	-	-	-	-
	Karaka MET25JANUARY3	-	-	-	-	-	-	-	-	-
	Karaka MET25JANUARY4	-	-	-	-	-	-	-	-	-
	Karaka MET25JANUARY5	-	-	-	-	-	-	-	-	-
	Mean	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	SD	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	CI	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Te Toro Boat Ramp	Te Toro Ramp MET25JANUARY1	-	-	-	-	-	-	-	-	-
	Te Toro Ramp MET25JANUARY2	-	-	-	-	-	-	-	-	-
	Te Toro Ramp MET25JANUARY3	-	-	-	-	-	-	-	-	-
	Te Toro Ramp MET25JANUARY4	-	-	-	-	-	-	-	-	-
	Te Toro Ramp MET25JANUARY5	-	-	-	-	-	-	-	-	-
	Mean	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	SD	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	CI	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Te Toro Road Settlement	Te Toro Settlement MET25JANUARY1	182	74	108	23.27	88.36	65.09	87.9	7.88	7.29
	Te Toro Settlement MET25JANUARY2	184	67	117	23.34	88.41	65.07	90.3	6.31	5.39
	Te Toro Settlement MET25JANUARY3	170	70	100	22.82	77.74	54.92	89.4	5.82	5.82
	Te Toro Settlement MET25JANUARY4	172	68	104	23.48	75.68	52.2	89.3	5.59	5.37
	Te Toro Settlement MET25JANUARY5	174	53	121	23.36	85.36	62	87	8.06	6.66
	Mean	**176.40**	**66.40**	**110.00**	**23.25**	**83.11**	**59.86**	**88.78**	**6.73**	**6.11**
	SD	**6.23**	**7.96**	**8.80**	**0.25**	**6.02**	**5.96**	**1.31**	**1.16**	**0.84**
	CI	**5.46**	**6.97**	**7.72**	**0.22**	**5.27**	**5.23**	**1.15**	**1.02**	**0.74**
Gordons Landing	Gordons MET25JANUARY1	159	65	94	22.93	63.42	40.49	90.3	3.93	4.18
	Gordons MET25JANUARY2	150	58	92	23.26	68.32	45.06	90.6	4.24	4.60
	Gordons MET25JANUARY3	214	90	124	23.31	79.18	55.87	91.2	4.92	3.96
	Gordons MET25JANUARY4	180	84	96	23.52	81.43	57.91	93	4.05	4.22
	Gordons MET25JANUARY5	209	86	123	23.26	78.83	55.57	91.1	4.95	4.02
	Mean	**182.40**	**76.60**	**105.80**	**23.26**	**74.24**	**50.98**	**91.24**	**4.42**	**4.20**
	SD	**28.76**	**14.17**	**16.22**	**0.21**	**7.89**	**7.72**	**1.05**	**0.48**	**0.25**
	CI	**25.21**	**12.42**	**14.22**	**0.19**	**6.92**	**6.76**	**0.92**	**0.42**	**0.22**

Table A 2.8 Condition Index of Farmed Oysters - March 2025

Site	Replicate	Entire Oysters (ml)	Empty Shells (ml)	Shell Volume (ml)	Jar Weight (g)	Combined weight (g)	Flesh wet weight (g)	Percentage Moisture	Dry Weight (g)	Condition Index
Matakawau Headland	Matakawau MET25MARCH1	185	79	106	23.34	92.1	68.76	91.2	6.05	5.71
	Matakawau MET25MARCH2	186	84	102	23.49	88.75	65.26	90.6	6.13	6.01
	Matakawau MET25MARCH3	180	74	106	23.31	83.55	60.24	90.5	5.72	5.40
	Matakawau MET25MARCH4	205	92	113	23.34	88.92	65.58	89.1	7.15	6.33
	Matakawau MET25MARCH5	180	66	114	23.26	86.43	63.17	90.5	6.00	5.26
	Mean	**187.20**	**79.00**	**108.20**	**23.35**	**87.95**	**64.60**	**90.38**	**6.21**	**5.74**
	SD	**10.33**	**9.85**	**5.12**	**0.09**	**3.18**	**3.15**	**0.77**	**0.55**	**0.44**
	CI	**9.05**	**8.63**	**4.49**	**0.08**	**2.79**	**2.76**	**0.68**	**0.48**	**0.38**
Karaka Point	Karaka MET25MARCH1	164	71	93	23.35	91.17	67.82	92.7	4.95	5.32
	Karaka MET25MARCH2	143	57	86	22.95	74.53	51.58	92.3	3.97	4.62
	Karaka MET25MARCH3	154	60	94	23.3	72.67	49.37	92.4	3.75	3.99
	Karaka MET25MARCH4	163	72	91	23.29	77.09	53.8	92.1	4.25	4.67
	Karaka MET25MARCH5	161	62	99	23.34	82.9	59.56	92.2	4.65	4.69
	Mean	**157.00**	**64.40**	**92.60**	**23.25**	**79.67**	**56.43**	**92.34**	**4.31**	**4.66**
	SD	**8.75**	**6.73**	**4.72**	**0.17**	**7.50**	**7.41**	**0.23**	**0.49**	**0.47**
	CI	**7.67**	**5.90**	**4.14**	**0.15**	**6.57**	**6.50**	**0.20**	**0.43**	**0.41**
Te Toro Boat Ramp	Te Toro Ramp MET25MARCH1	166	66	100	23.18	73.48	50.3	91.8	4.12	4.12
	Te Toro Ramp MET25MARCH2	150	67	83	23.52	72.81	49.29	91.9	3.99	4.81
	Te Toro Ramp MET25MARCH3	152	66	86	23.15	65.15	42	91.7	3.49	4.05
	Te Toro Ramp MET25MARCH4	146	58	88	23.21	64.79	41.58	91.1	3.70	4.21
	Te Toro Ramp MET25MARCH5	171	78	93	23.39	60.9	37.51	90.4	3.60	3.87
	Mean	**157.00**	**67.00**	**90.00**	**23.29**	**67.43**	**44.14**	**91.38**	**3.78**	**4.21**
	SD	**10.86**	**7.14**	**6.67**	**0.16**	**5.49**	**5.47**	**0.63**	**0.27**	**0.36**
	CI	**9.52**	**6.26**	**5.85**	**0.14**	**4.81**	**4.79**	**0.55**	**0.24**	**0.31**
Te Toro Road Settlement	Te Toro Settlement MET25MARCH1	128	54	74	23.31	65.36	42.05	87.8	5.13	6.93
	Te Toro Settlement MET25MARCH2	152	60	92	23.3	69.43	46.13	88.1	5.49	5.97
	Te Toro Settlement MET25MARCH3	136	59	77	23.27	60.82	37.55	87.7	4.62	6.00
	Te Toro Settlement MET25MARCH4	152	60	92	23.33	70.77	47.44	88.7	5.36	5.83
	Te Toro Settlement MET25MARCH5	116	53	63	23.19	55.49	32.3	87.2	4.13	6.56
	Mean	**136.80**	**57.20**	**79.60**	**23.28**	**64.37**	**41.09**	**87.90**	**4.95**	**6.26**
	SD	**15.59**	**3.42**	**12.46**	**0.05**	**6.30**	**6.25**	**0.55**	**0.56**	**0.47**
	CI	**13.67**	**3.00**	**10.92**	**0.05**	**5.53**	**5.48**	**0.48**	**0.49**	**0.41**
Gordons Landing	Gordons MET25MARCH1	176	67	109	23.34	91.45	68.11	92.9	4.84	4.44
	Gordons MET25MARCH2	175	76	99	23.36	76.75	53.39	93.7	3.36	3.40
	Gordons MET25MARCH3	150	62	88	23.32	82.2	58.88	93	4.12	4.68
	Gordons MET25MARCH4	165	72	93	23.19	88.45	65.26	92.7	4.76	5.12
	Gordons MET25MARCH5	188	87	101	23.26	89.41	66.15	92.8	4.76	4.72
	Mean	**170.80**	**72.80**	**98.00**	**23.29**	**85.65**	**62.36**	**93.02**	**4.37**	**4.47**
	SD	**14.20**	**9.52**	**8.00**	**0.07**	**6.06**	**6.09**	**0.40**	**0.63**	**0.65**
	CI	**12.45**	**8.35**	**7.01**	**0.06**	**5.31**	**5.34**	**0.35**	**0.55**	**0.57**

Table A 2.9 Condition Index of Farmed Oysters - May 2025

Site	Replicate	Entire Oysters (ml)	Empty Shells (ml)	Shell Volume (ml)	Jar Weight (g)	Combined weight (g)	Flesh wet weight (g)	Percentage Moisture	Dry Weight (g)	Condition Index
Matakawau Headland	Matakawau MET25MAY1	168	68	100	22.89	81.36	58.47	89.5	6.14	6.14
	Matakawau MET25MAY2	186	75	111	22.98	78.06	55.08	89.5	5.78	5.21
	Matakawau MET25MAY3	166	76	90	23.26	69.93	46.67	91	4.20	4.67
	Matakawau MET25MAY4	167	72	95	22.99	74.41	51.42	89.8	5.24	5.52
	Matakawau MET25MAY5	178	71	107	23.15	72.88	49.73	89.1	5.42	5.07
	Mean	**173.00**	**72.40**	**100.60**	**23.05**	**75.33**	**52.27**	**89.78**	**5.36**	**5.32**
	SD	**8.72**	**3.21**	**8.56**	**0.15**	**4.47**	**4.61**	**0.73**	**0.73**	**0.55**
	CI	**7.64**	**2.81**	**7.50**	**0.13**	**3.92**	**4.04**	**0.64**	**0.64**	**0.48**
Karaka Point	Karaka MET25MAY1	139	58	81	23.19	56.46	33.27	88.9	3.69	4.56
	Karaka MET25MAY2	134	60	74	23.3	57.41	34.11	89.9	3.45	4.66
	Karaka MET25MAY3	168	78	90	23.28	62.03	38.75	87.5	4.84	5.38
	Karaka MET25MAY4	172	75	97	23.28	66.92	43.64	88.7	4.93	5.08
	Karaka MET25MAY5	160	75	85	23.18	60.63	37.45	89.1	4.08	4.80
	Mean	**154.60**	**69.20**	**85.40**	**23.25**	**60.69**	**37.44**	**88.82**	**4.20**	**4.90**
	SD	**17.17**	**9.42**	**8.73**	**0.06**	**4.16**	**4.14**	**0.87**	**0.67**	**0.34**
	CI	**15.05**	**8.26**	**7.66**	**0.05**	**3.65**	**3.63**	**0.76**	**0.59**	**0.29**
Te Toro Boat Ramp	Te Toro Ramp MET25MAY1	185	80	105	22.95	68.59	45.64	89.6	4.75	4.52
	Te Toro Ramp MET25MAY2	169	79	90	23.08	66.51	43.43	88.9	4.82	5.36
	Te Toro Ramp MET25MAY3	156	66	90	23.15	69.57	46.42	88	5.57	6.19
	Te Toro Ramp MET25MAY4	154	64	90	23	67.66	44.66	87.1	5.76	6.40
	Te Toro Ramp MET25MAY5	176	70	106	22.96	62.96	40	88.2	4.72	4.45
	Mean	**168.00**	**71.80**	**96.20**	**23.03**	**67.06**	**44.03**	**88.36**	**5.12**	**5.38**
	SD	**13.17**	**7.36**	**8.50**	**0.09**	**2.56**	**2.52**	**0.94**	**0.50**	**0.91**
	CI	**11.55**	**6.45**	**7.45**	**0.07**	**2.24**	**2.20**	**0.83**	**0.44**	**0.80**
Te Toro Road Settlement	Te Toro Settlement MET25MAY1	174	78	96	23.18	71.35	48.17	89.7	4.96	5.17
	Te Toro Settlement MET25MAY2	181	74	107	23.27	72.05	48.78	88.8	5.46	5.11
	Te Toro Settlement MET25MAY3	156	80	76	23.22	72.95	49.73	89.3	5.32	7.00
	Te Toro Settlement MET25MAY4	152	65	87	23.07	70.5	47.43	92.2	3.70	4.25
	Te Toro Settlement MET25MAY5	182	71	111	23	70.34	47.34	91.2	4.17	3.75
	Mean	**169.00**	**73.60**	**95.40**	**23.15**	**71.44**	**48.29**	**90.24**	**4.72**	**5.06**
	SD	**14.11**	**5.94**	**14.36**	**0.11**	**1.09**	**1.00**	**1.42**	**0.76**	**1.24**
	CI	**12.37**	**5.21**	**12.59**	**0.10**	**0.96**	**0.87**	**1.24**	**0.67**	**1.09**
Gordons Landing	Gordons MET25MAY1	197	82	115	22.99	65.45	42.46	93.5	2.76	2.40
	Gordons MET25MAY2	184	74	110	22.9	58.93	36.03	92.4	2.74	2.49
	Gordons MET25MAY3	164	60	104	22.98	61.03	38.05	93	2.66	2.56
	Gordons MET25MAY4	184	76	108	23.12	63.09	39.97	92.5	3.00	2.78
	Gordons MET25MAY5	156	65	91	23.18	54.16	30.98	92.9	2.20	2.42
	Mean	**177.00**	**71.40**	**105.60**	**23.03**	**60.53**	**37.50**	**92.86**	**2.67**	**2.53**
	SD	**16.64**	**8.82**	**9.07**	**0.11**	**4.31**	**4.35**	**0.44**	**0.29**	**0.15**
	CI	**14.59**	**7.73**	**7.95**	**0.10**	**3.77**	**3.81**	**0.39**	**0.26**	**0.13**

APPENDIX 3 CONTAMINANT DATA IN FARMED OYSTERS

Table A 3.10 Raw Data Metals (mg/kg dry weight) - August 2024

Site	Sample ID	Arsenic	Copper	Lead	Zinc
	Guidelines		34	50	150
Matakawau Headland	Matakawau MET24AUGUST1	14	370	0.30	1200
	Matakawau MET24AUGUST2	14	360	0.32	1300
	Matakawau MET24AUGUST3	14	440	0.34	1600
	Matakawau MET24AUGUST4	14	440	0.34	1600
	Matakawau MET24AUGUST5	13	330	0.30	1200
	Mean	**13.80**	**388.00**	**0.32**	**1380**
	SD	**0.45**	**49.70**	**0.02**	**204.94**
	CI	**0.39**	**43.56**	**0.02**	**179.64**
Karaka Point	Karaka MET24AUGUST1	12	310	0.34	1000
	Karaka MET24AUGUST2	14	270	0.53	1100
	Karaka MET24AUGUST3	14	320	0.50	1200
	Karaka MET24AUGUST4	13	350	0.32	1200
	Karaka MET24AUGUST5	14	340	0.55	1200
	Mean	**13.40**	**318.00**	**0.45**	**1140**
	SD	**0.89**	**31.14**	**0.11**	**89.44**
	CI	**0.78**	**27.30**	**0.10**	**78.40**
Te Toro Boat Ramp	Te Toro Ramp MET24AUGUST1	13	300	0.24	1200
	Te Toro Ramp MET24AUGUST2	12	340	0.28	1100
	Te Toro Ramp MET24AUGUST3	13	400	0.30	1500
	Te Toro Ramp MET24AUGUST4	13	400	0.32	1300
	Te Toro Ramp MET24AUGUST5	13	350	0.27	1200
	Mean	**12.80**	**358.00**	**0.28**	**1260**
	SD	**0.45**	**42.66**	**0.03**	**151.66**
	CI	**0.39**	**37.39**	**0.03**	**132.93**
Te Toro Road Settlement	Te Toro Settlement MET24AUGUST1	14	330	0.31	1200
	Te Toro Settlement MET24AUGUST2	13	320	0.34	1100
	Te Toro Settlement MET24AUGUST3	13	370	0.28	1300
	Te Toro Settlement MET24AUGUST4	13	320	0.23	1200
	Te Toro Settlement MET24AUGUST5	12	370	0.29	1200
	Mean	**13.00**	**342.00**	**0.29**	**1200**
	SD	**0.71**	**25.88**	**0.04**	**70.71**
	CI	**0.62**	**22.69**	**0.04**	**61.98**
Gordons Landing	Gordons MET24AUGUST1	13	470	0.24	1600
	Gordons MET24AUGUST2	13	320	0.20	1100
	Gordons MET24AUGUST3	12	410	0.20	1400
	Gordons MET24AUGUST4	12	330	0.21	1200
	Gordons MET24AUGUST5	11	330	0.20	1100
	Mean	**12.20**	**372.00**	**0.21**	**1280**
	SD	**0.84**	**65.73**	**0.02**	**216.79**
	CI	**0.73**	**57.61**	**0.02**	**190.03**

Table A 3.11 Raw Data Metals (mg/kg dry weight) - October 2024

Site	Sample ID	Arsenic	Copper	Lead	Zinc
	Guidelines		**34**	**50**	**150**
Matakawau Headland	Matakawau MET24OCTOBER1	13	150	0.17	1700
	Matakawau MET24OCTOBER2	15	120	0.21	1400
	Matakawau MET24OCTOBER3	13	340	0.26	1200
	Matakawau MET24OCTOBER4	14	360	0.39	1500
	Matakawau MET24OCTOBER5	14	130	0.21	1600
	Mean	**13.80**	**220**	**0.25**	**1480**
	SD	**0.84**	**119.37**	**0.09**	**192.35**
	CI	**0.73**	**104.64**	**0.07**	**168.61**
Karaka Point	Karaka MET24OCTOBER1	14	310	0.38	1300
	Karaka MET24OCTOBER2	11	290	0.30	1400
	Karaka MET24OCTOBER3	11	420	0.33	1900
	Karaka MET24OCTOBER4	11	280	0.35	1400
	Karaka MET24OCTOBER5	13	330	0.32	1600
	Mean	**12**	**326**	**0.34**	**1520**
	SD	**1.41**	**55.95**	**0.03**	**238.75**
	CI	**1.24**	**49.04**	**0.03**	**209.27**
Te Toro Boat Ramp	Te Toro Ramp MET24OCTOBER1	13	310	0.22	1200
	Te Toro Ramp MET24OCTOBER2	12	350	0.23	1400
	Te Toro Ramp MET24OCTOBER3	11	250	0.25	1100
	Te Toro Ramp MET24OCTOBER4	14	350	0.24	1600
	Te Toro Ramp MET24OCTOBER5	13	370	0.22	1700
	Mean	**12.60**	**326**	**0.23**	**1400**
	SD	**1.14**	**47.75**	**0.01**	**254.95**
	CI	**1.00**	**41.85**	**0.01**	**223.47**
Te Toro Road Settlement	Te Toro Settlement MET24OCTOBER1	11	360	0.22	1200
	Te Toro Settlement MET24OCTOBER2	12	250	0.22	1400
	Te Toro Settlement MET24OCTOBER3	11	360	0.24	1600
	Te Toro Settlement MET24OCTOBER4	13	240	0.22	1300
	Te Toro Settlement MET24OCTOBER5	12	400	0.22	1600
	Mean	**11.80**	**322**	**0.22**	**1420**
	SD	**0.84**	**72.25**	**0.01**	**178.89**
	CI	**0.73**	**63.33**	**0.01**	**156.80**
Gordons Landing	Gordons MET24OCTOBER1	13	470	0.27	1500
	Gordons MET24OCTOBER2	13	480	0.28	1800
	Gordons MET24OCTOBER3	12	520	0.27	1800
	Gordons MET24OCTOBER4	11	610	0.28	1900
	Gordons MET24OCTOBER5	12	500	0.24	1800
	Mean	**12.20**	**516.00**	**0.27**	**1760**
	SD	**0.84**	**55.95**	**0.02**	**151.66**
	CI	**0.73**	**49.04**	**0.01**	**132.93**

Table A 3.12 Raw Data Metals (mg/kg dry weight) - January 2025

Site	Sample ID	Arsenic	Copper	Lead	Zinc
	Guidelines		**34**	**50**	**150**
Matakawau Headland	Matakawau MET25JANUARY1	9	290	0.23	1400
	Matakawau MET25JANUARY2	12	320	0.36	1400
	Matakawau MET25JANUARY3	13	330	0.31	1600
	Matakawau MET25JANUARY4	13	380	0.33	1600
	Matakawau MET25JANUARY5	14	410	0.30	1900
	Mean	**12.20**	**346**	**0.31**	**1580**
	SD	**1.92**	**48.27**	**0.05**	**204.94**
	CI	**1.69**	**42.31**	**0.04**	**179.64**
Karaka Point	Karaka MET25JANUARY1	-	-	-	-
	Karaka MET25JANUARY2	-	-	-	-
	Karaka MET25JANUARY3	-	-	-	-
	Karaka MET25JANUARY4	-	-	-	-
	Karaka MET25JANUARY5	-	-	-	-
	Mean	**-**	**-**	**-**	**-**
	SD	**-**	**-**	**-**	**-**
	CI	**-**	**-**	**-**	**-**
Te Toro Boat Ramp	Te Toro Ramp MET25JANUARY1	-	-	-	-
	Te Toro Ramp MET25JANUARY2	-	-	-	-
	Te Toro Ramp MET25JANUARY3	-	-	-	-
	Te Toro Ramp MET25JANUARY4	-	-	-	-
	Te Toro Ramp MET25JANUARY5	-	-	-	-
	Mean	**-**	**-**	**-**	**-**
	SD	**-**	**-**	**-**	**-**
	CI	**-**	**-**	**-**	**-**
Te Toro Road Settlement	Te Toro Settlement MET25JANUARY1	15	220	0.19	940
	Te Toro Settlement MET25JANUARY2	11	370	0.21	1600
	Te Toro Settlement MET25JANUARY3	14	350	0.24	1500
	Te Toro Settlement MET25JANUARY4	14	440	0.25	1900
	Te Toro Settlement MET25JANUARY5	15	280	0.19	1100
	Mean	**13.80**	**332**	**0.22**	**1408**
	SD	**1.64**	**84.68**	**0.03**	**387.71**
	CI	**1.44**	**74.22**	**0.02**	**339.84**
Gordons Landing	Gordons MET25JANUARY1	12	410	0.22	2000
	Gordons MET25JANUARY2	12	360	0.21	1500
	Gordons MET25JANUARY3	12	510	0.21	2000
	Gordons MET25JANUARY4	11	540	0.26	2300
	Gordons MET25JANUARY5	12	500	0.19	2000
	Mean	**11.80**	**464**	**0.22**	**1960**
	SD	**0.45**	**75.70**	**0.03**	**288.10**
	CI	**0.39**	**66.35**	**0.02**	**252.53**

Table A 3.13 Raw Data Metals (mg/kg dry weight) - March 2025

Site	Month	Arsenic	Copper	Lead	Zinc
	Guideline		**34**	**50**	**150**
Matakawau Headland	Matakawau MET25MARCH1	11	280	0.24	1500
	Matakawau MET25MARCH2	12	290	0.29	1800
	Matakawau MET25MARCH3	11	300	0.28	1600
	Matakawau MET25MARCH4	11	240	0.32	1300
	Matakawau MET25MARCH5	14	320	0.32	1800
	Mean	**11.80**	**286**	**0.29**	**1600**
	SD	**1.30**	**29.66**	**0.03**	**212.13**
	CI	**1.14**	**26.00**	**0.03**	**185.94**
Karaka Point	Karaka MET25MARCH1	11	490	0.20	1800
	Karaka MET25MARCH2	11	640	0.35	2200
	Karaka MET25MARCH3	10	540	0.32	1900
	Karaka MET25MARCH4	12	520	0.25	1700
	Karaka MET25MARCH5	10	430	0.24	1700
	Mean	**10.80**	**524**	**0.27**	**1860**
	SD	**0.84**	**77.01**	**0.06**	**207.36**
	CI	**0.73**	**67.50**	**0.05**	**181.76**
Te Toro Boat Ramp	Te Toro Ramp MET25MARCH1	11	500	0.34	1700
	Te Toro Ramp MET25MARCH2	11	540	0.38	1800
	Te Toro Ramp MET25MARCH3	12	500	0.35	1700
	Te Toro Ramp MET25MARCH4	11	460	0.4	1600
	Te Toro Ramp MET25MARCH5	11	680	0.43	2600
	Mean	**11.20**	**536**	**0.38**	**1880**
	SD	**0.45**	**85.32**	**0.04**	**408.66**
	CI	**0.39**	**74.79**	**0.03**	**358.20**
Te Toro Road Settlement	Te Toro Settlement MET25MARCH1	9.8	430	0.23	2200
	Te Toro Settlement MET25MARCH2	11	630	0.19	2900
	Te Toro Settlement MET25MARCH3	10	430	0.18	2000
	Te Toro Settlement MET25MARCH4	9.9	360	0.19	1900
	Te Toro Settlement MET25MARCH5	11	590	0.19	2600
	Mean	**10.34**	**488**	**0.20**	**2320**
	SD	**0.61**	**115.84**	**0.02**	**420.71**
	CI	**0.53**	**101.54**	**0.02**	**368.77**
Gordons Landing	Gordons MET25MARCH1	10	740	0.21	2800
	Gordons MET25MARCH2	14	410	0.25	1900
	Gordons MET25MARCH3	11	490	0.29	2500
	Gordons MET25MARCH4	13	420	0.22	2200
	Gordons MET25MARCH5	12	450	0.24	2400
	Mean	**12.00**	**502**	**0.24**	**2360**
	SD	**1.58**	**136.64**	**0.03**	**336.15**
	CI	**1.39**	**119.77**	**0.03**	**294.65**

Table A 3.14 Raw Data Metals (mg/kg dry weight) - May 2025

Site	Month	Arsenic	Copper	Lead	Zinc
	Guidelines		**34**	**50**	**150**
Matakawau Headland	Matakawau MET25MAY1	16	280	0.33	1100
	Matakawau MET25MAY2	13	340	0.31	1200
	Matakawau MET25MAY3	15	450	0.34	1800
	Matakawau MET25MAY4	16	410	0.34	1400
	Matakawau MET25MAY5	16	390	0.37	1600
	Mean	**15.20**	**374**	**0.34**	**1420**
	SD	**1.30**	**65.80**	**0.02**	**286.36**
	CI	**1.14**	**57.68**	**0.02**	**251.00**
Karaka Point	Karaka MET25MAY1	15	510	0.27	2000
	Karaka MET25MAY2	14	560	0.29	2400
	Karaka MET25MAY3	15	310	0.27	1800
	Karaka MET25MAY4	14	400	0.27	1700
	Karaka MET25MAY5	14	580	0.28	2300
	Mean	**14.40**	**472**	**0.28**	**2040**
	SD	**0.55**	**114.32**	**0.01**	**304.96**
	CI	**0.48**	**100.21**	**0.01**	**267.31**
Te Toro Boat Ramp	Te Toro Ramp MET25MAY1	14	410	0.28	1900
	Te Toro Ramp MET25MAY2	14	350	0.27	1400
	Te Toro Ramp MET25MAY3	14	310	0.25	1300
	Te Toro Ramp MET25MAY4	15	320	0.25	1500
	Te Toro Ramp MET25MAY5	15	420	0.27	1900
	Mean	**14.40**	**362**	**0.26**	**1600**
	SD	**0.55**	**50.70**	**0.01**	**282.84**
	CI	**0.48**	**44.44**	**0.01**	**247.92**
Te Toro Road Settlement	Te Toro Settlement MET25MAY1	16	410	0.29	1600
	Te Toro Settlement MET25MAY2	16	410	0.26	1500
	Te Toro Settlement MET25MAY3	16	470	0.32	1600
	Te Toro Settlement MET25MAY4	14	540	0.25	2100
	Te Toro Settlement MET25MAY5	15	520	0.28	1700
	Mean	**15.40**	**470**	**0.28**	**1700**
	SD	**0.89**	**60.42**	**0.03**	**234.52**
	CI	**0.78**	**52.96**	**0.02**	**205.57**
Gordons Landing	Gordons MET25MAY1	16	770	0.31	2700
	Gordons MET25MAY2	18	1000	0.36	3100
	Gordons MET25MAY3	16	950	0.35	2700
	Gordons MET25MAY4	17	900	0.32	2800
	Gordons MET25MAY5	17	1100	0.35	3300
	Mean	**16.80**	**944**	**0.34**	**2920**
	SD	**0.84**	**122.19**	**0.02**	**268.33**
	CI	**0.73**	**107.10**	**0.02**	**235.20**

Table A 3.15 Raw Data PAH (ng/g dry weight) - August 2024

Site	Sample ID	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)an-thracene	Benzo(a)py-rene	Benzo(b+k)fl uoranthene	Benzo(ghi)pe rylene	Chrysene	Dibenzo(ah)a nthracene	Fluoranthene	Fluorene	Indeno(1-2-3-c-d)pyrene	Naphthalene	Phenan-threne	Pyrene
Matakawau Headland	Matakawau PAH24AUGUST1	<1.0	<1.0	<1.0	1.3	<2.0	<2.0	<4.0	<1.0	<4.0	2.2	2.2	<4.0	7.4	8.5	1.5
	Matakawau PAH24AUGUST2	1	<1.0	1	<1.0	<2.0	<2.0	<4.0	<1.0	<4.0	2.3	2.2	<4.0	9.1	8.2	1.6
	Matakawau PAH24AUGUST3	<1.0	<1.0	1.9	1.8	<2.0	<2.0	<4.0	<1.0	<4.0	2.9	3.1	<4.0	8.6	12.6	1.9
	Matakawau PAH24AUGUST4	<1.0	<1.0	1.3	1.7	<2.0	<2.0	<4.0	1	<4.0	2.5	2.5	<4.0	8.4	10.7	1.8
	Matakawau PAH24AUGUST5	<1.0	<1.0	1	1.8	<2.0	<2.0	<4.0	1.2	<4.0	2.2	2.3	<4.0	8.8	8.9	1.6
	Mean	**0.20**	**0.00**	**1.04**	**1.32**	**0.00**	**0.00**	**0.00**	**0.44**	**0.00**	**2.42**	**2.46**	**0.00**	**8.46**	**9.78**	**1.68**
	SD	**0.45**	**0.00**	**0.69**	**0.77**	**0.00**	**0.00**	**0.00**	**0.61**	**0.00**	**0.29**	**0.38**	**0.00**	**0.65**	**1.85**	**0.16**
	CI	**0.39**	**0.00**	**0.60**	**0.67**	**0.00**	**0.00**	**0.00**	**0.53**	**0.00**	**0.26**	**0.33**	**0.00**	**0.57**	**1.62**	**0.14**
Karaka Point	Karaka PAH24AUGUST1	1.4	<1.0	1.2	1.5	<2.0	<2.0	<4.0	<1.0	<4.0	2	2.7	<4.0	9.6	10.7	1.4
	Karaka PAH24AUGUST2	1	<1.0	1.3	<1.0	<2.0	<2.0	<4.0	<1.0	<4.0	2.5	2.3	<4.0	8.3	9.5	1.6
	Karaka PAH24AUGUST3	<1.0	<1.0	1.1	1.8	<2.0	<2.0	<4.0	<1.0	<4.0	2.4	2	<4.0	10.1	7.2	1.3
	Karaka PAH24AUGUST4	1	<1.0	1.4	1.7	<2.0	<2.0	<4.0	1	<4.0	2.9	2.5	<4.0	9.5	11.8	1.9
	Karaka PAH24AUGUST5	2	<1.0	1.4	1.6	<2.0	<2.0	<4.0	<1.0	<4.0	2.6	2.4	<4.0	9	10.2	2
	Mean	**1.08**	**0.00**	**1.28**	**1.32**	**0.00**	**0.00**	**0.00**	**0.20**	**0.00**	**2.48**	**2.38**	**0.00**	**9.30**	**9.88**	**1.64**
	SD	**0.73**	**0.00**	**0.13**	**0.75**	**0.00**	**0.00**	**0.00**	**0.45**	**0.00**	**0.33**	**0.26**	**0.00**	**0.68**	**1.72**	**0.30**
	CI	**0.64**	**0.00**	**0.11**	**0.65**	**0.00**	**0.00**	**0.00**	**0.39**	**0.00**	**0.29**	**0.23**	**0.00**	**0.60**	**1.50**	**0.27**
Te Toro Boat Ramp	Te Toro Ramp PAH24AUGUST1	1.5	<1.0	1.3	1.9	<2.0	<2.0	<4.0	<1.0	<4.0	2.9	2.2	<4.0	9	11.3	2.2
	Te Toro Ramp PAH24AUGUST2	1.8	<1.0	1	2.2	<2.0	<2.0	<4.0	<1.0	<4.0	2.2	2.2	<4.0	10.1	9	1.7
	Te Toro Ramp PAH24AUGUST3	1.4	<1.0	1.7	2	<2.0	<2.0	<4.0	<1.0	<4.0	2.9	2.7	<4.0	9.3	13.3	2.4
	Te Toro Ramp PAH24AUGUST4	1.3	<1.0	<1.0	1.6	<2.0	<2.0	<4.0	<1.0	<4.0	2.5	1.9	<4.0	8.5	8.7	1.9
	Te Toro Ramp PAH24AUGUST5	<1.0	<1.0	1.4	1.6	<2.0	<2.0	<4.0	1	<4.0	3.2	2.5	<4.0	9.9	12.1	2.3
	Mean	**1.20**	**0.00**	**1.08**	**1.86**	**0.00**	**0.00**	**0.00**	**0.20**	**0.00**	**2.74**	**2.30**	**0.00**	**9.36**	**10.88**	**2.10**
	SD	**0.70**	**0.00**	**0.65**	**0.26**	**0.00**	**0.00**	**0.00**	**0.45**	**0.00**	**0.39**	**0.31**	**0.00**	**0.65**	**1.99**	**0.29**
	CI	**0.61**	**0.00**	**0.57**	**0.23**	**0.00**	**0.00**	**0.00**	**0.39**	**0.00**	**0.34**	**0.27**	**0.00**	**0.57**	**1.74**	**0.26**
Te Toro Road Settlement	Te Toro Settlement PAH24AUGUST1	1.3	<1.0	1.6	1.7	<2.0	<2.0	<4.0	1	<4.0	2.8	2.9	<4.0	9.6	14	2.1
	Te Toro Settlement PAH24AUGUST2	1.1	<1.0	<1.0	1.4	<2.0	<2.0	<4.0	<1.0	<4.0	2.1	1.7	<4.0	8.9	7.1	1.5
	Te Toro Settlement PAH24AUGUST3	1.2	<1.0	<1.0	1.6	<2.0	<2.0	<4.0	<1.0	<4.0	2.1	1.5	<4.0	9.6	5.7	1.4
	Te Toro Settlement PAH24AUGUST4	<1.0	<1.0	<1.0	1.3	<2.0	<2.0	<4.0	<1.0	<4.0	2.5	1.7	<4.0	10.2	6.2	1.5
	Te Toro Settlement PAH24AUGUST5	1.2	<1.0	1.1	1.6	<2.0	<2.0	<4.0	<1.0	<4.0	2.2	2.2	<4.0	9.4	10.1	1.5
	Mean	**0.96**	**0.00**	**0.54**	**1.52**	**0.00**	**0.00**	**0.00**	**0.20**	**0.00**	**2.34**	**2.00**	**0.00**	**9.54**	**8.62**	**1.60**
	SD	**0.54**	**0.00**	**0.76**	**0.16**	**0.00**	**0.00**	**0.00**	**0.45**	**0.00**	**0.30**	**0.57**	**0.00**	**0.47**	**3.46**	**0.28**
	CI	**0.47**	**0.00**	**0.67**	**0.14**	**0.00**	**0.00**	**0.00**	**0.39**	**0.00**	**0.27**	**0.50**	**0.00**	**0.41**	**3.03**	**0.25**
Gordons Landing	Gordons PAH24AUGUST1	<1.0	<1.0	<1.0	1.5	<2.0	<2.0	<4.0	1.2	<4.0	3.3	1.9	<4.0	10.1	8.1	2.1
	Gordons PAH24AUGUST2	1.3	<1.0	<1.0	<1.0	<2.0	<2.0	<4.0	<1.0	<4.0	2.3	1.7	<4.0	9.4	7.6	1.6
	Gordons PAH24AUGUST3	1.3	<1.0	<1.0	1.4	<2.0	<2.0	<4.0	<1.0	<4.0	2.5	1.8	<4.0	10	8.2	1.9
	Gordons PAH24AUGUST4	1.1	<1.0	1.6	2.4	<2.0	3.6	<4.0	3.6	<4.0	3	2.4	<4.0	9.1	11.6	2.9
	Gordons PAH24AUGUST5	<1.0	<1.0	1.1	1.4	<2.0	<2.0	<4.0	<1.0	<4.0	2.2	1.8	<4.0	9.4	7.7	1.9
	Mean	**0.74**	**0.00**	**0.54**	**1.34**	**0.00**	**0.72**	**0.00**	**0.96**	**0.00**	**2.66**	**1.92**	**0.00**	**9.60**	**8.64**	**2.08**
	SD	**0.68**	**0.00**	**0.76**	**0.86**	**0.00**	**1.61**	**0.00**	**1.56**	**0.00**	**0.47**	**0.28**	**0.00**	**0.43**	**1.67**	**0.49**
	CI	**0.60**	**0.00**	**0.67**	**0.75**	**0.00**	**1.41**	**0.00**	**1.37**	**0.00**	**0.41**	**0.24**	**0.00**	**0.38**	**1.47**	**0.43**

Table A 3.16 Raw Data PAH (ng/g dry weight) - October 2024

Site	Sample ID	Acenaphthene	Acenaph-thylene	Anthracene	Benzo(a)an-thracene	Benzo(a)py-rene	Benzo(b+k)flu-oranthene	Benzo(ghi)pery lene	Chrysene	Dibenzo(ah)an thracene	Fluoranthene	Fluorene	Indeno(1-2-3-c-d)pyrene	Naphthalene	Phenanthrene	Pyrene
Matakawau Headland	Matakawau PAH24OCTOBER1	0.33	0.49	1.82	0.46	0.32	0.4	<1	0.74	<1	2.58	1.45	<1	2.23	6.8	2.87
	Matakawau PAH24OCTOBER2	0.45	0.35	1.2	0.43	0.32	0.47	<1	0.82	<1	2.96	1.72	<1	2.68	8.16	3.42
	Matakawau PAH24OCTOBER3	0.36	0.31	1.24	0.84	0.33	0.23	<1	0.64	<1	1.58	1.25	<1	2.58	4.79	1.55
	Matakawau PAH24OCTOBER4	0.28	0.14	0.28	0.27	<1	0.19	<1	0.46	<1	0.8	0.74	<1	2.66	1.59	0.43
	Matakawau PAH24OCTOBER5	0.26	0.14	0.44	0.29	<1	0.42	<1	0.49	<1	0.79	0.98	<1	4.23	1.55	0.55
	Mean	**0.34**	**0.29**	**1.00**	**0.46**	**0.19**	**0.34**	**0.00**	**0.63**	**0.00**	**1.74**	**1.23**	**0.00**	**2.88**	**4.58**	**1.76**
	SD	**0.08**	**0.15**	**0.63**	**0.23**	**0.18**	**0.12**	**0.00**	**0.16**	**0.00**	**1.00**	**0.38**	**0.00**	**0.78**	**3.00**	**1.35**
	CI	**0.07**	**0.13**	**0.55**	**0.20**	**0.16**	**0.11**	**0.00**	**0.14**	**0.00**	**0.88**	**0.34**	**0.00**	**0.68**	**2.63**	**1.18**
Karaka Point	Karaka PAH24OCTOBER1	0.36	0.47	0.75	0.7	0.38	0.47	<1	0.68	<1	1.8	1.39	<1	2.74	5.74	1.81
	Karaka PAH24OCTOBER2	0.48	0.28	0.88	0.92	0.36	0.39	<1	0.63	<1	2.44	1.51	<1	3.38	7.47	2.81
	Karaka PAH24OCTOBER3	0.41	0.44	0.89	0.98	0.23	0.49	<1	0.6	<1	2.25	1.26	<1	2.37	5.94	2.67
	Karaka PAH24OCTOBER4	0.33	0.35	0.52	0.92	0.43	0.54	<1	0.67	<1	1.55	1.03	<1	2.28	4.44	1.5
	Karaka PAH24OCTOBER5	0.54	0.69	0.66	1.03	0.37	0.38	<1	0.5	<1	1.69	1.67	<1	2.73	6.4	1.69
	Mean	**0.42**	**0.45**	**0.74**	**0.91**	**0.35**	**0.45**	**0.00**	**0.62**	**0.00**	**1.95**	**1.37**	**0.00**	**2.70**	**6.00**	**2.10**
	SD	**0.09**	**0.16**	**0.16**	**0.13**	**0.07**	**0.07**	**0.00**	**0.07**	**0.00**	**0.38**	**0.24**	**0.00**	**0.43**	**1.10**	**0.60**
	CI	**0.08**	**0.14**	**0.14**	**0.11**	**0.07**	**0.06**	**0.00**	**0.06**	**0.00**	**0.33**	**0.21**	**0.00**	**0.38**	**0.96**	**0.53**
Te Toro Boat Ramp	Te Toro Ramp PAH24OCTOBER1	0.44	0.37	1.06	0.43	0.38	0.48	<1	0.58	<1	2.74	1.56	<1	3.25	8.18	3.22
	Te Toro Ramp PAH24OCTOBER2	0.43	0.54	0.87	0.88	0.38	0.46	<1	0.72	<1	2.14	1.4	<1	3.88	6.59	2.09
	Te Toro Ramp PAH24OCTOBER3	0.32	0.29	0.69	0.82	0.31	0.35	<1	0.48	<1	1.47	1.02	<1	2.9	4.88	1.58
	Te Toro Ramp PAH24OCTOBER4	0.42	0.42	0.81	0.48	0.42	0.49	<1	0.58	<1	1.79	1.39	<1	3.5	6.11	1.84
	Te Toro Ramp PAH24OCTOBER5	0.4	0.54	0.66	1.04	0.33	0.45	<1	0.71	<1	2.73	1.32	<1	3.51	7.05	2.9
	Mean	**0.40**	**0.43**	**0.82**	**0.73**	**0.36**	**0.45**	**0.00**	**0.61**	**0.00**	**2.17**	**1.34**	**0.00**	**3.41**	**6.56**	**2.33**
	SD	**0.05**	**0.11**	**0.16**	**0.26**	**0.04**	**0.06**	**0.00**	**0.10**	**0.00**	**0.56**	**0.20**	**0.00**	**0.36**	**1.21**	**0.70**
	CI	**0.04**	**0.10**	**0.14**	**0.23**	**0.04**	**0.05**	**0.00**	**0.09**	**0.00**	**0.49**	**0.17**	**0.00**	**0.32**	**1.06**	**0.62**
Te Toro Road Settlement	Te Toro Settlement PAH24OCTOBER1	0.43	0.33	1.49	0.9	0.4	0.38	<1	0.64	<1	2.78	1.59	<1	3.87	8.91	3.32
	Te Toro Settlement PAH24OCTOBER2	0.42	0.34	1	1.19	0.39	0.37	<1	0.51	<1	2.08	1.24	<1	3.34	5.98	2.34
	Te Toro Settlement PAH24OCTOBER3	0.36	0.28	1.32	1.01	0.37	0.39	<1	0.7	<1	2.92	1.83	<1	4.18	9.82	3.31
	Te Toro Settlement PAH24OCTOBER4	0.54	0.65	1.32	1.02	0.4	0.46	<1	0.68	<1	3.25	2.04	<1	4.47	11.32	3.29
	Te Toro Settlement PAH24OCTOBER5	1.16	0.4	1.64	1.06	0.2	0.36	<1	0.68	<1	3.21	2.23	<1	4.64	12.18	4.01
	Mean	**0.58**	**0.40**	**1.35**	**1.04**	**0.35**	**0.39**	**0.00**	**0.64**	**0.00**	**2.85**	**1.79**	**0.00**	**4.10**	**9.64**	**3.25**
	SD	**0.33**	**0.15**	**0.24**	**0.10**	**0.09**	**0.04**	**0.00**	**0.08**	**0.00**	**0.47**	**0.39**	**0.00**	**0.52**	**2.41**	**0.59**
	CI	**0.29**	**0.13**	**0.21**	**0.09**	**0.08**	**0.03**	**0.00**	**0.07**	**0.00**	**0.41**	**0.34**	**0.00**	**0.45**	**2.11**	**0.52**
Gordons Landing	Gordons PAH24OCTOBER1	0.65	0.45	0.78	0.86	0.44	0.64	<1	0.75	<1	2.42	1.96	<1	3.38	9.26	2.72
	Gordons PAH24OCTOBER2	0.64	0.86	1.67	1.61	0.68	0.92	<1	1.01	<1	4.19	2.44	<1	3.73	13.37	4.66
	Gordons PAH24OCTOBER3	0.53	0.63	1.22	0.92	0.56	1.54	<1	0.93	<1	3.7	2.05	<1	3.99	12.91	4.5
	Gordons PAH24OCTOBER4	0.46	0.42	1.42	0.64	0.31	1	<1	0.64	<1	2.78	1.75	<1	3.31	9.43	2.86
	Gordons PAH24OCTOBER5	0.6	0.98	1.65	1.76	0.52	0.58	<1	0.86	<1	3.31	1.97	<1	3.33	10.7	4.21
	Mean	**0.58**	**0.67**	**1.35**	**1.16**	**0.50**	**0.94**	**0.00**	**0.84**	**0.00**	**3.28**	**2.03**	**0.00**	**3.55**	**11.13**	**3.79**
	SD	**0.08**	**0.25**	**0.37**	**0.50**	**0.14**	**0.38**	**0.00**	**0.15**	**0.00**	**0.71**	**0.25**	**0.00**	**0.30**	**1.92**	**0.93**
	CI	**0.07**	**0.22**	**0.32**	**0.43**	**0.12**	**0.33**	**0.00**	**0.13**	**0.00**	**0.62**	**0.22**	**0.00**	**0.26**	**1.68**	**0.81**

Table A 3.17 Raw Data PAH (ng/g dry weight) - January 2025

Site	Sample ID	Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b+k)fluoranthene	Benzo(ghi)perylene	Chrysene	Dibenzo(ah)anthracene	Fluoranthene	Fluorene	Indeno(1-2-3-c-d)pyrene	Naphthalene	Phenanthrene	Pyrene
Matakawau Headland	Matakawau PAH25JANUARY1	<0.2	<0.2	<0.2	0.67	0.39	0.81	<1	<0.2	<1	1.73	1.27	<1	2.78	1.38	2.24
	Matakawau PAH25JANUARY2	<0.2	0.56	0.89	0.7	< 0.2	0.58	<1	1.16	<1	2.12	1.48	<1	5.53	1.4	2.04
	Matakawau PAH25JANUARY3	0.62	0.44	0.84	0.62	0.55	0.65	<1	0.63	<1	2.96	1.81	<1	13.96	1.93	2.65
	Matakawau PAH25JANUARY4	0.68	0.51	0.6	0.64	0.6	0.74	<1	0.73	<1	2.81	1.81	<1	9.21	2.18	2.38
	Matakawau PAH25JANUARY5	<0.2	<0.2	0.33	0.8	0.53	0.78	<1	0.55	<1	2.44	1.38	<1	6.22	1.02	2.15
	Mean	**0.26**	**0.30**	**0.53**	**0.69**	**0.41**	**0.71**	**0.00**	**0.61**	**0.00**	**2.41**	**1.55**	**0.00**	**7.54**	**1.58**	**2.29**
	SD	**0.36**	**0.28**	**0.37**	**0.07**	**0.24**	**0.10**	**0.00**	**0.42**	**0.00**	**0.50**	**0.25**	**0.00**	**4.26**	**0.47**	**0.24**
	CI	**0.31**	**0.24**	**0.33**	**0.06**	**0.21**	**0.08**	**0.00**	**0.36**	**0.00**	**0.44**	**0.22**	**0.00**	**3.73**	**0.41**	**0.21**
Karaka Point	Karaka PAH25JANUARY1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25JANUARY2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25JANUARY3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25JANUARY4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25JANUARY5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mean	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	SD	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	CI	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Te Toro Boat Ramp	Te Toro Ramp PAH25JANUARY1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Te Toro Ramp PAH25JANUARY2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Te Toro Ramp PAH25JANUARY3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Te Toro Ramp PAH25JANUARY4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Te Toro Ramp PAH25JANUARY5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mean	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	SD	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	CI	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Te Toro Road Settlement	Te Toro Settlement PAH25JANUARY1	<0.2	0.5	0.48	0.7	0.5	0.46	<1	0.69	<1	2.72	1.26	<1	3.71	1.31	2.3
	Te Toro Settlement PAH25JANUARY2	0.59	0.23	0.59	0.57	0.48	0.22	<1	0.49	<1	2.88	1.71	<1	6.53	1.86	2.34
	Te Toro Settlement PAH25JANUARY3	<0.2	0.38	1.03	<0.2	<0.2	0.37	<1	0.6	<1	3.61	2.17	<1	17.5	2.98	2.65
	Te Toro Settlement PAH25JANUARY4	<0.2	0.49	0.75	0.61	0.65	0.43	<1	0.87	<1	3.22	1.71	<1	9.97	2.1	2.83
	Te Toro Settlement PAH25JANUARY5	<0.2	< 0.2	0.91	0.67	< 0.2	0.37	<1	0.74	<1	2.5	1.91	<1	7.96	3.42	1.89
	Mean	**0.12**	**0.32**	**0.75**	**0.51**	**0.33**	**0.37**	**0.00**	**0.68**	**0.00**	**2.99**	**1.75**	**0.00**	**9.13**	**2.33**	**2.40**
	SD	**0.26**	**0.21**	**0.22**	**0.29**	**0.30**	**0.09**	**0.00**	**0.14**	**0.00**	**0.44**	**0.33**	**0.00**	**5.20**	**0.86**	**0.36**
	CI	**0.23**	**0.18**	**0.20**	**0.25**	**0.27**	**0.08**	**0.00**	**0.13**	**0.00**	**0.38**	**0.29**	**0.00**	**4.56**	**0.75**	**0.32**
Gordons Landing	Gordons PAH25JANUARY1	<0.2	0.32	0.93	0.46	1.15	0.89	<1	1.54	<1	3.77	1.47	<1	4.96	2.1	2.8
	Gordons PAH25JANUARY2	<0.2	0.37	0.67	0.67	0.59	0.43	<1	0.89	<1	2.44	1.77	<1	6.29	1.41	2.01
	Gordons PAH25JANUARY3	<0.2	0.22	0.68	0.63	0.65	0.64	<1	0.69	<1	2.66	1.66	<1	4.48	1.74	2.25
	Gordons PAH25JANUARY4	<0.2	0.55	1.11	<0.2	0.88	0.58	<1	1.45	<1	3.39	2.12	<1	11.08	1.54	2.55
	Gordons PAH25JANUARY5	0.59	0.53	0.63	<0.2	0.89	0.47	<1	0.94	<1	2.97	1.96	<1	4.02	2.25	2.24
	Mean	**0.12**	**0.40**	**0.80**	**0.35**	**0.83**	**0.60**	**0.00**	**1.10**	**0.00**	**3.05**	**1.80**	**0.00**	**6.17**	**1.81**	**2.37**
	SD	**0.26**	**0.14**	**0.21**	**0.33**	**0.22**	**0.18**	**0.00**	**0.37**	**0.00**	**0.54**	**0.25**	**0.00**	**2.88**	**0.36**	**0.31**
	CI	**0.23**	**0.12**	**0.18**	**0.29**	**0.20**	**0.16**	**0.00**	**0.33**	**0.00**	**0.47**	**0.22**	**0.00**	**2.52**	**0.31**	**0.27**

Table A 3.18 Raw Data PAH (ng/g dry weight) - March 2025

Site	Sample ID	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)an-thracene	Benzo(a)py-rene	Benzo(b+k)fl uoranthene	Benzo(ghi)pe rylene	Chrysene	Dibenzo(ah)a nthracene	Fluoranthene	Fluorene	Indeno(1-2-3-c-d)pyrene	Naphthalene	Phenan-threne	Pyrene
Matakawau Headland	Matakawau PAH25MARCH1	<0.2	<0.2	<0.2	< 0.2	< 0.2	< 0.2	<1	<1	<0.2	2.89	1.38	<1	8.95	4.28	2.28
	Matakawau PAH25MARCH2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	6.14	2.12	<1	18.74	7.07	5.43
	Matakawau PAH25MARCH3	<0.2	<0.2	< 0.2	< 0.2	< 0.2	< 0.2	<1	<1	< 0.2	2.09	1.14	<1	10.81	4.63	1.65
	Matakawau PAH25MARCH4	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	<1	<1	<0.2	2.14	<0.2	<1	10.81	4.63	1.65
	Matakawau PAH25MARCH5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.3	1.4	<1	11.79	4.53	1.8
	Mean	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.11**	**1.21**	**0.00**	**12.22**	**5.03**	**2.56**
	SD	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.72**	**0.77**	**0.00**	**3.79**	**1.15**	**1.62**
	CI	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**1.51**	**0.67**	**0.00**	**3.32**	**1.01**	**1.42**
Karaka Point	Karaka PAH25MARCH1	<0.2	<0.2	<0.2	< 0.2	<0.2	< 0.2	<1	<1	< 0.2	2.81	2.14	<1	15.42	5.74	2.41
	Karaka PAH25MARCH2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	<1	<1	<0.2	2.19	1.87	<1	12.26	5.28	2.38
	Karaka PAH25MARCH3	< 0.2	< 0.2	< 0.2	< 0.2	<0.2	< 0.2	<1	<1	< 0.2	3.01	1.47	<1	14.94	4.9	2.61
	Karaka PAH25MARCH4	< 0.2	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	<1	<1	<0.2	3.25	1.78	<1	14.36	5.98	2.93
	Karaka PAH25MARCH5	< 0.2	<0.2	< 0.2	< 0.2	< 0.2	<0.2	<1	<1	<0.2	2.7	1.78	<1	13.73	5.77	2.24
	Mean	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.79**	**1.81**	**0.00**	**14.14**	**5.53**	**2.51**
	SD	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.40**	**0.24**	**0.00**	**1.23**	**0.44**	**0.27**
	CI	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.35**	**0.21**	**0.00**	**1.08**	**0.38**	**0.23**
Te Toro Boat Ramp	Te Toro Ramp PAH25MARCH1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.95	2.19	<1	19.32	5.32	2.28
	Te Toro Ramp PAH25MARCH2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.48	1.68	<1	16.54	4.35	2.17
	Te Toro Ramp PAH25MARCH3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	3.79	1.56	<1	16.91	3.79	3.36
	Te Toro Ramp PAH25MARCH4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	3.71	0.21	<1	17.27	2.41	2.08
	Te Toro Ramp PAH25MARCH5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	3.25	4.48	<1	8.61	9.77	1.86
	Mean	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.24**	**2.02**	**0.00**	**15.73**	**5.13**	**2.35**
	SD	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.54**	**1.56**	**0.00**	**4.12**	**2.80**	**0.59**
	CI	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.48**	**1.36**	**0.00**	**3.61**	**2.45**	**0.51**
Te Toro Road Settlement	Te Toro Settlement PAH25MARCH1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	4.18	<0.2	<1	0.24	3.62	2.43
	Te Toro Settlement PAH25MARCH2	4.66	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	3.01	8.09	<1	12.38	12.44	1.66
	Te Toro Settlement PAH25MARCH3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	3.8	<0.2	<1	7.1	2.23	1.85
	Te Toro Settlement PAH25MARCH4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.5	<0.2	<1	3.95	0.97	1.27
	Te Toro Settlement PAH25MARCH5	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.64	<0.2	<1	2.1	2.45	1.28
	Mean	**0.93**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**3.23**	**1.62**	**0.00**	**5.15**	**4.34**	**1.70**
	SD	**2.08**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.73**	**3.62**	**0.00**	**4.77**	**4.62**	**0.48**
	CI	**1.83**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.64**	**3.17**	**0.00**	**4.18**	**4.05**	**0.42**
Gordons Landing	Gordons PAH25MARCH1	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	3.32	<0.2	<1	1.11	2.09	1.51
	Gordons PAH25MARCH2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.88	<0.2	<1	2.31	1.97	1.55
	Gordons PAH25MARCH3	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.41	<0.2	<1	2.43	2.14	1.51
	Gordons PAH25MARCH4	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<1	<1	<0.2	2.65	<0.2	<1	2.99	1.98	1.62
	Gordons PAH25MARCH5	2.39	<0.2	<0.2	2.058	<0.2	<0.2	<1	<1	<0.2	1.52	3.83	<1	4.51	4.8	0.66
	Mean	**0.48**	**0.00**	**0.00**	**0.41**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**2.56**	**0.77**	**0.00**	**2.67**	**2.60**	**1.37**
	SD	**1.07**	**0.00**	**0.00**	**0.92**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.67**	**1.71**	**0.00**	**1.24**	**1.23**	**0.40**
	CI	**0.94**	**0.00**	**0.00**	**0.81**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.59**	**1.50**	**0.00**	**1.08**	**1.08**	**0.35**

Table A 3.19 Raw Data PAH (ng/g dry weight) - May 2025

Site	Sample ID	Acenaph-thene	Acenaph-thylene	Anthracene	Benzo(a)an-thracene	Benzo(a)py-rene	Benzo(b+k)f luoran-...	Benzo(ghi)p erylene	Chrysene	Dibenzo(ah) anthracene	Fluoran-thene	Fluorene	Indeno(1-2-3-c-d)py-	Naphtha-lene	Phenan-threne	Pyrene
Matakawau Headland	Karaka PAH25MAY1	<0.2	0.4	<0.2	0.9	<0.2	1.3	2.4	1.7	1.7	3.4	1.1	<1.0	8.7	3.9	2.1
	Karaka PAH25MAY2	<0.2	<0.2	<0.2	0.6	<0.2	0.8	1.9	1.2	1.2	2.4	1	<1.0	6.7	3.4	1.5
	Karaka PAH25MAY3	<0.2	0.5	<0.2	1.3	<0.2	1.8	2.3	2.9	2.1	4.9	1.8	1.3	17	7.4	3.1
	Karaka PAH25MAY4	<0.2	<0.2	<0.2	0.8	<0.2	1.2	1.8	1.3	1.4	3.5	1	<1.0	11	4.7	1.9
	Karaka PAH25MAY5	<0.2	<0.2	<0.2	0.6	<0.2	0.5	<1.0	0.6	<1.0	2	0.9	<1.0	7	2.9	1.1
	Mean	**0.00**	**0.18**	**0.00**	**0.84**	**0.00**	**1.12**	**1.68**	**1.54**	**1.28**	**3.24**	**1.16**	**0.26**	**10.08**	**4.46**	**1.94**
	SD	**0.00**	**0.25**	**0.00**	**0.29**	**0.00**	**0.50**	**0.97**	**0.86**	**0.79**	**1.13**	**0.36**	**0.58**	**4.23**	**1.77**	**0.75**
	CI	**0.00**	**0.22**	**0.00**	**0.25**	**0.00**	**0.44**	**0.85**	**0.75**	**0.69**	**0.99**	**0.32**	**0.51**	**3.71**	**1.55**	**0.66**
Karaka Point	Karaka PAH25MAY1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25MAY2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25MAY3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25MAY4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Karaka PAH25MAY5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mean	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	SD	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
	CI	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**	**-**
Te Toro Boat Ramp	Te Toro Ramp PAH25MAY1	<0.2	0.7	<0.2	0.8	0.8	1	1	1.8	<1.0	7.7	1.5	<1.0	9.9	8.6	4.3
	Te Toro Ramp PAH25MAY2	<0.2	0.4	<0.2	0.7	0.5	0.7	<1.0	1.2	<1.0	5.5	1.2	<1.0	8.6	6	3.1
	Te Toro Ramp PAH25MAY3	<0.2	0.4	<0.2	0.6	0.9	0.9	<1.0	1.3	<1.0	8	1.3	<1.0	10	7.9	4
	Te Toro Ramp PAH25MAY4	<0.2	0.5	<0.2	1.9	1.9	1.9	1.4	2.6	1	13	2.3	<1.0	16	13	6
	Te Toro Ramp PAH25MAY5	<0.2	<0.2	<0.2	0.4	0.4	0.6	<1.0	0.7	<1.0	3.2	1.1	<1.0	10	3.9	1.9
	Mean	**0.00**	**0.40**	**0.00**	**0.88**	**0.90**	**1.02**	**0.48**	**1.52**	**0.20**	**7.48**	**1.48**	**0.00**	**10.90**	**7.88**	**3.86**
	SD	**0.00**	**0.25**	**0.00**	**0.59**	**0.60**	**0.52**	**0.67**	**0.72**	**0.45**	**3.64**	**0.48**	**0.00**	**2.91**	**3.40**	**1.52**
	CI	**0.00**	**0.22**	**0.00**	**0.52**	**0.52**	**0.45**	**0.59**	**0.63**	**0.39**	**3.19**	**0.42**	**0.00**	**2.55**	**2.98**	**1.33**
Te Toro Road Settlement	Te Toro Settlement PAH25MAY1	<0.2	<0.2	<0.2	0.7	0.8	1	<1.0	1.7	<1.0	9.1	2.7	<1.0	15	10	4.6
	Te Toro Settlement PAH25MAY2	<0.2	0.4	<0.2	0.5	<0.2	0.6	<1.0	0.9	<1.0	4.5	1.4	<1.0	10	5.7	2.5
	Te Toro Settlement PAH25MAY3	<0.2	<0.2	<0.2	0.8	0.5	0.6	<1.0	1.1	<1.0	7.2	1.1	<1.0	14	7.2	3.4
	Te Toro Settlement PAH25MAY4	<0.2	0.2	<0.2	0.6	<0.2	0.4	<1.0	0.5	<1.0	3.2	0.8	<1.0	5.9	3.4	1.7
	Te Toro Settlement PAH25MAY5	<0.2	<0.2	<0.2	2.4	<0.2	1.8	<1.0	2.9	1.6	10	2.8	<1.0	18	12	5.3
	Mean	**0.00**	**0.12**	**0.00**	**1.00**	**0.26**	**0.88**	**0.00**	**1.42**	**0.32**	**6.80**	**1.76**	**0.00**	**12.58**	**7.66**	**3.50**
	SD	**0.00**	**0.18**	**0.00**	**0.79**	**0.37**	**0.56**	**0.00**	**0.93**	**0.72**	**2.91**	**0.93**	**0.00**	**4.70**	**3.41**	**1.47**
	CI	**0.00**	**0.16**	**0.00**	**0.69**	**0.33**	**0.49**	**0.00**	**0.82**	**0.63**	**2.55**	**0.81**	**0.00**	**4.12**	**2.99**	**1.29**
Gordons Landing	Gordons PAH25MAY1	<0.2	<0.2	<0.2	0.5	<0.2	0.9	<1.0	0.7	<1.0	3.5	1.4	<1.0	8.5	5.1	2.2
	Gordons PAH25MAY2	<0.2	<0.2	<0.2	1.1	<0.2	1.2	<1.0	1.2	<1.0	4.6	1.7	<1.0	9.7	5.3	2.9
	Gordons PAH25MAY3	<0.2	<0.2	<0.2	1.2	<0.2	0.7	<1.0	0.5	<1.0	2.9	1	<1.0	6.9	3	1.7
	Gordons PAH25MAY4	<0.2	<0.2	<0.2	0.8	<0.2	1.3	<1.0	1.3	<1.0	5.2	1.2	<1.0	8.7	5.2	3.4
	Gordons PAH25MAY5	<0.2	<0.2	<0.2	0.6	<0.2	0.7	<1.0	0.6	<1.0	3.3	1.1	<1.0	7.4	4.2	2.2
	Mean	**0.00**	**0.00**	**0.00**	**0.84**	**0.00**	**0.96**	**0.00**	**0.86**	**0.00**	**3.90**	**1.28**	**0.00**	**8.24**	**4.56**	**2.48**
	SD	**0.00**	**0.00**	**0.00**	**0.30**	**0.00**	**0.28**	**0.00**	**0.36**	**0.00**	**0.96**	**0.28**	**0.00**	**1.11**	**0.98**	**0.67**
	CI	**0.00**	**0.00**	**0.00**	**0.27**	**0.00**	**0.24**	**0.00**	**0.32**	**0.00**	**0.84**	**0.24**	**0.00**	**0.97**	**0.86**	**0.59**

Table A 3.20 Raw Data for Faecal Coliforms (MPN/100g) from August 2024 to May 2025

Faecal Coliforms				Replicates						>230		>330	
Sites	Month	Year	Weather	1	2	3	4	5	Median	Number exceeding	Compliant	Number exceeding	Compliant
Matakawau Headland	August	2024	Dry	170	490	490	220	330	330	3/5	No	2/5	No
	October	2024	Dry-	490	330	490	790	790	490	5/5	No	4/5	No
	January	2025	Dry-	1300	490	790	1300	490	790	5/5	No	5/5	No
	March	2025	Wet	45	78	220	-	-	78	0/5	Yes	0/5	Yes
	May	2025	Dry-	20	45	40	230	270	45	1/5	Yes	0/5	Yes
Karaka Point	August	2024	Dry	78	130	20	45	330	78	1/5	Yes	0/5	Yes
	October	2024	Dry-	45	130	18	<18	45	45	0/5	Yes	0/5	Yes
	January	2025	Dry-	-	-	-	-	-	-	-	-	-	-
	March	2025	Wet	45	78	78	-	-	78	0/3	Yes	0/3	Yes
	May	2025	Dry-	45	230	45	45	130	45	0/5	Yes	0/5	Yes
Te Toro Boat Ramp	August	2024	Dry	110	45	330	120	140	120	1/5	Yes	0/5	Yes
	October	2024	Dry-	78	230	<18	68	170	78	0/5	Yes	0/5	Yes
	January	2025	Dry-	-	-	-	-	-	-	-	-	-	-
	March	2025	Wet	45	45	<18	-	-	45	0/3	Yes	0/3	Yes
	May	2025	Dry-	230	170	330	78	790	230	2/5	No	1/5	No
Te Toro Road Settlement	August	2024	Dry	<18	110	<18	<18	18	0	0/5	Yes	0/5	Yes
	October	2024	Dry-	<18	<18	<18	20	<18	0	0/5	Yes	0/5	Yes
	January	2025	Dry-	<18	<18	<18	<18	<18	0	0/5	Yes	0/5	Yes
	March	2025	Wet	-	20	<18	<18	20	10	0/4	Yes	0/4	Yes
	May	2025	Dry-	170	20	20	20	230	20	0/5	Yes	0/5	Yes
Gordons Landing	August	2024	Dry	45	45	110	78	110	78	0/5	Yes	0/5	Yes
	October	2024	Dry-	45	20	<18	<18	45	20	0/5	Yes	0/5	Yes
	January	2025	Dry-	<18	93	78	170	<18	78	0/5	Yes	0/5	Yes
	March	2025	Wet	20	<18	<18	20	<18	0	0/5	Yes	0/5	Yes
	May	2025	Dry-	310	130	<18	20	78	78	1/5	Yes	0/5	Yes

Table A 3.21 Raw Data for Enterococci (MPN/100g) and Enterovirus (pfu/100g) from August 2024 to May 2025.

Sites	Month	Year	Weather	Enterococci						Enterovirus			
				1	2	3	4	5	Median	1	2	3	Median
Matakawau Headland	August	2024	Dry	45	78	78	20	230	**78**	<4.0	<4.0	<4.0	**<4.0**
	October	2024	Dry-	78	170	2300	330	45	**170**	<4.0	<4.0	<4.0	**<4.0**
	January	2025	Dry-	460	790	2300	3300	2300	**2300**	<4.0	<4.0	<4.0	**<4.0**
	March	2025	Wet	230	490	110	45	130	**130**	<4.0	<4.0	<4.0	**<4.0**
	May	2025	Dry-	170	140	78	170	130	**140**	<4.0	<4.0	<4.0	**<4.0**
Karaka Point	August	2024	Dry	78	20	45	40	20	**40**	<4.0	<4.0	<4.0	**<4.0**
	October	2024	Dry-	<18	20	20	45	45	**20**	<4.0	<4.0	<4.0	**<4.0**
	January	2025	Dry-	-	-	-	-	-	**-**	-	-	-	**-**
	March	2025	Wet	<18	78	45	78	45	**45**	<4.0	<4.0	<4.0	**<4.0**
	May	2025	Dry-	130	330	700	130	45	**130**	<4.0	<4.0	-	**<4.0**
Te Toro Boat Ramp	August	2024	Dry	78	130	61	20	18	**61**	<4.0	<4.0	<4.0	**<4.0**
	October	2024	Dry-	790	130	<18	<18	20	**20**	<4.0	<4.0	<4.0	**<4.0**
	January	2025	Dry-	-	-	-	-	-	**-**	-	-	-	**-**
	March	2025	Wet	490	78	790	170	78	**170**	<4.0	<4.0	<4.0	**<4.0**
	May	2025	Dry-	230	330	140	230	330	**230**	<4.0	<4.0	<4.0	**<4.0**
Te Toro Road Settlement	August	2024	Dry	20	<18	20	20	<18	**20**	<4.0	<4.0	<4.0	**<4.0**
	October	2024	Dry-	<18	<18	<18	20	<18	**0**	<4.0	<4.0	<4.0	**<4.0**
	January	2025	Dry-	<18	<18	45	78	<18	**0**	<4.0	<4.0	<4.0	**<4.0**
	March	2025	Wet	230	45	45	78	170	**78**	<4.0	<4.0	<4.0	**<4.0**
	May	2025	Dry-	78	790	110	78	110	**110**	<4.0	<4.0	<4.0	**<4.0**
Gordons Landing	August	2024	Dry	170	78	490	140	110	**140**	<4.0	<4.0	<4.0	**<4.0**
	October	2024	Dry-	<18	<18	<18	40	45	**0**	<4.0	<4.0	<4.0	**<4.0**
	January	2025	Dry-	170	68	68	45	18	**68**	<4.0	<4.0	<4.0	**<4.0**
	March	2025	Wet	170	68	110	170	20	**110**	<4.0	<4.0	<4.0	**<4.0**
	May	2025	Dry-	78	68	1300	1300	220	**220**	<4.0	<4.0	<4.0	**<4.0**

Certificate of Analysis Metals & PAH - August 2024

Watercare
Laboratory Services

Watercare Services Limited
52 Aintree Ave, Māngere, Auckland, 2022
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Certificate of Analysis
Laboratory Reference:240827-106

Attention:	Laureline Meynier	*Final Report:*	**562485-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**11-Sep-2024**
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**27-Aug-2024**
Client Reference:	**SW Clark WWTP Monitoring - Contaminants**	*Laboratory Activity Dates:*	**28-Aug-2024 - 11-Sep-2024**
Purchase Order:	**Y-3310-LB-002**	*Quote Reference :*	**16391**

Sample Details					
Lab Sample ID:		**240827-106-1**	**240827-106-2**	**240827-106-3**	**240827-106-4**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Matakawau MET24WI 1 Wet	Matakawau MET24WI 2 Wet	Matakawau MET24WI 3 Wet	Matakawau MET24WI 4 Wet
General Testing					
Percentage Moisture	%	88.8	88.3	87.3	88.8
Percentage Solids	%	11.2	11.7	12.7	11.2
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	14	14	14
Copper (Recoverable Dry Wt.)	mg/kg	370	360	290	440
Lead (Recoverable Dry Wt.)	mg/kg	0.3	0.32	0.34	0.34
Zinc (Recoverable Dry Wt.)	mg/kg	1200	1300	890	1600

Sample Details					
Lab Sample ID:		**240827-106-5**	**240827-106-6**	**240827-106-7**	**240827-106-8**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Matakawau MET24WI 5 Wet	Matakawau PAH24WI 1 Wet	Matakawau PAH24WI 2 Wet	Matakawau PAH24WI 3 Wet
General Testing					
Percentage Moisture	%	87.9	-	-	-
Percentage Solids	%	12.1	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	330	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.3	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1200	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	<1.0 *	1.0 *	<1.0 *
Acenaphthylene	ng/g	-	<1.0 *	<1.0 *	<1.0 *
Anthracene	ng/g	-	<1.0 *	1.0 *	1.9 *
Benzo(a)anthracene	ng/g	-	1.3 *	<1.0 *	1.8 *
Benzo(a)pyrene	ng/g	-	<2.0 *	<2.0 *	<2.0 *
Benzo(b+k)fluoranthene	ng/g	-	<2.0 *	<2.0 *	<2.0 *
Benzo(ghi)perylene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Chrysene	ng/g	-	<1.0 *	<1.0 *	<1.0 *
Comments		-	Sample tested using GCMS *	Sample tested using GCMS *	Sample tested using GCMS *
Dibenzo(ah)anthracene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Fluoranthene	ng/g	-	2.2 *	2.3 *	2.9 *
Fluorene	ng/g	-	2.2 *	2.2 *	3.1 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Naphthalene	ng/g	-	7.4 *	9.1 *	8.6 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**240827-106-5**	**240827-106-6**	**240827-106-7**	**240827-106-8**
Client Sample ID:					
Sample Date/Time:		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Matakawau MET24WI 5 Wet	Matakawau PAH24WI 1 Wet	Matakawau PAH24WI 2 Wet	Matakawau PAH24WI 3 Wet
Organics					
Adhoc investigation					
Phenanthrene	ng/g	-	8.5 *	8.2 *	12.6 *
Pyrene	ng/g	-	1.5 *	1.6 *	1.9 *

Sample Details					
Lab Sample ID:		**240827-106-9**	**240827-106-10**	**240827-106-11**	**240827-106-12**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Matakawau PAH24WI 4 Wet	Matakawau PAH24WI 5 Wet	Karaka MET24WI1 Wet	Karaka MET24WI2 Wet
General Testing					
Percentage Moisture	%	-	-	88.4	89.3
Percentage Solids	%	-	-	11.6	10.7
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	12	14
Copper (Recoverable Dry Wt.)	mg/kg	-	-	310	270
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.34	0.53
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	1000	1100
Organics					
Adhoc investigation					
Acenaphthene	ng/g	<1.0 *	<1.0 *	-	-
Acenaphthylene	ng/g	<1.0 *	<1.0 *	-	-
Anthracene	ng/g	1.3 *	1.0 *	-	-
Benzo(a)anthracene	ng/g	1.7 *	1.8 *	-	-
Benzo(a)pyrene	ng/g	<2.0 *	<2.0 *	-	-
Benzo(b+k)fluoranthene	ng/g	<2.0 *	<2.0 *	-	-
Benzo(ghi)perylene	ng/g	<4.0 *	<4.0 *	-	-
Chrysene	ng/g	1.0 *	1.2 *	-	-
Comments		Sample tested using GCMS *	Sample tested using GCMS *	-	-
Dibenzo(ah)anthracene	ng/g	<4.0 *	<4.0 *	-	-
Fluoranthene	ng/g	2.5 *	2.2 *	-	-
Fluorene	ng/g	2.5 *	2.3 *	-	-
Indeno(1-2-3-c-d)pyrene	ng/g	<4.0 *	<4.0 *	-	-
Naphthalene	ng/g	8.4 *	8.8 *	-	-
Phenanthrene	ng/g	10.7 *	8.9 *	-	-
Pyrene	ng/g	1.8 *	1.6 *	-	-

Sample Details					
Lab Sample ID:		**240827-106-13**	**240827-106-14**	**240827-106-15**	**240827-106-16**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Karaka MET24WI3 Wet	Karaka MET24WI4 Wet	Karaka MET24WI5 Wet	Karaka PAH24WI1 Wet
General Testing					
Percentage Moisture	%	87.8	88.5	89.0	-
Percentage Solids	%	12.2	11.5	11.0	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	13	14	-
Copper (Recoverable Dry Wt.)	mg/kg	320	350	340	-
Lead (Recoverable Dry Wt.)	mg/kg	0.5	0.32	0.55	-
Zinc (Recoverable Dry Wt.)	mg/kg	1200	1200	1200	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	-	-	1.4 *
Acenaphthylene	ng/g	-	-	-	<1.0 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**240827-106-13**	**240827-106-14**	**240827-106-15**	**240827-106-16**
Client Sample ID:					
Sample Date/Time:		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Karaka MET24WI3 Wet	Karaka MET24WI4 Wet	Karaka MET24WI5 Wet	Karaka PAH24WI1 Wet
Organics					
Adhoc investigation					
Anthracene	ng/g	-	-	-	1.2 *
Benzo(a)anthracene	ng/g	-	-	-	1.5 *
Benzo(a)pyrene	ng/g	-	-	-	<2.0 *
Benzo(b+k)fluoranthene	ng/g	-	-	-	<2.0 *
Benzo(ghi)perylene	ng/g	-	-	-	<4.0 *
Chrysene	ng/g	-	-	-	<1.0 *
Comments		-	-	-	Sample tested using GCMS *
Dibenzo(ah)anthracene	ng/g	-	-	-	<4.0 *
Fluoranthene	ng/g	-	-	-	2.0 *
Fluorene	ng/g	-	-	-	2.7 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	-	-	<4.0 *
Naphthalene	ng/g	-	-	-	9.6 *
Phenanthrene	ng/g	-	-	-	10.7 *
Pyrene	ng/g	-	-	-	1.4 *

Sample Details					
Lab Sample ID:		**240827-106-17**	**240827-106-18**	**240827-106-19**	**240827-106-20**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Karaka PAH24WI2 Wet	Karaka PAH24WI3 Wet	Karaka PAH24WI4 Wet	Karaka PAH24WI5 Wet
Organics					
Adhoc investigation					
Acenaphthene	ng/g	1.0 *	<1.0 *	1.0 *	2.0 *
Acenaphthylene	ng/g	<1.0 *	<1.0 *	<1.0 *	<1.0 *
Anthracene	ng/g	1.3 *	1.1 *	1.4 *	1.4 *
Benzo(a)anthracene	ng/g	<1.0 *	1.8 *	1.7 *	1.6 *
Benzo(a)pyrene	ng/g	<2.0 *	<2.0 *	<2.0 *	<2.0 *
Benzo(b+k)fluoranthene	ng/g	<2.0 *	<2.0 *	<2.0 *	<2.0 *
Benzo(ghi)perylene	ng/g	<4.0 *	<4.0 *	<4.0 *	<4.0 *
Chrysene	ng/g	<1.0 *	<1.0 *	1.0 *	<1.0 *
Comments		Sample tested using GCMS *	Sample tested using GCMS *	Sample tested using GCMS *	Sample tested using GCMS *
Dibenzo(ah)anthracene	ng/g	<4.0 *	<4.0 *	<4.0 *	<4.0 *
Fluoranthene	ng/g	2.5 *	2.4 *	2.9 *	2.6 *
Fluorene	ng/g	2.3 *	2.0 *	2.5 *	2.4 *
Indeno(1-2-3-c-d)pyrene	ng/g	<4.0 *	<4.0 *	<4.0 *	<4.0 *
Naphthalene	ng/g	8.3 *	10.1 *	9.5 *	9.0 *
Phenanthrene	ng/g	9.5 *	7.2 *	11.8 *	10.2 *
Pyrene	ng/g	1.6 *	1.3 *	1.9 *	2.0 *

Sample Details					
Lab Sample ID:		**240827-106-21**	**240827-106-22**	**240827-106-23**	**240827-106-24**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Toro Ramp MET24WI 1 Wet	Toro Ramp MET24WI 2 Wet	Toro Ramp MET24WI 3 Wet	Toro Ramp MET24WI 4 Wet
General Testing					
Percentage Moisture	%	88.7	90.0	89.7	90.0
Percentage Solids	%	11.3	10.0	10.3	10.0
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	12	13	13
Copper (Recoverable Dry Wt.)	mg/kg	300	340	400	400
Lead (Recoverable Dry Wt.)	mg/kg	0.24	0.28	0.3	0.32
Zinc (Recoverable Dry Wt.)	mg/kg	1200	1100	1500	1300

Sample Details					
Lab Sample ID:		**240827-106-25**	**240827-106-26**	**240827-106-27**	**240827-106-28**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Toro Ramp MET24WI 5 Wet	Toro Ramp PAH24WI 1 Wet	Toro Ramp PAH24WI 2 Wet	Toro Ramp PAH24WI3 Wet
General Testing					
Percentage Moisture	%	88.9	-	-	-
Percentage Solids	%	11.1	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	350	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.27	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1200	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	1.5 *	1.8 *	1.4 *
Acenaphthylene	ng/g	-	<1.0 *	<1.0 *	<1.0 *
Anthracene	ng/g	-	1.3 *	1.0 *	1.7 *
Benzo(a)anthracene	ng/g	-	1.9 *	2.2 *	2.0 *
Benzo(a)pyrene	ng/g	-	<2.0 *	<2.0 *	<2.0 *
Benzo(b+k)fluoranthene	ng/g	-	<2.0 *	<2.0 *	<2.0 *
Benzo(ghi)perylene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Chrysene	ng/g	-	<1.0 *	<1.0 *	<1.0 *
Comments		-	Sample tested using GCMS *	Sample tested using GCMS *	Sample tested using GCMS *
Dibenzo(ah)anthracene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Fluoranthene	ng/g	-	2.9 *	2.2 *	2.9 *
Fluorene	ng/g	-	2.2 *	2.2 *	2.7 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Naphthalene	ng/g	-	9.0 *	10.1 *	9.3 *
Phenanthrene	ng/g	-	11.3 *	9.0 *	13.3 *
Pyrene	ng/g	-	2.2 *	1.7 *	2.4 *

Sample Details					
Lab Sample ID:		**240827-106-29**	**240827-106-30**	**240827-106-31**	**240827-106-32**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Toro Ramp PAH24WI 4 Wet	Toro Ramp PAH24WI 5 Wet	Te Toro MET24WI1 Wet	Te Toro MET24WI2 Wet
General Testing					
Percentage Moisture	%	-	-	87.8	88.1
Percentage Solids	%	-	-	12.2	11.9
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	14	13
Copper (Recoverable Dry Wt.)	mg/kg	-	-	330	320
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.31	0.34
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	1200	1100
Organics					
Adhoc investigation					
Acenaphthene	ng/g	1.3 *	<1.0 *	-	-
Acenaphthylene	ng/g	<1.0 *	<1.0 *	-	-
Anthracene	ng/g	<1.0 *	1.4 *	-	-
Benzo(a)anthracene	ng/g	1.6 *	1.6 *	-	-
Benzo(a)pyrene	ng/g	<2.0 *	<2.0 *	-	-
Benzo(b+k)fluoranthene	ng/g	<2.0 *	<2.0 *	-	-
Benzo(ghi)perylene	ng/g	<4.0 *	<4.0 *	-	-
Chrysene	ng/g	<1.0 *	1.0 *	-	-
Comments		Sample tested using GCMS *	Sample tested using GCMS *	-	-
Dibenzo(ah)anthracene	ng/g	<4.0 *	<4.0 *	-	-
Fluoranthene	ng/g	2.5 *	3.2 *	-	-
Fluorene	ng/g	1.9 *	2.5 *	-	-

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**240827-106-29**	**240827-106-30**	**240827-106-31**	**240827-106-32**
Client Sample ID:					
Sample Date/Time:		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Toro Ramp PAH24WI 4 Wet	Toro Ramp PAH24WI 5 Wet	Te Toro MET24WI1 Wet	Te Toro MET24WI2 Wet
Organics					
Adhoc investigation					
Indeno(1-2-3-c-d)pyrene	ng/g	<4.0 *	<4.0 *	-	-
Naphthalene	ng/g	8.5 *	9.9 *	-	-
Phenanthrene	ng/g	8.7 *	12.1 *	-	-
Pyrene	ng/g	1.9 *	2.3 *	-	-

Sample Details					
Lab Sample ID:		**240827-106-33**	**240827-106-34**	**240827-106-35**	**240827-106-36**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Te Toro MET24WI3 Wet	Te Toro MET24WI4 Wet	Te Toro MET24WI5 Wet	Te Toro PAH24WI1 Wet
General Testing					
Percentage Moisture	%	87.7	88.7	87.2	-
Percentage Solids	%	12.3	11.3	12.8	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	13	12	-
Copper (Recoverable Dry Wt.)	mg/kg	370	320	370	-
Lead (Recoverable Dry Wt.)	mg/kg	0.28	0.23	0.29	-
Zinc (Recoverable Dry Wt.)	mg/kg	1300	1200	1200	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	-	-	1.3 *
Acenaphthylene	ng/g	-	-	-	<1.0 *
Anthracene	ng/g	-	-	-	1.6 *
Benzo(a)anthracene	ng/g	-	-	-	1.7 *
Benzo(a)pyrene	ng/g	-	-	-	<2.0 *
Benzo(b+k)fluoranthene	ng/g	-	-	-	<2.0 *
Benzo(ghi)perylene	ng/g	-	-	-	<4.0 *
Chrysene	ng/g	-	-	-	1.0 *
Comments		-	-	-	Sample tested using GCMS *
Dibenzo(ah)anthracene	ng/g	-	-	-	<4.0 *
Fluoranthene	ng/g	-	-	-	2.8 *
Fluorene	ng/g	-	-	-	2.9 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	-	-	<4.0 *
Naphthalene	ng/g	-	-	-	9.6 *
Phenanthrene	ng/g	-	-	-	14.0 *
Pyrene	ng/g	-	-	-	2.1 *

Sample Details					
Lab Sample ID:		**240827-106-37**	**240827-106-38**	**240827-106-39**	**240827-106-40**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Te Toro PAH24WI2 Wet	Te Toro PAH24WI3 Wet	Te Toro PAH24WI4 Wet	Te Toro PAH24WI5 Wet
Organics					
Adhoc investigation					
Acenaphthene	ng/g	1.1 *	1.2 *	<1.0 *	1.2 *
Acenaphthylene	ng/g	<1.0 *	<1.0 *	<1.0 *	<1.0 *
Anthracene	ng/g	<1.0 *	<1.0 *	<1.0 *	1.1 *
Benzo(a)anthracene	ng/g	1.4 *	1.6 *	1.3 *	1.6 *
Benzo(a)pyrene	ng/g	<2.0 *	<2.0 *	<2.0 *	<2.0 *
Benzo(b+k)fluoranthene	ng/g	<2.0 *	<2.0 *	<2.0 *	<2.0 *
Benzo(ghi)perylene	ng/g	<4.0 *	<4.0 *	<4.0 *	<4.0 *
Chrysene	ng/g	<1.0 *	<1.0 *	<1.0 *	<1.0 *
Comments		Sample tested using GCMS *	Sample tested using GCMS *	Sample tested using GCMS *	Sample tested using GCMS *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**240827-106-37**	**240827-106-38**	**240827-106-39**	**240827-106-40**
Client Sample ID:					
Sample Date/Time:		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Te Toro PAH24WI2 Wet	Te Toro PAH24WI3 Wet	Te Toro PAH24WI4 Wet	Te Toro PAH24WI5 Wet
Organics					
Adhoc investigation					
Dibenzo(ah)anthracene	ng/g	<4.0 *	<4.0 *	<4.0 *	<4.0 *
Fluoranthene	ng/g	2.1 *	2.1 *	2.5 *	2.2 *
Fluorene	ng/g	1.7 *	1.5 *	1.7 *	2.2 *
Indeno(1-2-3-c-d)pyrene	ng/g	<4.0 *	<4.0 *	<4.0 *	<4.0 *
Naphthalene	ng/g	8.9 *	9.6 *	10.2 *	9.4 *
Phenanthrene	ng/g	7.1 *	5.7 *	6.2 *	10.1 *
Pyrene	ng/g	1.5 *	1.4 *	1.5 *	1.5 *

Sample Details					
Lab Sample ID:		**240827-106-41**	**240827-106-42**	**240827-106-43**	**240827-106-44**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Gordons MET24WI1 Wet	Gordons MET24WI2 Wet	Gordons MET24WI3 Wet	Gordons MET24WI4 Wet
General Testing					
Percentage Moisture	%	91.1	90.9	90.2	90.7
Percentage Solids	%	8.9	9.1	9.8	9.3
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	13	12	12
Copper (Recoverable Dry Wt.)	mg/kg	470	320	410	330
Lead (Recoverable Dry Wt.)	mg/kg	0.24	0.2	0.2	0.21
Zinc (Recoverable Dry Wt.)	mg/kg	1600	1100	1400	1200

Sample Details					
Lab Sample ID:		**240827-106-45**	**240827-106-46**	**240827-106-47**	**240827-106-48**
Client Sample ID:					
Sample Date/Time		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Gordons MET24WI5 Wet	Gordons PAH24WI1 Wet	Gordons PAH24WI2 Wet	Gordons PAH24WI3 Wet
General Testing					
Percentage Moisture	%	91.5	-	-	-
Percentage Solids	%	8.5	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	11	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	330	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.2	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1100	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	<1.0 *	1.3 *	1.3 *
Acenaphthylene	ng/g	-	<1.0 *	<1.0 *	<1.0 *
Anthracene	ng/g	-	<1.0 *	<1.0 *	<1.0 *
Benzo(a)anthracene	ng/g	-	1.5 *	<1.0 *	1.4 *
Benzo(a)pyrene	ng/g	-	<2.0 *	<2.0 *	<2.0 *
Benzo(b+k)fluoranthene	ng/g	-	<2.0 *	<2.0 *	<2.0 *
Benzo(ghi)perylene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Chrysene	ng/g	-	1.2 *	<1.0 *	<1.0 *
Comments		-	Sample tested using GCMS *	Sample tested using GCMS *	Sample tested using GCMS *
Dibenzo(ah)anthracene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Fluoranthene	ng/g	-	3.3 *	2.3 *	2.5 *
Fluorene	ng/g	-	1.9 *	1.7 *	1.8 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	<4.0 *	<4.0 *	<4.0 *
Naphthalene	ng/g	-	10.1 *	9.4 *	10.0 *
Phenanthrene	ng/g	-	8.1 *	7.6 *	8.2 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**240827-106-45**	**240827-106-46**	**240827-106-47**	**240827-106-48**
Client Sample ID:					
Sample Date/Time:		15/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Gordons MET24WI5 Wet	Gordons PAH24WI1 Wet	Gordons PAH24WI2 Wet	Gordons PAH24WI3 Wet
Organics					
Adhoc investigation					
Pyrene	ng/g	-	2.1 *	1.6 *	1.9 *

Sample Details			
Lab Sample ID:		**240827-106-49**	**240827-106-50**
Client Sample ID:			
Sample Date/Time		15/08/2024	15/08/2024
Description:		Gordons PAH24WI4 Wet	Gordons PAH24WI5 Wet
Organics			
Adhoc investigation			
Acenaphthene	ng/g	1.1 *	<1.0 *
Acenaphthylene	ng/g	<1.0 *	<1.0 *
Anthracene	ng/g	1.6 *	1.1 *
Benzo(a)anthracene	ng/g	2.4 *	1.4 *
Benzo(a)pyrene	ng/g	<2.0 *	<2.0 *
Benzo(b+k)fluoranthene	ng/g	3.6 *	<2.0 *
Benzo(ghi)perylene	ng/g	<4.0 *	<4.0 *
Chrysene	ng/g	3.6 *	<1.0 *
Comments		Sample tested using GCMS *	Sample tested using GCMS *
Dibenzo(ah)anthracene	ng/g	<4.0 *	<4.0 *
Fluoranthene	ng/g	3.0 *	2.2 *
Fluorene	ng/g	2.4 *	1.8 *
Indeno(1-2-3-c-d)pyrene	ng/g	<4.0 *	<4.0 *
Naphthalene	ng/g	9.1 *	9.4 *
Phenanthrene	ng/g	11.6 *	7.7 *
Pyrene	ng/g	2.9 *	1.9 *

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

Where samples have been supplied by the client, they are tested as received.

The results of analysis contained in this report relate only to the sample(s) tested. Where sample collection was performed by the laboratory, the results of analysis contained in this report relate only to the sample(s) collected.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)				
Arsenic (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.04 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Copper (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	2 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Lead (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.02 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Zinc (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	5 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Organics				
Adhoc investigation				
Comments	As specified above		6, 7, 8, 9, 10, 16, 17, 18, 19, 20, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Preparations				
Digestion for Recoverable Metals in Biomatter	In House (8 mL Nitric, 1 mL Hydrochloric Acid: 1 hr 95°C: 2 mL hydrogen peroxide 1 hr 85°C)		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Biomatter Percentage Moisture	APHA (online edition) 2540 B		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Biomatter Percentage Solids	APHA (online edition) 2540 B		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Tissue Homogenising for Metals Analysis	In-house method (ML01)		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Anel Du Preez
KTP Signatory

Peter Boniface
KTP Signatory

Certificate of Analysis Metals & PAH - October 2024

Watercare
Laboratory Services

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Certificate of Analysis
Laboratory Reference:241014-099

Attention:	Laureline Meynier	*Final Report:*	**572364-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**10-Dec-2024**
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**19-Nov-2024**
Client Reference:	**SW Clark WWTP Monitoring - Contaminants**	*Laboratory Activity Dates:*	**20-Nov-2024 - 10-Dec-2024**
Purchase Order:	**Y-3310-LB-002**	*Quote Reference :*	**16391**

Sample Details					
Lab Sample ID:		**241014-099-1**	**241014-099-2**	**241014-099-3**	**241014-099-4**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Matakawau MET24WI 1 dry	Matakawau MET24WI 2 dry	Matakawau MET24WI 3 dry	Matakawau MET24WI 4 dry
General Testing					
Percentage Moisture	%	87.1	87.1	87.3	88.1
Percentage Solids	%	12.9	12.9	12.7	11.9
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	15	13	14
Copper (Recoverable Dry Wt.)	mg/kg	150	120	340	360
Lead (Recoverable Dry Wt.)	mg/kg	0.17	0.21	0.26	0.39
Zinc (Recoverable Dry Wt.)	mg/kg	1700	1400	1200	1500

Sample Details					
Lab Sample ID:		**241014-099-5**	**241014-099-6**	**241014-099-7**	**241014-099-8**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Matakawau MET24WI 5 dry	Matakawau PAH24WI 1 dry	Matakawau PAH24WI 2 dry	Matakawau PAH24WI 3 dry
General Testing					
Percentage Moisture	%	87.7	-	-	-
Percentage Solids	%	12.3	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	130	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.21	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1600	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	0.33 *	0.45 *	0.36 *
Acenaphthylene	ng/g	-	0.49 *	0.35 *	0.31 *
Anthracene	ng/g	-	1.82 *	1.20 *	1.24 *
Benzo(a)anthracene	ng/g	-	0.46 *	0.43 *	0.84 *
Benzo(a)pyrene	ng/g	-	0.32 *	0.32 *	0.33 *
Benzo(b+k)fluoranthene	ng/g	-	0.40 *	0.47 *	0.23 *
Benzo(ghi)perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	0.74 *	0.82 *	0.64 *
Comments		-	Analysed by GCMS *	Analysed by GCMS *	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	-	<1 *	<1 *	<1 *
Fluoranthene	ng/g	-	2.58 *	2.96 *	1.58 *
Fluorene	ng/g	-	1.45 *	1.72 *	1.25 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	2.23 *	2.68 *	2.58 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**241014-099-5**	**241014-099-6**	**241014-099-7**	**241014-099-8**
Client Sample ID:					
Sample Date/Time:		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Matakawau MET24WI 5 dry	Matakawau PAH24WI 1 dry	Matakawau PAH24WI 2 dry	Matakawau PAH24WI 3 dry
Organics					
Adhoc investigation					
Phenanthrene	ng/g	-	6.80 *	8.16 *	4.79 *
Pyrene	ng/g	-	2.87 *	3.42 *	1.55 *

Sample Details					
Lab Sample ID:		**241014-099-9**	**241014-099-10**	**241014-099-11**	**241014-099-12**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Matakawau PAH24WI 4 dry	Matakawau PAH24WI 5 dry	Karaka MET24WI1 dry	Karaka MET24WI2 dry
General Testing					
Percentage Moisture	%	-	-	86.8	88.3
Percentage Solids	%	-	-	13.2	11.7
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	14	11
Copper (Recoverable Dry Wt.)	mg/kg	-	-	310	290
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.38	0.3
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	1300	1400
Organics					
Adhoc investigation					
Acenaphthene	ng/g	0.28 *	0.26 *	-	-
Acenaphthylene	ng/g	0.14 *	0.14 *	-	-
Anthracene	ng/g	0.28 *	0.44 *	-	-
Benzo(a)anthracene	ng/g	0.27 *	0.29 *	-	-
Benzo(a)pyrene	ng/g	<1 *	<1 *	-	-
Benzo(b+k)fluoranthene	ng/g	0.19 *	0.42 *	-	-
Benzo(ghi)perylene	ng/g	<1 *	<1 *	-	-
Chrysene	ng/g	0.46 *	0.49 *	-	-
Comments		Analysed by GCMS *	Analysed by GCMS *	-	-
Dibenz(ah)anthracene	ng/g	<1 *	<1 *	-	-
Fluoranthene	ng/g	0.80 *	0.79 *	-	-
Fluorene	ng/g	0.74 *	0.98 *	-	-
Indeno(1-2-3-c-d)pyrene	ng/g	<1 *	<1 *	-	-
Naphthalene	ng/g	2.66 *	4.23 *	-	-
Phenanthrene	ng/g	1.59 *	1.55 *	-	-
Pyrene	ng/g	0.43 *	0.55 *	-	-

Sample Details					
Lab Sample ID:		**241014-099-13**	**241014-099-14**	**241014-099-15**	**241014-099-16**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Karaka MET24WI3 dry	Karaka MET24WI4 dry	Karaka MET24WI5 dry	Karaka PAH24WI1 dry
General Testing					
Percentage Moisture	%	89.2	89.7	87.6	-
Percentage Solids	%	10.8	10.3	12.4	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	11	11	13	-
Copper (Recoverable Dry Wt.)	mg/kg	420	280	330	-
Lead (Recoverable Dry Wt.)	mg/kg	0.33	0.35	0.32	-
Zinc (Recoverable Dry Wt.)	mg/kg	1900	1400	1600	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	-	-	0.36 *
Acenaphthylene	ng/g	-	-	-	0.47 *
Anthracene	ng/g	-	-	-	0.75 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**241014-099-13**	**241014-099-14**	**241014-099-15**	**241014-099-16**
Client Sample ID:					
Sample Date/Time:		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Karaka MET24WI3 dry	Karaka MET24WI4 dry	Karaka MET24WI5 dry	Karaka PAH24WI1 dry
Organics					
Adhoc investigation					
Benzo(a)anthracene	ng/g	-	-	-	0.70 *
Benzo(a)pyrene	ng/g	-	-	-	0.38 *
Benzo(b+k)fluoranthene	ng/g	-	-	-	0.47 *
Benzo(ghi)perylene	ng/g	-	-	-	<1 *
Chrysene	ng/g	-	-	-	0.68 *
Comments		-	-	-	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	-	-	-	<1 *
Fluoranthene	ng/g	-	-	-	1.80 *
Fluorene	ng/g	-	-	-	1.39 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	-	-	<1 *
Naphthalene	ng/g	-	-	-	2.74 *
Phenanthrene	ng/g	-	-	-	5.74 *
Pyrene	ng/g	-	-	-	1.81 *

Sample Details					
Lab Sample ID:		**241014-099-17**	**241014-099-18**	**241014-099-19**	**241014-099-20**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Karaka PAH24WI2 dry	Karaka PAH24WI3 dry	Karaka PAH24WI4 dry	Karaka PAH24WI5 dry
Organics					
Adhoc investigation					
Acenaphthene	ng/g	0.48 *	0.41 *	0.33 *	0.54 *
Acenaphthylene	ng/g	0.28 *	0.44 *	0.35 *	0.69 *
Anthracene	ng/g	0.88 *	0.89 *	0.52 *	0.66 *
Benzo(a)anthracene	ng/g	0.92 *	0.98 *	0.92 *	1.03 *
Benzo(a)pyrene	ng/g	0.36 *	0.23 *	0.43 *	0.37 *
Benzo(b+k)fluoranthene	ng/g	0.39 *	0.49 *	0.54 *	0.38 *
Benzo(ghi)perylene	ng/g	<1 *	<1 *	<1 *	<1 *
Chrysene	ng/g	0.63 *	0.60 *	0.67 *	0.50 *
Comments		Analysed by GCMS *	Analysed by GCMS *	Analysed by GCMS *	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	<1 *	<1 *	<1 *	<1 *
Fluoranthene	ng/g	2.44 *	2.25 *	1.55 *	1.69 *
Fluorene	ng/g	1.51 *	1.26 *	1.03 *	1.67 *
Indeno(1-2-3-c-d)pyrene	ng/g	<1 *	<1 *	<1 *	<1 *
Naphthalene	ng/g	3.38 *	2.37 *	2.28 *	2.73 *
Phenanthrene	ng/g	7.47 *	5.94 *	4.44 *	6.40 *
Pyrene	ng/g	2.81 *	2.67 *	1.50 *	1.69 *

Sample Details					
Lab Sample ID:		**241014-099-21**	**241014-099-22**	**241014-099-23**	**241014-099-24**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Toro ramp MET24WI1 dry	Toro ramp MET24WI2 dry	Toro ramp MET24WI3 dry	Toro ramp MET24WI4 dry
General Testing					
Percentage Moisture	%	88.3	88.5	87.2	88.3
Percentage Solids	%	11.7	11.5	12.8	11.7
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	12	11	14
Copper (Recoverable Dry Wt.)	mg/kg	310	350	250	350
Lead (Recoverable Dry Wt.)	mg/kg	0.22	0.23	0.25	0.24
Zinc (Recoverable Dry Wt.)	mg/kg	1200	1400	1100	1600

Sample Details					
Lab Sample ID:		**241014-099-25**	**241014-099-26**	**241014-099-27**	**241014-099-28**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Toro ramp MET24WI5 dry	Toro ramp PAH24WI1 dry	Toro ramp PAH24WI2 dry	Toro ramp PAH24WI3 dry
General Testing					
Percentage Moisture	%	87.2	-	-	-
Percentage Solids	%	12.8	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	370	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.22	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1700	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	0.44 *	0.43 *	0.32 *
Acenaphthylene	ng/g	-	0.37 *	0.54 *	0.29 *
Anthracene	ng/g	-	1.06 *	0.87 *	0.69 *
Benzo(a)anthracene	ng/g	-	0.43 *	0.88 *	0.82 *
Benzo(a)pyrene	ng/g	-	0.38 *	0.38 *	0.31 *
Benzo(b+k)fluoranthene	ng/g	-	0.48 *	0.46 *	0.35 *
Benzo(ghi)perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	0.58 *	0.72 *	0.48 *
Comments		-	Analysed by GCMS *	Analysed by GCMS *	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	-	<1 *	<1 *	<1 *
Fluoranthene	ng/g	-	2.74 *	2.14 *	1.47 *
Fluorene	ng/g	-	1.56 *	1.40 *	1.02 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	3.25 *	3.88 *	2.90 *
Phenanthrene	ng/g	-	8.18 *	6.59 *	4.88 *
Pyrene	ng/g	-	3.22 *	2.09 *	1.58 *

Sample Details					
Lab Sample ID:		**241014-099-29**	**241014-099-30**	**241014-099-31**	**241014-099-32**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Toro ramp PAH24WI4 dry	Toro ramp PAH24WI5 dry	Te Toro MET24WI1 dry	Te Toro MET24WI2 dry
General Testing					
Percentage Moisture	%	-	-	89.4	89.7
Percentage Solids	%	-	-	10.6	10.3
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	11	12
Copper (Recoverable Dry Wt.)	mg/kg	-	-	360	250
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.22	0.22
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	1200	1400
Organics					
Adhoc investigation					
Acenaphthene	ng/g	0.42 *	0.40 *	-	-
Acenaphthylene	ng/g	0.42 *	0.54 *	-	-
Anthracene	ng/g	0.81 *	0.66 *	-	-
Benzo(a)anthracene	ng/g	0.48 *	1.04 *	-	-
Benzo(a)pyrene	ng/g	0.42 *	0.33 *	-	-
Benzo(b+k)fluoranthene	ng/g	0.49 *	0.45 *	-	-
Benzo(ghi)perylene	ng/g	<1 *	<1 *	-	-
Chrysene	ng/g	0.58 *	0.71 *	-	-
Comments		Analysed by GCMS *	Analysed by GCMS *	-	-
Dibenz(ah)anthracene	ng/g	<1 *	<1 *	-	-
Fluoranthene	ng/g	1.79 *	2.73 *	-	-
Fluorene	ng/g	1.39 *	1.32 *	-	-
Indeno(1-2-3-c-d)pyrene	ng/g	<1 *	<1 *	-	-

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**241014-099-29**	**241014-099-30**	**241014-099-31**	**241014-099-32**
Client Sample ID:					
Sample Date/Time:		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Toro ramp PAH24WI4 dry	Toro ramp PAH24WI5 dry	Te Toro MET24WI1 dry	Te Toro MET24WI2 dry
Organics					
Adhoc investigation					
Naphthalene	ng/g	3.50 *	3.51 *	-	-
Phenanthrene	ng/g	6.11 *	7.05 *	-	-
Pyrene	ng/g	1.84 *	2.90 *	-	-

Sample Details					
Lab Sample ID:		**241014-099-33**	**241014-099-34**	**241014-099-35**	**241014-099-36**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Te Toro MET24WI3 dry	Te Toro MET24WI4 dry	Te Toro MET24WI5 dry	Te Toro PAH24WI1 dry
General Testing					
Percentage Moisture	%	89.7	88.1	89.4	-
Percentage Solids	%	10.3	11.9	10.6	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	11	13	12	-
Copper (Recoverable Dry Wt.)	mg/kg	360	240	400	-
Lead (Recoverable Dry Wt.)	mg/kg	0.24	0.22	0.22	-
Zinc (Recoverable Dry Wt.)	mg/kg	1600	1300	1600	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	-	-	0.43 *
Acenaphthylene	ng/g	-	-	-	0.33 *
Anthracene	ng/g	-	-	-	1.49 *
Benzo(a)anthracene	ng/g	-	-	-	0.90 *
Benzo(a)pyrene	ng/g	-	-	-	0.40 *
Benzo(b+k)fluoranthene	ng/g	-	-	-	0.38 *
Benzo(ghi)perylene	ng/g	-	-	-	<1 *
Chrysene	ng/g	-	-	-	0.64 *
Comments		-	-	-	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	-	-	-	<1 *
Fluoranthene	ng/g	-	-	-	2.78 *
Fluorene	ng/g	-	-	-	1.59 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	-	-	<1 *
Naphthalene	ng/g	-	-	-	3.87 *
Phenanthrene	ng/g	-	-	-	8.91 *
Pyrene	ng/g	-	-	-	3.32 *

Sample Details					
Lab Sample ID:		**241014-099-37**	**241014-099-38**	**241014-099-39**	**241014-099-40**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Te Toro PAH24WI2 dry	Te Toro PAH24WI3 dry	Te Toro PAH24WI4 dry	Te Toro PAH24WI5 dry
Organics					
Adhoc investigation					
Acenaphthene	ng/g	0.42 *	0.36 *	0.54 *	1.16 *
Acenaphthylene	ng/g	0.34 *	0.28 *	0.65 *	0.40 *
Anthracene	ng/g	1.00 *	1.32 *	1.32 *	1.64 *
Benzo(a)anthracene	ng/g	1.19 *	1.01 *	1.02 *	1.06 *
Benzo(a)pyrene	ng/g	0.39 *	0.37 *	0.40 *	0.20 *
Benzo(b+k)fluoranthene	ng/g	0.37 *	0.39 *	0.46 *	0.36 *
Benzo(ghi)perylene	ng/g	<1 *	<1 *	<1 *	<1 *
Chrysene	ng/g	0.51 *	0.70 *	0.68 *	0.68 *
Comments		Analysed by GCMS *	Analysed by GCMS *	Analysed by GCMS *	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	<1 *	<1 *	<1 *	<1 *

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Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**241014-099-37**	**241014-099-38**	**241014-099-39**	**241014-099-40**
Client Sample ID:					
Sample Date/Time:		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Te Toro PAH24WI2 dry	Te Toro PAH24WI3 dry	Te Toro PAH24WI4 dry	Te Toro PAH24WI5 dry
Organics					
Adhoc investigation					
Fluoranthene	ng/g	2.08 *	2.92 *	3.25 *	3.21 *
Fluorene	ng/g	1.24 *	1.83 *	2.04 *	2.23 *
Indeno(1-2-3-c-d)pyrene	ng/g	<1 *	<1 *	<1 *	<1 *
Naphthalene	ng/g	3.34 *	4.18 *	4.47 *	4.64 *
Phenanthrene	ng/g	5.98 *	9.82 *	11.32 *	12.18 *
Pyrene	ng/g	2.34 *	3.31 *	3.29 *	4.01 *

Sample Details					
Lab Sample ID:		**241014-099-41**	**241014-099-42**	**241014-099-43**	**241014-099-44**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Gordons MET24WI1 dry	Gordons MET24WI2 dry	Gordons MET24WI3 dry	Gordons MET24WI4 dry
General Testing					
Percentage Moisture	%	90.4	90.4	90.2	90.1
Percentage Solids	%	9.6	9.6	9.8	9.9
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	13	13	12	11
Copper (Recoverable Dry Wt.)	mg/kg	470	480	520	610
Lead (Recoverable Dry Wt.)	mg/kg	0.27	0.28	0.27	0.28
Zinc (Recoverable Dry Wt.)	mg/kg	1500	1800	1800	1900

Sample Details					
Lab Sample ID:		**241014-099-45**	**241014-099-46**	**241014-099-47**	**241014-099-48**
Client Sample ID:					
Sample Date/Time		30/10/2024	30/10/2024	30/10/2024	30/10/2024
Description:		Gordons MET24WI5 dry	Gordons PAH24WI1 dry	Gordons PAH24WI2 dry	Gordons PAH24WI3 dry
General Testing					
Percentage Moisture	%	90.2	-	-	-
Percentage Solids	%	9.8	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	12	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	500	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.24	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1800	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	0.65 *	0.64 *	0.53 *
Acenaphthylene	ng/g	-	0.45 *	0.86 *	0.63 *
Anthracene	ng/g	-	0.78 *	1.67 *	1.22 *
Benzo(a)anthracene	ng/g	-	0.86 *	1.61 *	0.92 *
Benzo(a)pyrene	ng/g	-	0.44 *	0.68 *	0.56 *
Benzo(b+k)fluoranthene	ng/g	-	0.64 *	0.92 *	1.54 *
Benzo(ghi)perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	0.75 *	1.01 *	0.93 *
Comments		-	Analysed by GCMS *	Analysed by GCMS *	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	-	<1 *	<1 *	<1 *
Fluoranthene	ng/g	-	2.42 *	4.19 *	3.70 *
Fluorene	ng/g	-	1.96 *	2.44 *	2.05 *
Indeno(1-2-3-c-d)pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	3.38 *	3.73 *	3.99 *
Phenanthrene	ng/g	-	9.26 *	13.37 *	12.91 *
Pyrene	ng/g	-	2.72 *	4.66 *	4.50 *

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Sample Details			
Lab Sample ID:		**241014-099-49**	**241014-099-50**
Client Sample ID:			
Sample Date/Time		30/10/2024	30/10/2024
Description:		Gordons PAH24WI4 dry	Gordons PAH24WI5 dry
Organics			
Adhoc investigation			
Acenaphthene	ng/g	0.46 *	0.60 *
Acenaphthylene	ng/g	0.42 *	0.98 *
Anthracene	ng/g	1.42 *	1.65 *
Benzo(a)anthracene	ng/g	0.64 *	1.76 *
Benzo(a)pyrene	ng/g	0.31 *	0.52 *
Benzo(b+k)fluoranthene	ng/g	1.00 *	0.58 *
Benzo(ghi)perylene	ng/g	<1 *	<1 *
Chrysene	ng/g	0.64 *	0.86 *
Comments		Analysed by GCMS *	Analysed by GCMS *
Dibenz(ah)anthracene	ng/g	<1 *	<1 *
Fluoranthene	ng/g	2.78 *	3.31 *
Fluorene	ng/g	1.75 *	1.97 *
Indeno(1-2-3-c-d)pyrene	ng/g	<1 *	<1 *
Naphthalene	ng/g	3.31 *	3.33 *
Phenanthrene	ng/g	9.43 *	10.70 *
Pyrene	ng/g	2.86 *	4.21 *

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

Where samples have been supplied by the client, they are tested as received.
The results of analysis contained in this report relate only to the sample(s) tested. Where sample collection was performed by the laboratory, the results of analysis contained in this report relate only to the sample(s) collected.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)				
Arsenic (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.04 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Copper (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	2 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Lead (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.02 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Zinc (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	5 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Organics				
Adhoc investigation				
Comments	As specified above		6, 7, 8, 9, 10, 16, 17, 18, 19, 20, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Preparations				
Digestion for Recoverable Metals in Biomatter	In House (8 mL Nitric, 1 mL Hydrochloric Acid: 1 hr 95°C: 2 mL hydrogen peroxide 1 hr 85°C)		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Biomatter Percentage Moisture	APHA (online edition) 2540 B		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland

Preparations			
Biomatter Percentage Solids	APHA (online edition) 2540 B	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Tissue Homogenising for Metals Analysis	In-house method (ML01)	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Anel Du Preez
KTP Signatory

Peter Boniface
KTP Signatory

Certificate of Analysis Metals & PAH - January 2025

Watercare
Laboratory Services

Watercare Services Limited
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PO Box 107028, Auckland, 2150
T: 0800 522 365
clientsupport@water.co.nz
www.watercarelabs.co.nz

Certificate of Analysis
Laboratory Reference: 250218-124

Attention:		*Final Report:*	**591842-0**	*Replaces Report*	**591389-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**05-Jun-2025**		
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**18-Feb-2025**		
Client Reference:	**SW Clark WWTP Monitoring - Contaminants**	*Laboratory Activity Dates:*	**18-Feb-2025** -	**29-May-2025**	
Purchase Order:	**3310-WV-02-693040**	*Quote Reference :*	**16353**		

This is an amended report superseding 581967-0. The PAH results have been corrected for amount and the correct units are now applied. We apologise for this error on our part.

Sample Details					
Lab Sample ID:		**250218-124-1**	**250218-124-2**	**250218-124-3**	**250218-124-4**
Client Sample ID:					
Sample Date/Time		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Matakawau MET25WI 1 dry	Matakawau MET25WI 2 dry	Matakawau MET25WI 3 dry	Matakawau MET25WI 4 dry
General Testing					
Percentage Moisture	%	89.3	90.9	90.1	90.4
Percentage Solids	%	10.7	9.1	9.9	9.6
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	9.0	12	13	13
Copper (Recoverable Dry Wt.)	mg/kg	290	320	330	380
Lead (Recoverable Dry Wt.)	mg/kg	0.23	0.36	0.31	0.33
Zinc (Recoverable Dry Wt.)	mg/kg	1400	1400	1600	1600

Sample Details					
Lab Sample ID:		**250218-124-5**	**250218-124-6**	**250218-124-7**	**250218-124-8**
Client Sample ID:					
Sample Date/Time		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Matakawau MET25WI 5 dry	Matakawau PAH25WI 1 dry	Matakawau PAH25WI 2 dry	Matakawau PAH25WI 3 dry
General Testing					
Percentage Moisture	%	91.6	91.3	90.4	90.3
Percentage Solids	%	8.4	8.7	9.6	9.7
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	410	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.3	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1900	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	<0.2 *	<0.2 *	0.62 *
Acenaphthylene	ng/g	-	<0.2 *	0.56 *	0.44 *
Anthracene	ng/g	-	<0.2 *	0.89 *	0.84 *
Ben[a]anthracene	ng/g	-	0.67 *	0.70 *	0.62 *
Benzo[a]anthracene	ng/g	-	0.67 *	0.70 *	0.62 *
Benzo[a]pyrene	ng/g	-	0.39 *	< 0.2 *	0.55 *
Benzo[b+k]fluoranthene	ng/g	-	0.81 *	0.58 *	0.65 *
Benzo[g,h,i]perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	<0.2 *	1.16 *	0.63 *
Comments		-	GC-MSMS *	GC-MSMS *	GC-MSMS *
Dibenz[a,h]anthrancene	ng/g	-	<1 *	<1 *	<1 *
Fluoranthene	ng/g	-	1.73 *	2.12 *	2.96 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250218-124-5**	**250218-124-6**	**250218-124-7**	**250218-124-8**
Client Sample ID:					
Sample Date/Time:		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Matakawau MET25WI 5 dry	Matakawau PAH25WI 1 dry	Matakawau PAH25WI 2 dry	Matakawau PAH25WI 3 dry
Organics					
Adhoc investigation					
Fluorene	ng/g	-	1.27 *	1.48 *	1.81 *
Indeno[1,2,3-cd]pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	2.78 *	5.53 *	13.96 *
Phenanathrene	ng/g	-	1.38 *	1.40 *	1.93 *
Pyrene	ng/g	-	2.24 *	2.04 *	2.65 *

Sample Details					
Lab Sample ID:		**250218-124-9**	**250218-124-10**	**250218-124-11**	**250218-124-12**
Client Sample ID:					
Sample Date/Time		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Matakawau PAH25WI 4 dry	Matakawau PAH25WI 5 dry	Te Toro MET25WI1 dry	Te Toro MET25WI2 dry
General Testing					
Percentage Moisture	%	90.7	91.8	87.9	90.3
Percentage Solids	%	9.3	8.2	12.1	9.7
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	15	11
Copper (Recoverable Dry Wt.)	mg/kg	-	-	220	370
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.19	0.21
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	940	1600
Organics					
Adhoc investigation					
Acenaphthene	ng/g	0.68 *	<0.2 *	-	-
Acenaphthylene	ng/g	0.51 *	<0.2 *	-	-
Anthracene	ng/g	0.60 *	0.33 *	-	-
Ben[a]anthracene	ng/g	0.64 *	-	-	-
Benzo[a]anthracene	ng/g	0.64 *	0.80 *	-	-
Benzo[a]pyrene	ng/g	0.60 *	0.53 *	-	-
Benzo[b+k]fluoranthene	ng/g	0.74 *	0.78 *	-	-
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *	-	-
Chrysene	ng/g	0.73 *	0.55 *	-	-
Comments		GC-MSMS *	GC-MSMS *	-	-
Dibenz[a,h]anthrancene	ng/g	<1 *	<1 *	-	-
Fluoranthene	ng/g	2.81 *	2.44 *	-	-
Fluorene	ng/g	1.81 *	1.38 *	-	-
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *	-	-
Naphthalene	ng/g	9.21 *	6.22 *	-	-
Phenanathrene	ng/g	2.18 *	1.02 *	-	-
Pyrene	ng/g	2.38 *	2.15 *	-	-

Sample Details					
Lab Sample ID:		**250218-124-13**	**250218-124-14**	**250218-124-15**	**250218-124-16**
Client Sample ID:					
Sample Date/Time		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Te Toro MET25WI3 dry	Te Toro MET25WI4 dry	Te Toro MET25WI5 dry	Te Toro PAH25WI1 dry
General Testing					
Percentage Moisture	%	89.4	89.3	87.0	88.5
Percentage Solids	%	10.6	10.7	13.0	11.5
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	14	15	-
Copper (Recoverable Dry Wt.)	mg/kg	350	440	280	-
Lead (Recoverable Dry Wt.)	mg/kg	0.24	0.25	0.19	-
Zinc (Recoverable Dry Wt.)	mg/kg	1500	1900	1100	-
Organics					

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250218-124-13**	**250218-124-14**	**250218-124-15**	**250218-124-16**
Client Sample ID:					
Sample Date/Time:		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Te Toro MET25WI3 dry	Te Toro MET25WI4 dry	Te Toro MET25WI5 dry	Te Toro PAH25WI1 dry
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	-	-	<0.2 *
Acenaphthylene	ng/g	-	-	-	0.50 *
Anthracene	ng/g	-	-	-	0.48 *
Ben[a]anthracene	ng/g	-	-	-	0.70 *
Benzo[a]anthracene	ng/g	-	-	-	0.70 *
Benzo[a]pyrene	ng/g	-	-	-	0.50 *
Benzo[b+k]fluoranthene	ng/g	-	-	-	0.46 *
Benzo[g,h,i]perylene	ng/g	-	-	-	<1 *
Chrysene	ng/g	-	-	-	0.69 *
Comments		-	-	-	GC-MSMS *
Dibenz[a,h]anthrancene	ng/g	-	-	-	<1 *
Fluoranthene	ng/g	-	-	-	2.72 *
Fluorene	ng/g	-	-	-	1.26 *
Indeno[1,2,3-cd]pyrene	ng/g	-	-	-	<1 *
Naphthalene	ng/g	-	-	-	3.71 *
Phenanathrene	ng/g	-	-	-	1.31 *
Pyrene	ng/g	-	-	-	2.30 *

Sample Details					
Lab Sample ID:		**250218-124-17**	**250218-124-18**	**250218-124-19**	**250218-124-20**
Client Sample ID:					
Sample Date/Time		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Te Toro PAH25WI2 dry	Te Toro PAH25WI3 dry	Te Toro PAH25WI4 dry	Te Toro PAH25WI5 dry
General Testing					
Percentage Moisture	%	89.1	87.5	88.7	90.7
Percentage Solids	%	10.9	12.5	11.3	9.3
Organics					
Adhoc investigation					
Acenaphthene	ng/g	0.59 *	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	0.23 *	0.38 *	0.49 *	< 0.2 *
Anthracene	ng/g	0.59 *	1.03 *	0.75 *	0.91 *
Ben[a]anthracene	ng/g	0.57 *	<0.2 *	0.61 *	0.67 *
Benzo[a]anthracene	ng/g	0.57 *	<0.2 *	0.61 *	0.67 *
Benzo[a]pyrene	ng/g	0.48 *	<0.2 *	0.65 *	< 0.2 *
Benzo[b+k]fluoranthene	ng/g	0.22 *	0.37 *	0.43 *	0.37 *
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *	<1 *	<1 *
Chrysene	ng/g	0.49 *	0.60 *	0.87 *	0.74 *
Comments		GC-MSMS *	GC-MSMS *	GC-MSMS *	GC-MSMS *
Dibenz[a,h]anthrancene	ng/g	<1 *	<1 *	<1 *	<1 *
Fluoranthene	ng/g	2.88 *	3.61 *	3.22 *	2.50 *
Fluorene	ng/g	1.71 *	2.17 *	1.71 *	1.91 *
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *	<1 *	<1 *
Naphthalene	ng/g	6.53 *	17.50 *	9.97 *	7.96 *
Phenanathrene	ng/g	1.86 *	2.98 *	2.10 *	3.42 *
Pyrene	ng/g	2.34 *	2.65 *	2.83 *	1.89 *

Sample Details					
Lab Sample ID:		**250218-124-21**	**250218-124-22**	**250218-124-23**	**250218-124-24**
Client Sample ID:					
Sample Date/Time		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Gordons MET25WI1	Gordons MET25WI2	Gordons MET25WI3	Gordons MET25WI4
General Testing					
Percentage Moisture	%	90.3	90.6	91.2	93.0
Percentage Solids	%	9.7	9.4	8.8	7.0
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250218-124-21**	**250218-124-22**	**250218-124-23**	**250218-124-24**
Client Sample ID:					
Sample Date/Time:		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Gordons MET25WI1	Gordons MET25WI2	Gordons MET25WI3	Gordons MET25WI4
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	12	12	12	11
Copper (Recoverable Dry Wt.)	mg/kg	410	360	510	540
Lead (Recoverable Dry Wt.)	mg/kg	0.22	0.21	0.21	0.26
Zinc (Recoverable Dry Wt.)	mg/kg	2000	1500	2000	2300

Sample Details					
Lab Sample ID:		**250218-124-25**	**250218-124-26**	**250218-124-27**	**250218-124-28**
Client Sample ID:					
Sample Date/Time		22/01/2025	22/01/2025	22/01/2025	22/01/2025
Description:		Gordons MET25WI5	Gordons PAH25WI1	Gordons PAH25WI2	Gordons PAH25WI3
General Testing					
Percentage Moisture	%	91.1	90.3	91.2	92.0
Percentage Solids	%	8.9	9.7	8.8	8.0
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	12	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	500	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.19	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	2000	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	-	0.32 *	0.37 *	0.22 *
Anthracene	ng/g	-	0.93 *	0.67 *	0.68 *
Ben[a]anthracene	ng/g	-	0.46 *	0.67 *	0.63 *
Benzo[a]anthracene	ng/g	-	0.46 *	0.67 *	0.63 *
Benzo[a]pyrene	ng/g	-	1.15 *	0.59 *	0.65 *
Benzo[b+k]fluoranthene	ng/g	-	0.89 *	0.43 *	0.64 *
Benzo[g,h,i]perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	1.54 *	0.89 *	0.69 *
Comments		-	GC-MSMS *	GC-MSMS *	GC-MSMS *
Dibenz[a,h]anthrancene	ng/g	-	<1 *	<1 *	<1 *
Fluoranthene	ng/g	-	3.77 *	2.44 *	2.66 *
Fluorene	ng/g	-	1.47 *	1.77 *	1.66 *
Indeno[1,2,3-cd]pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	4.96 *	6.29 *	4.48 *
Phenanathrene	ng/g	-	2.10 *	1.41 *	1.74 *
Pyrene	ng/g	-	2.80 *	2.01 *	2.25 *

Sample Details			
Lab Sample ID:		**250218-124-29**	**250218-124-30**
Client Sample ID:			
Sample Date/Time		22/01/2025	22/01/2025
Description:		Gordons PAH25WI4	Gordons PAH25WI5
General Testing			
Percentage Moisture	%	90.3	90.6
Percentage Solids	%	9.7	9.4
Organics			
Adhoc investigation			
Acenaphthene	ng/g	<0.2 *	0.59 *
Acenaphthylene	ng/g	0.55 *	0.53 *
Anthracene	ng/g	1.11 *	0.63 *
Ben[a]anthracene	ng/g	< 0.2 *	<0.2 *
Benzo[a]anthracene	ng/g	<0.2 *	<0.2 *
Benzo[a]pyrene	ng/g	0.88 *	0.89 *
Benzo[b+k]fluoranthene	ng/g	0.58 *	0.47 *
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250218-124-29**	**250218-124-30**
Client Sample ID:			
Sample Date/Time:		22/01/2025	22/01/2025
Description:		Gordons PAH25WI4	Gordons PAH25WI5
Organics			
Adhoc investigation			
Chrysene	ng/g	1.45 *	0.94 *
Comments		GC-MSMS *	GC-MSMS *
Dibenz[a,h]anthrancene	ng/g	<1 *	<1 *
Fluoranthene	ng/g	3.39 *	2.97 *
Fluorene	ng/g	2.12 *	1.96 *
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *
Naphthalene	ng/g	11.08 *	4.02 *
Phenanathrene	ng/g	1.54 *	2.25 *
Pyrene	ng/g	2.55 *	2.24 *

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

Where samples have been supplied by the client, they are tested as received.

The results of analysis contained in this report relate only to the sample(s) tested. Where sample collection was performed by the laboratory, the results of analysis contained in this report relate only to the sample(s) collected.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)				
Arsenic (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.04 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25	Auckland
Copper (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	2 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25	Auckland
Lead (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.02 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25	Auckland
Zinc (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	5 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25	Auckland
Organics				
Adhoc investigation				
Comments	As specified above		6, 7, 8, 9, 10, 16, 17, 18, 19, 20, 26, 27, 28, 29, 30	Auckland
Preparations				
Digestion for Recoverable Metals in Biomatter	In House (8 mL Nitric, 1 mL Hydrochloric Acid: 1 hr 95°C: 2 mL hydrogen peroxide 1 hr 85°C)		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25	Auckland
Biomatter Percentage Moisture	APHA (online edition) 2540 B		All	Auckland
Biomatter Percentage Solids	APHA (online edition) 2540 B		All	Auckland
Tissue Homogenising for Metals Analysis	In-house method (ML01)		All	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Robyn Abernethy
Compliance and Projects Manager

Report Number: **591842-0** Watercare Laboratory Services **Page 5 of 5**

Certificate of Analysis Metals & PAH - March 2025

Watercare
Laboratory Services

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Certificate of Analysis
Laboratory Reference: 250325-145

Attention:	Laureline Meynier	*Final Report:*	**586605-0**	*Replaces Report*	**585913-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**17-Apr-2025**		
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**25-Mar-2025**		
Client Reference:	**SW Clark WWTP Monitoring - Contaminants**	*Laboratory Activity Dates:*	**26-Mar-2025**	-	**11-Apr-2025**
Purchase Order:	**3310-WV-02-693040**	*Quote Reference :*	**16353**		

Amended COA generated with corrected accreditation status.

Sample Details					
Lab Sample ID:		**250325-145-1**	**250325-145-2**	**250325-145-3**	**250325-145-4**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Matakawau MET25MA RCH1	Matakawau MET25MA RCH2	Matakawau MET25MA RCH3	Matakawau MET25MA RCH4
General Testing					
Percentage Moisture	%	91.2	90.6	90.5	89.1
Percentage Solids	%	8.8	9.4	9.5	10.9
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	11	12	11	11
Copper (Recoverable Dry Wt.)	mg/kg	280	290	300	240
Lead (Recoverable Dry Wt.)	mg/kg	0.24	0.29	0.28	0.32
Zinc (Recoverable Dry Wt.)	mg/kg	1500	1800	1600	1300

Sample Details					
Lab Sample ID:		**250325-145-5**	**250325-145-6**	**250325-145-7**	**250325-145-8**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Matakawau MET25MA RCH5	Matakawau PAH25MA RCH1	Matakawau PAH25MA RCH2	Matakawau PAH25MA RCH3
General Testing					
Percentage Moisture	%	90.5	-	-	-
Percentage Solids	%	9.5	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	320	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.32	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1800	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Anthracene	ng/g	-	<0.2 *	<0.2 *	< 0.2 *
Ben[a]anthracene	ng/g	-	< 0.2 *	<0.2 *	< 0.2 *
Benzo[a]pyrene	ng/g	-	< 0.2 *	<0.2 *	< 0.2 *
Benzo[b+k]fluoranthene	ng/g	-	< 0.2 *	<0.2 *	< 0.2 *
Benzo[g,h,i]perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	<1 *	<1 *	<1 *
Comments		-	Analyze by GC-MS *	Analyze by GC-MS *	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	-	<0.2 *	<0.2 *	< 0.2 *
Fluoranthene	ng/g	-	2.89 *	6.14 *	2.09 *
Fluorene	ng/g	-	1.38 *	2.12 *	1.14 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-5**	**250325-145-6**	**250325-145-7**	**250325-145-8**
Client Sample ID:					
Sample Date/Time:		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Matakawau MET25M ARCH5	Matakawau PAH25MA RCH1	Matakawau PAH25MA RCH2	Matakawau PAH25MA RCH3
Organics					
Adhoc investigation					
Indeno[1,2,3-cd]pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	8.95 *	18.74 *	10.81 *
Phenanathrene	ng/g	-	4.28 *	7.07 *	4.63 *
Pyrene	ng/g	-	2.28 *	5.43 *	1.65 *

Sample Details					
Lab Sample ID:		**250325-145-9**	**250325-145-10**	**250325-145-11**	**250325-145-12**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Matakawau PAH25MA RCH4	Matakawau PAH25MA RCH5	Karaka MET25MARC H1	Karaka MET25MARC H2
General Testing					
Percentage Moisture	%	-	-	92.7	92.3
Percentage Solids	%	-	-	7.3	7.7
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	11	11
Copper (Recoverable Dry Wt.)	mg/kg	-	-	490	640
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.2	0.35
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	1800	2200
Organics					
Adhoc investigation					
Acenaphthene	ng/g	< 0.2 *	<0.2 *	-	-
Acenaphthylene	ng/g	< 0.2 *	<0.2 *	-	-
Anthracene	ng/g	< 0.2 *	<0.2 *	-	-
Ben[a]anthracene	ng/g	< 0.2 *	<0.2 *	-	-
Benzo[a]pyrene	ng/g	< 0.2 *	<0.2 *	-	-
Benzo[b+k]fluoranthene	ng/g	<0.2 *	<0.2 *	-	-
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *	-	-
Chrysene	ng/g	<1 *	<1 *	-	-
Comments		Analyze by GC-MS *	Analyze by GC-MS *	-	-
Dibenz[a,h]anthrancene	ng/g	<0.2 *	<0.2 *	-	-
Fluoranthene	ng/g	2.14 *	2.3 *	-	-
Fluorene	ng/g	<0.2 *	1.40 *	-	-
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *	-	-
Naphthalene	ng/g	10.81 *	11.79 *	-	-
Phenanathrene	ng/g	4.63 *	4.53 *	-	-
Pyrene	ng/g	1.65 *	1.80 *	-	-

Sample Details					
Lab Sample ID:		**250325-145-13**	**250325-145-14**	**250325-145-15**	**250325-145-16**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Karaka MET25MARC H3	Karaka MET25MARC H4	Karaka MET25MARC H5	Karaka PAH25MARC H1
General Testing					
Percentage Moisture	%	92.4	92.1	92.2	-
Percentage Solids	%	7.6	7.9	7.8	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	10	12	10	-
Copper (Recoverable Dry Wt.)	mg/kg	540	520	430	-
Lead (Recoverable Dry Wt.)	mg/kg	0.32	0.25	0.24	-
Zinc (Recoverable Dry Wt.)	mg/kg	1900	1700	1700	-
Organics					
Adhoc investigation					

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-13**	**250325-145-14**	**250325-145-15**	**250325-145-16**
Client Sample ID:					
Sample Date/Time:		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Karaka MET25MARC H3	Karaka MET25MARC H4	Karaka MET25MARC H5	Karaka PAH25MARC H1
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	-	-	<0.2 *
Acenaphthylene	ng/g	-	-	-	<0.2 *
Anthracene	ng/g	-	-	-	<0.2 *
Ben[a]anthracene	ng/g	-	-	-	< 0.2 *
Benzo[a]pyrene	ng/g	-	-	-	<0.2 *
Benzo[b+k]fluoranthene	ng/g	-	-	-	< 0.2 *
Benzo[g,h,i]perylene	ng/g	-	-	-	<1 *
Chrysene	ng/g	-	-	-	<1 *
Comments		-	-	-	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	-	-	-	< 0.2 *
Fluoranthene	ng/g	-	-	-	2.81 *
Fluorene	ng/g	-	-	-	2.14 *
Indeno[1,2,3-cd]pyrene	ng/g	-	-	-	<1 *
Naphthalene	ng/g	-	-	-	15.42 *
Phenanathrene	ng/g	-	-	-	5.74 *
Pyrene	ng/g	-	-	-	2.41 *

Sample Details					
Lab Sample ID:		**250325-145-17**	**250325-145-18**	**250325-145-19**	**250325-145-20**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Karaka PAH25MARC H2	Karaka PAH25MARC H3	Karaka PAH25MARC H4	Karaka PAH25MARC H5
Organics					
Adhoc investigation					
Acenaphthene	ng/g	< 0.2 *	< 0.2 *	< 0.2 *	< 0.2 *
Acenaphthylene	ng/g	< 0.2 *	< 0.2 *	< 0.2 *	<0.2 *
Anthracene	ng/g	< 0.2 *	< 0.2 *	<0.2 *	< 0.2 *
Ben[a]anthracene	ng/g	< 0.2 *	< 0.2 *	< 0.2 *	< 0.2 *
Benzo[a]pyrene	ng/g	< 0.2 *	<0.2 *	< 0.2 *	< 0.2 *
Benzo[b+k]fluoranthene	ng/g	< 0.2 *	< 0.2 *	< 0.2 *	<0.2 *
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *	<1 *	<1 *
Chrysene	ng/g	<1 *	<1 *	<1 *	<1 *
Comments		Analyze by GC-MS *	Analyze by GC-MS *	Analyze by GC-MS *	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	<0.2 *	< 0.2 *	<0.2 *	<0.2 *
Fluoranthene	ng/g	2.19 *	3.01 *	3.25 *	2.70 *
Fluorene	ng/g	1.87 *	1.47 *	1.78 *	1.78 *
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *	<1 *	<1 *
Naphthalene	ng/g	12.26 *	14.94 *	14.36 *	13.73 *
Phenanathrene	ng/g	5.28 *	4.90 *	5.98 *	5.77 *
Pyrene	ng/g	2.38 *	2.61 *	2.93 *	2.24 *

Sample Details					
Lab Sample ID:		**250325-145-21**	**250325-145-22**	**250325-145-23**	**250325-145-24**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Toro ramp MET25MA RCH1	Toro ramp MET25MA RCH2	Toro ramp MET25MA RCH3	Toro ramp MET25MA RCH4
General Testing					
Percentage Moisture	%	91.8	91.9	91.7	91.1
Percentage Solids	%	8.2	8.1	8.3	8.9
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	11	11	12	11
Copper (Recoverable Dry Wt.)	mg/kg	500	540	500	460
Lead (Recoverable Dry Wt.)	mg/kg	0.34	0.38	0.35	0.4
Zinc (Recoverable Dry Wt.)	mg/kg	1700	1800	1700	1600

Sample Details					
Lab Sample ID:		**250325-145-25**	**250325-145-26**	**250325-145-27**	**250325-145-28**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Toro ramp MET25MA RCH5	Toro ramp PAH25MAR CH1	Toro ramp PAH25MAR CH2	Toro ramp PAH25MAR CH3
General Testing					
Percentage Moisture	%	90.4	-	-	-
Percentage Solids	%	9.6	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	11	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	680	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.43	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	2600	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Anthracene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Ben[a]anthracene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[a]pyrene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[b+k]fluoranthene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[g,h,i]perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	<1 *	<1 *	<1 *
Comments		-	Analyze by GC-MS *	Analyze by GC-MS *	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Fluoranthene	ng/g	-	2.95 *	2.48 *	3.79 *
Fluorene	ng/g	-	2.19 *	1.68 *	1.56 *
Indeno[1,2,3-cd]pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	19.32 *	16.54 *	16.91 *
Phenanathrene	ng/g	-	5.32 *	4.35 *	3.79 *
Pyrene	ng/g	-	2.28 *	2.17 *	3.36 *

Sample Details					
Lab Sample ID:		**250325-145-29**	**250325-145-30**	**250325-145-31**	**250325-145-32**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Toro ramp PAH25MAR CH4	Toro ramp PAH25MAR CH5	Te Toro MET25MARC H1	Te Toro MET25MARC H2
General Testing					
Percentage Moisture	%	-	-	92.9	93.7
Percentage Solids	%	-	-	7.1	6.3
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	9.8	11
Copper (Recoverable Dry Wt.)	mg/kg	-	-	430	630
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.23	0.19
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	2200	2900
Organics					
Adhoc investigation					
Acenaphthene	ng/g	<0.2 *	<0.2 *	-	-
Acenaphthylene	ng/g	<0.2 *	<0.2 *	-	-
Anthracene	ng/g	<0.2 *	<0.2 *	-	-
Ben[a]anthracene	ng/g	<0.2 *	<0.2 *	-	-
Benzo[a]pyrene	ng/g	<0.2 *	<0.2 *	-	-
Benzo[b+k]fluoranthene	ng/g	<0.2 *	<0.2 *	-	-
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *	-	-
Chrysene	ng/g	<1 *	<1 *	-	-
Comments		Analyze by GC-MS *	Analyze by GC-MS *	-	-
Dibenz[a,h]anthrancene	ng/g	<0.2 *	<0.2 *	-	-
Fluoranthene	ng/g	3.71 *	3.25 *	-	-
Fluorene	ng/g	0.21 *	4.48 *	-	-
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *	-	-
Naphthalene	ng/g	17.27 *	8.61 *	-	-

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-29**	**250325-145-30**	**250325-145-31**	**250325-145-32**
Client Sample ID:					
Sample Date/Time:		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Toro ramp PAH25MA RCH4	Toro ramp PAH25MAR CH5	Te Toro MET25MARC H1	Te Toro MET25MARC H2
Organics					
Adhoc investigation					
Phenanathrene	ng/g	2.41 *	9.77 *	-	-
Pyrene	ng/g	2.08 *	1.86 *	-	-

Sample Details		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-33**	**250325-145-34**	**250325-145-35**	**250325-145-36**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Te Toro MET25MARC H3	Te Toro MET25MARC H4	Te Toro MET25MARC H5	Te Toro PAH25MARC H1
General Testing					
Percentage Moisture	%	93.0	92.7	92.8	-
Percentage Solids	%	7.0	7.3	7.2	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	10	9.9	11	-
Copper (Recoverable Dry Wt.)	mg/kg	430	360	590	-
Lead (Recoverable Dry Wt.)	mg/kg	0.18	0.19	0.19	-
Zinc (Recoverable Dry Wt.)	mg/kg	2000	1900	2600	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	-	-	<0.2 *
Acenaphthylene	ng/g	-	-	-	<0.2 *
Anthracene	ng/g	-	-	-	<0.2 *
Ben[a]anthracene	ng/g	-	-	-	<0.2 *
Benzo[a]pyrene	ng/g	-	-	-	<0.2 *
Benzo[b+k]fluoranthene	ng/g	-	-	-	<0.2 *
Benzo[g,h,i]perylene	ng/g	-	-	-	<1 *
Chrysene	ng/g	-	-	-	<1 *
Comments		-	-	-	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	-	-	-	<0.2 *
Fluoranthene	ng/g	-	-	-	4.18 *
Fluorene	ng/g	-	-	-	<0.2 *
Indeno[1,2,3-cd]pyrene	ng/g	-	-	-	<1 *
Naphthalene	ng/g	-	-	-	0.24 *
Phenanathrene	ng/g	-	-	-	3.62 *
Pyrene	ng/g	-	-	-	2.43 *

Sample Details		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-37**	**250325-145-38**	**250325-145-39**	**250325-145-40**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Te Toro PAH25MARC H2	Te Toro PAH25MARC H3	Te Toro PAH25MARC H4	Te Toro PAH25MARC H5
Organics					
Adhoc investigation					
Acenaphthene	ng/g	4.66 *	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Anthracene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Ben[a]anthracene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Benzo[a]pyrene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Benzo[b+k]fluoranthene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Benzo[g,h,i]perylene	ng	-	-	-	<1 *
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *	<1 *	-
Chrysene	ng/g	<1 *	<1 *	<1 *	<1 *
Comments		Analyze by GC-MS *	Analyze by GC-MS *	Analyze by GC-MS *	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Fluoranthene	ng/g	3.01 *	3.80 *	2.50 *	2.64 *

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-37**	**250325-145-38**	**250325-145-39**	**250325-145-40**
Client Sample ID:					
Sample Date/Time:		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Te Toro PAH25MARC H2	Te Toro PAH25MARC H3	Te Toro PAH25MARC H4	Te Toro PAH25MARC H5
Organics					
Adhoc investigation					
Fluorene	ng/g	8.09 *	<0.2 *	<0.2 *	<0.2 *
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *	<1 *	<1 *
Naphthalene	ng/g	12.38 *	7.10 *	3.95 *	2.10 *
Phenanathrene	ng/g	12.44 *	2.23 *	0.97 *	2.45 *
Pyrene	ng/g	1.66 *	1.85 *	1.27 *	1.28 *

Sample Details		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-41**	**250325-145-42**	**250325-145-43**	**250325-145-44**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Gordons MET25MAR CH1	Gordons MET25MAR CH2	Gordons MET25MAR CH3	Gordons MET25MAR CH4
General Testing					
Percentage Moisture	%	93.2	90.4	91.5	91.5
Percentage Solids	%	6.8	9.6	8.5	8.5
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	10	14	11	13
Copper (Recoverable Dry Wt.)	mg/kg	740	410	490	420
Lead (Recoverable Dry Wt.)	mg/kg	0.21	0.25	0.29	0.22
Zinc (Recoverable Dry Wt.)	mg/kg	2800	1900	2500	2200

Sample Details		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250325-145-45**	**250325-145-46**	**250325-145-47**	**250325-145-48**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Gordons MET25MAR CH5	Gordons PAH25MAR CH1	Gordons PAH25MAR CH2	Gordons PAH25MARC H3
General Testing					
Percentage Moisture	%	90.7	-	-	-
Percentage Solids	%	9.3	-	-	-
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	12	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	450	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.24	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	2400	-	-	-
Organics					
Adhoc investigation					
Acenaphthene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Anthracene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Ben[a]anthracene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[a]pyrene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[b+k]fluoranthene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[g,h,i]perylene	ng/g	-	<1 *	<1 *	<1 *
Chrysene	ng/g	-	<1 *	<1 *	<1 *
Comments		-	Analyze by GC-MS *	Analyze by GC-MS *	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Fluoranthene	ng/g	-	3.32 *	2.88 *	2.41 *
Fluorene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Indeno[1,2,3-cd]pyrene	ng/g	-	<1 *	<1 *	<1 *
Naphthalene	ng/g	-	1.11 *	2.31 *	2.43 *
Phenanathrene	ng/g	-	2.09 *	1.97 *	2.14 *
Pyrene	ng/g	-	1.51 *	1.55 *	1.51 *

Sample Details			
Lab Sample ID:		**250325-145-49**	**250325-145-50**
Client Sample ID:			
Sample Date/Time		06/03/2025	06/03/2025
Description:		Gordons PAH25MAR CH4	Gordons PAH25MAR CH5
Organics			
Adhoc investigation			
Acenaphthene	ng/g	<0.2 *	2.39 *
Acenaphthylene	ng/g	<0.2 *	<0.2 *
Anthracene	ng/g	<0.2 *	<0.2 *
Ben[a]anthracene	ng/g	<0.2 *	2.058 *
Benzo[a]pyrene	ng/g	<0.2 *	<0.2 *
Benzo[b+k]fluoranthene	ng/g	<0.2 *	<0.2 *
Benzo[g,h,i]perylene	ng/g	<1 *	<1 *
Chrysene	ng/g	<1 *	<1 *
Comments		Analyze by GC-MS *	Analyze by GC-MS *
Dibenz[a,h]anthrancene	ng/g	<0.2 *	<0.2 *
Fluoranthene	ng/g	2.65 *	1.52 *
Fluorene	ng/g	<0.2 *	3.83 *
Indeno[1,2,3-cd]pyrene	ng/g	<1 *	<1 *
Naphthalene	ng/g	2.99 *	4.51 *
Phenanathrene	ng/g	1.98 *	4.80 *
Pyrene	ng/g	1.62 *	0.66 *

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

Where samples have been supplied by the client, they are tested as received.

The results of analysis contained in this report relate only to the sample(s) tested. Where sample collection was performed by the laboratory, the results of analysis contained in this report relate only to the sample(s) collected.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)				
Arsenic (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.04 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Copper (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	2 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Lead (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.02 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Zinc (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	5 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Organics				
Adhoc investigation				
Comments	As specified above		6, 7, 8, 9, 10, 16, 17, 18, 19, 20, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Preparations				
Digestion for Recoverable Metals in Biomatter	In House (8 mL Nitric, 1 mL Hydrochloric Acid: 1 hr 95°C: 2 mL hydrogen peroxide 1 hr 85°C)		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Biomatter Percentage Moisture	APHA (online edition) 2540 B		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland

Preparations			
Biomatter Percentage Solids	APHA (online edition) 2540 B	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Tissue Homogenising for Metals Analysis	In-house method (ML01)	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Robyn Abernethy
Compliance and Projects Manager

Certificate of Analysis Metals & PAH - May 2025

Watercare
Laboratory Services

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www.watercarelabs.co.nz

Certificate of Analysis
Laboratory Reference: 250516-129

Attention:		*Final Report:*	**593508-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**19-Jun-2025**
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**29-May-2025**
Client Reference:	**SW Clark WWTP Monitoring - Contaminants**	*Laboratory Activity Dates:*	**29-May-2025 - 19-Jun-2025**
Purchase Order:	**3310-WV-02-693040**	*Quote Reference :*	**16353**

Sample Details					
Lab Sample ID:		**250516-129-1**	**250516-129-2**	**250516-129-3**	**250516-129-4**
Client Sample ID:					
Sample Date/Time		16/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Matakawau MET25Ma y-1	Matakawau MET25Ma y-2	Matakawau MET25Ma y-3	Matakawau MET25Ma y-4
General Testing					
Percentage Moisture	%	89.5	89.5	91.0	89.8
Percentage Solids	%	10.5	10.5	9.0	10.2
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	16	13	15	16
Copper (Recoverable Dry Wt.)	mg/kg	280	340	450	410
Lead (Recoverable Dry Wt.)	mg/kg	0.33	0.31	0.34	0.34
Zinc (Recoverable Dry Wt.)	mg/kg	1100	1200	1800	1400

Sample Details					
Lab Sample ID:		**250516-129-5**	**250516-129-6**	**250516-129-7**	**250516-129-8**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Matakawau MET25Ma y-5	Matakawau PAH25Ma y-1	Matakawau PAH25Ma y-2	Matakawau PAH25Ma y-3
General Testing					
Percentage Moisture	%	89.1	78.2	76.8	89.5
Percentage Solids	%	10.9	21.8	23.2	10.5
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	16	-	-	-
Copper (Recoverable Dry Wt.)	mg/kg	390	-	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.37	-	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	1600	-	-	-
Organics					
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)					
Acenaphthene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	-	0.4 *	<0.2 *	0.5 *
Anthracene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[a]anthracene	ng/g	-	0.9 *	0.6 *	1.3 *
Benzo[a]pyrene	ng/g	-	<0.2 *	<0.2 *	<0.2 *
Benzo[b+k]fluoranthene	ng/g	-	1.3 *	0.8 *	1.8 *
Benzo[g,h,i]perylene	ng/g	-	2.4 *	1.9 *	2.3 *
Chrysene	ng/g	-	1.7 *	1.2 *	2.9 *
Dibenz[a,h]anthracene	ng/g	-	1.7 *	1.2 *	2.1 *
Fluoranthene	ng/g	-	3.4 *	2.4 *	4.9 *
Fluorene	ng/g	-	1.1 *	1.0 *	1.8 *
Indeno[1,2,3-cd]pyrene	ng/g	-	<1.0 *	<1.0 *	1.3 *
Naphthalene	ng/g	-	8.7 *	6.7 *	17 *
Phenanthrene	ng/g	-	3.9 *	3.4 *	7.4 *
Pyrene	ng/g	-	2.1 *	1.5 *	3.1 *

Sample Details					
Lab Sample ID:		**250516-129-9**	**250516-129-10**	**250516-129-11**	**250516-129-12**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Matakawau PAH25Ma y-4	Matakawau PAH25Ma y-5	Karaka MET25May-1	Karaka MET25May-2
General Testing					
Percentage Moisture	%	83.8	77.2	88.9	89.9
Percentage Solids	%	16.2	22.8	11.1	10.1
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	15	14
Copper (Recoverable Dry Wt.)	mg/kg	-	-	510	560
Lead (Recoverable Dry Wt.)	mg/kg	-	-	0.27	0.29
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	2000	2400
Organics					
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)					
Acenaphthene	ng/g	<0.2 *	<0.2 *	-	-
Acenaphthylene	ng/g	<0.2 *	<0.2 *	-	-
Anthracene	ng/g	<0.2 *	<0.2 *	-	-
Benzo[a]anthracene	ng/g	0.8 *	0.6 *	-	-
Benzo[a]pyrene	ng/g	<0.2 *	<0.2 *	-	-
Benzo[b+k]fluoranthene	ng/g	1.2 *	0.5 *	-	-
Benzo[g,h,i]perylene	ng/g	1.8 *	<1.0 *	-	-
Chrysene	ng/g	1.3 *	0.6 *	-	-
Dibenz[a,h]anthracene	ng/g	1.4 *	<1.0 *	-	-
Fluoranthene	ng/g	3.5 *	2.0 *	-	-
Fluorene	ng/g	1.0 *	0.9 *	-	-
Indeno[1,2,3-cd]pyrene	ng/g	<1.0 *	<1.0 *	-	-
Naphthalene	ng/g	11 *	7.0 *	-	-
Phenanthrene	ng/g	4.7 *	2.9 *	-	-
Pyrene	ng/g	1.9 *	1.1 *	-	-

Sample Details					
Lab Sample ID:		**250516-129-13**	**250516-129-14**	**250516-129-15**	**250516-129-21**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Karaka MET25May-3	Karaka MET25May-4	Karaka MET25May-5	Toro Ramp MET25Ma y-1
General Testing					
Percentage Moisture	%	87.5	88.7	89.1	89.6
Percentage Solids	%	12.5	11.3	10.9	10.4
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	15	14	14	14
Copper (Recoverable Dry Wt.)	mg/kg	310	400	580	410
Lead (Recoverable Dry Wt.)	mg/kg	0.27	0.27	0.28	0.28
Zinc (Recoverable Dry Wt.)	mg/kg	1800	1700	2300	1900

Sample Details					
Lab Sample ID:		**250516-129-22**	**250516-129-23**	**250516-129-24**	**250516-129-25**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Toro Ramp MET25Ma y-2	Toro Ramp MET25Ma y-3	Toro Ramp MET25Ma y-4	Toro Ramp MET25Ma y-5
General Testing					
Percentage Moisture	%	88.9	88.0	87.1	88.2
Percentage Solids	%	11.1	12.0	12.9	11.8
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	14	15	15
Copper (Recoverable Dry Wt.)	mg/kg	350	310	320	420
Lead (Recoverable Dry Wt.)	mg/kg	0.27	0.25	0.25	0.27
Zinc (Recoverable Dry Wt.)	mg/kg	1400	1300	1500	1900

Sample Details					
Lab Sample ID:		250516-129-26	250516-129-27	250516-129-28	250516-129-29
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Toro Ramp PAH25May-1	Toro Ramp PAH25May-2	Toro Ramp PAH25May-3	Toro Ramp PAH25May-4
General Testing					
Percentage Moisture	%	86.1	77.9	78.7	87.0
Percentage Solids	%	13.9	22.1	21.3	13.0
Organics					
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)					
Acenaphthene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	0.7 *	0.4 *	0.4 *	0.5 *
Anthracene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Benzo[a]anthracene	ng/g	0.8 *	0.7 *	0.6 *	1.9 *
Benzo[a]pyrene	ng/g	0.8 *	0.5 *	0.9 *	1.9 *
Benzo[b+k]fluoranthene	ng/g	1.0 *	0.7 *	0.9 *	1.9 *
Benzo[g,h,i]perylene	ng/g	1.0 *	<1.0 *	<1.0 *	1.4 *
Chrysene	ng/g	1.8 *	1.2 *	1.3 *	2.6 *
Dibenz[a,h]anthracene	ng/g	<1.0 *	<1.0 *	<1.0 *	1.0 *
Fluoranthene	ng/g	7.7 *	5.5 *	8.0 *	13 *
Fluorene	ng/g	1.5 *	1.2 *	1.3 *	2.3 *
Indeno[1,2,3-cd]pyrene	ng/g	<1.0 *	<1.0 *	<1.0 *	<1.0 *
Naphthalene	ng/g	9.9 *	8.6 *	10 *	16 *
Phenanthrene	ng/g	8.6 *	6.0 *	7.9 *	13 *
Pyrene	ng/g	4.3 *	3.1 *	4.0 *	6.0 *

Sample Details					
Lab Sample ID:		250516-129-30	250516-129-31	250516-129-32	250516-129-33
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Toro Ramp PAH25May-5	Toro Toro MET25May-1	Toro Toro MET25May-2	Toro Toro MET25May-3
General Testing					
Percentage Moisture	%	77.9	89.7	88.8	89.3
Percentage Solids	%	22.1	10.3	11.2	10.7
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	16	16	16
Copper (Recoverable Dry Wt.)	mg/kg	-	410	410	470
Lead (Recoverable Dry Wt.)	mg/kg	-	0.29	0.26	0.32
Zinc (Recoverable Dry Wt.)	mg/kg	-	1600	1500	1600
Organics					
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)					
Acenaphthene	ng/g	<0.2 *	-	-	-
Acenaphthylene	ng/g	<0.2 *	-	-	-
Anthracene	ng/g	<0.2 *	-	-	-
Benzo[a]anthracene	ng/g	0.4 *	-	-	-
Benzo[a]pyrene	ng/g	0.4 *	-	-	-
Benzo[b+k]fluoranthene	ng/g	0.6 *	-	-	-
Benzo[g,h,i]perylene	ng/g	<1.0 *	-	-	-
Chrysene	ng/g	0.7 *	-	-	-
Dibenz[a,h]anthracene	ng/g	<1.0 *	-	-	-
Fluoranthene	ng/g	3.2 *	-	-	-
Fluorene	ng/g	1.1 *	-	-	-
Indeno[1,2,3-cd]pyrene	ng/g	<1.0 *	-	-	-
Naphthalene	ng/g	10 *	-	-	-
Phenanthrene	ng/g	3.9 *	-	-	-
Pyrene	ng/g	1.9 *	-	-	-

Sample Details					
Lab Sample ID:		250516-129-34	250516-129-35	250516-129-36	250516-129-37
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Toro Toro MET25May-4	Toro Toro MET25May-5	Toro Toro PAH25May-1	Toro Toro PAH25May-2
General Testing					
Percentage Moisture	%	92.2	91.2	89.8	82.1
Percentage Solids	%	7.8	8.8	10.2	17.9
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	14	15	-	-
Copper (Recoverable Dry Wt.)	mg/kg	540	520	-	-
Lead (Recoverable Dry Wt.)	mg/kg	0.25	0.28	-	-
Zinc (Recoverable Dry Wt.)	mg/kg	2100	1700	-	-
Organics					
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)					
Acenaphthene	ng/g	-	-	<0.2 *	<0.2 *
Acenaphthylene	ng/g	-	-	<0.2 *	0.4 *
Anthracene	ng/g	-	-	<0.2 *	<0.2 *
Benzo[a]anthracene	ng/g	-	-	0.7 *	0.5 *
Benzo[a]pyrene	ng/g	-	-	0.8 *	<0.2 *
Benzo[b+k]fluoranthene	ng/g	-	-	1.0 *	0.6 *
Benzo[g,h,i]perylene	ng/g	-	-	<1.0 *	<1.0 *
Chrysene	ng/g	-	-	1.7 *	0.9 *
Dibenz[a,h]anthracene	ng/g	-	-	<1.0 *	<1.0 *
Fluoranthene	ng/g	-	-	9.1 *	4.5 *
Fluorene	ng/g	-	-	2.7 *	1.4 *
Indeno[1,2,3-cd]pyrene	ng/g	-	-	<1.0 *	<1.0 *
Naphthalene	ng/g	-	-	15 *	10.0 *
Phenanthrene	ng/g	-	-	10 *	5.7 *
Pyrene	ng/g	-	-	4.6 *	2.5 *

Sample Details					
Lab Sample ID:		250516-129-38	250516-129-39	250516-129-40	250516-129-41
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Toro Toro PAH25May-3	Toro Toro PAH25May-4	Toro Toro PAH25May-5	Gordons MET25May-1
General Testing					
Percentage Moisture	%	84.7	79.0	91.8	93.5
Percentage Solids	%	15.3	21.0	8.2	6.5
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	-	-	-	16
Copper (Recoverable Dry Wt.)	mg/kg	-	-	-	770
Lead (Recoverable Dry Wt.)	mg/kg	-	-	-	0.31
Zinc (Recoverable Dry Wt.)	mg/kg	-	-	-	2700
Organics					
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)					
Acenaphthene	ng/g	<0.2 *	<0.2 *	<0.2 *	-
Acenaphthylene	ng/g	<0.2 *	0.2 *	<0.2 *	-
Anthracene	ng/g	<0.2 *	<0.2 *	<0.2 *	-
Benzo[a]anthracene	ng/g	0.8 *	0.6 *	2.4 *	-
Benzo[a]pyrene	ng/g	0.5 *	<0.2 *	<0.2 *	-
Benzo[b+k]fluoranthene	ng/g	0.6 *	0.4 *	1.8 *	-
Benzo[g,h,i]perylene	ng/g	<1.0 *	<1.0 *	<1.0 *	-
Chrysene	ng/g	1.1 *	0.5 *	2.9 *	-
Dibenz[a,h]anthracene	ng/g	<1.0 *	<1.0 *	1.6 *	-
Fluoranthene	ng/g	7.2 *	3.2 *	10 *	-
Fluorene	ng/g	1.1 *	0.8 *	2.8 *	-
Indeno[1,2,3-cd]pyrene	ng/g	<1.0 *	<1.0 *	<1.0 *	-
Naphthalene	ng/g	14 *	5.9 *	18 *	-
Phenanthrene	ng/g	7.2 *	3.4 *	12 *	-
Pyrene	ng/g	3.4 *	1.7 *	5.3 *	-

Sample Details					
Lab Sample ID:		250516-129-42	250516-129-43	250516-129-44	250516-129-45
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Gordons MET25May-2	Gordons MET25May-3	Gordons MET25May-4	Gordons MET25May-5
General Testing					
Percentage Moisture	%	92.4	93.0	92.5	92.9
Percentage Solids	%	7.6	7.0	7.5	7.1
Metals					
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)					
Arsenic (Recoverable Dry Wt.)	mg/kg	18	16	17	17
Copper (Recoverable Dry Wt.)	mg/kg	1000	950	900	1100
Lead (Recoverable Dry Wt.)	mg/kg	0.36	0.35	0.32	0.35
Zinc (Recoverable Dry Wt.)	mg/kg	3100	2700	2800	3300

Sample Details					
Lab Sample ID:		250516-129-46	250516-129-47	250516-129-48	250516-129-49
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Gordons PAH25May-1	Gordons PAH25May-2	Gordons PAH25May-3	Gordons PAH25May-4
General Testing					
Percentage Moisture	%	84.4	89.0	84.5	87.5
Percentage Solids	%	15.6	11.0	15.5	12.5
Organics					
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)					
Acenaphthene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Acenaphthylene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Anthracene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Benzo[a]anthracene	ng/g	0.5 *	1.1 *	1.2 *	0.8 *
Benzo[a]pyrene	ng/g	<0.2 *	<0.2 *	<0.2 *	<0.2 *
Benzo[b+k]fluoranthene	ng/g	0.9 *	1.2 *	0.7 *	1.3 *
Benzo[g,h,i]perylene	ng/g	<1.0 *	<1.0 *	<1.0 *	<1.0 *
Chrysene	ng/g	0.7 *	1.2 *	0.5 *	1.3 *
Dibenz[a,h]anthracene	ng/g	<1.0 *	<1.0 *	<1.0 *	<1.0 *
Fluoranthene	ng/g	3.5 *	4.6 *	2.9 *	5.2 *
Fluorene	ng/g	1.4 *	1.7 *	1.0 *	1.2 *
Indeno[1,2,3-cd]pyrene	ng/g	<1.0 *	<1.0 *	<1.0 *	<1.0 *
Naphthalene	ng/g	8.5 *	9.7 *	6.9 *	8.7 *
Phenanthrene	ng/g	5.1 *	5.3 *	3.0 *	5.2 *
Pyrene	ng/g	2.2 *	2.9 *	1.7 *	3.4 *

Sample Details			
Lab Sample ID:		250516-129-50	
Client Sample ID:			
Sample Date/Time		20/05/2025	
Description:		Gordons PAH25May-5	
General Testing			
Percentage Moisture	%	84.4	
Percentage Solids	%	15.6	
Organics			
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)			
Acenaphthene	ng/g	<0.2 *	
Acenaphthylene	ng/g	<0.2 *	
Anthracene	ng/g	<0.2 *	
Benzo[a]anthracene	ng/g	0.6 *	
Benzo[a]pyrene	ng/g	<0.2 *	
Benzo[b+k]fluoranthene	ng/g	0.7 *	
Benzo[g,h,i]perylene	ng/g	<1.0 *	
Chrysene	ng/g	0.6 *	
Dibenz[a,h]anthracene	ng/g	<1.0 *	
Fluoranthene	ng/g	3.3 *	
Fluorene	ng/g	1.1 *	
Indeno[1,2,3-cd]pyrene	ng/g	<1.0 *	
Naphthalene	ng/g	7.4 *	

Sample Details (continued)		ENV_BIOL
Lab Sample ID:		250516-129-50
Client Sample ID:		
Sample Date/Time:		20/05/2025
Description:		Gordons PAH25May-5
Organics		
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)		
Phenanthrene	ng/g	4.2 *
Pyrene	ng/g	2.2 *

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

Where samples have been supplied by the client, they are tested as received.

The results of analysis contained in this report relate only to the sample(s) tested. Where sample collection was performed by the laboratory, the results of analysis contained in this report relate only to the sample(s) collected.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Metals				
Recoverable Metals on Biomatter by ICP-MS - Trace (Dry Weight Basis)				
Arsenic (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.04 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Copper (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	2 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Lead (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	0.02 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Zinc (Recoverable Dry Wt.)	In House based on APHA (online edition) 3125 B by ICPMS	5 mg/kg	1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Organics				
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)				
Acenaphthene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Acenaphthylene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Anthracene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Benzo[a]anthracene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Benzo[a]pyrene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Benzo[b+k]fluoranthene	In-house by GC-MS/MS	0.4 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Benzo[g,h,i]perylene	In-house by GC-MS/MS	1 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Chrysene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Dibenz[a,h]anthracene	In-house by GC-MS/MS	1 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland

Organics				
Polycyclic Aromatic Hydrocarbons (PAH) (Dry Weight Basis) by Gas Chromatography-Mass Spectrometry(Trace level)				
Fluoranthene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Fluorene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Indeno[1,2,3-cd]pyrene	In-house by GC-MS/MS	1 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Naphthalene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Phenanthrene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Pyrene	In-house by GC-MS/MS	0.2 ng/g	6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Preps - Do not report				
QuEChERS Extraction	In-house by QuEChERS		6, 7, 8, 9, 10, 26, 27, 28, 29, 30, 36, 37, 38, 39, 40, 46, 47, 48, 49, 50	Auckland
Preparations				
Digestion for Recoverable Metals in Biomatter	In House (8 mL Nitric, 1 mL Hydrochloric Acid: 1 hr 95°C: 2 mL hydrogen peroxide 1 hr 85°C)		1, 2, 3, 4, 5, 11, 12, 13, 14, 15, 21, 22, 23, 24, 25, 31, 32, 33, 34, 35, 41, 42, 43, 44, 45	Auckland
Biomatter Percentage Moisture	APHA (online edition) 2540 B		All	Auckland
Biomatter Percentage Solids	APHA (online edition) 2540 B		All	Auckland
Tissue Homogenising for Metals Analysis	In-house method (ML01)		All	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Robyn Abernethy
Compliance and Projects Manager

Certificate of Analysis Bacteria & virus - August 2024

Watercare
Laboratory Services

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Certificate of Analysis
Laboratory Reference:240816-065

Attention:	Marine .	*Final Report:*	**561368-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**02-Sep-2024**
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**16-Aug-2024**
		Sampled By:	**Bioresearches**
Client Reference:	**SW Clark WWTP Monitoring - Microbiology**	*Laboratory Activity Dates:*	**16-Aug-2024 - 29-Aug-2024**
Purchase Order:	**Y-3310-LB-002**	*Quote Reference :*	**16391**

Sample Details					
Lab Sample ID:		**240816-065-1**	**240816-065-2**	**240816-065-3**	**240816-065-4**
Client Sample ID:					
Sample Date/Time		16/08/2024	16/08/2024	16/08/2024	16/08/2024
Description:		Matakawau BAC24WI 1 dry	Matakawau BAC24WI 2 dry	Matakawau BAC24WI 3 dry	Matakawau BAC24WI 4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	45 *	78 *	78 *	20 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	170	490	490	220

Sample Details					
Lab Sample ID:		**240816-065-5**	**240816-065-6**	**240816-065-7**	**240816-065-8**
Client Sample ID:					
Sample Date/Time		16/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Matakawau BAC24WI 5 dry	Matakawau VIR24WI1 dry	Matakawau VIR24WI2 dry	Matakawau VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	230 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	330	-	-	-

Sample Details					
Lab Sample ID:		**240816-065-9**	**240816-065-10**	**240816-065-11**	**240816-065-12**
Client Sample ID:					
Sample Date/Time		16/08/2024	16/08/2024	16/08/2024	16/08/2024
Description:		Karaka BAC24WI1 dry	Karaka BAC24WI2 dry	Karaka BAC24WI3 dry	Karaka BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	78 *	20 *	45 *	40 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	78	130	20	45

Sample Details					
Lab Sample ID:		**240816-065-13**	**240816-065-14**	**240816-065-15**	**240816-065-16**
Client Sample ID:					
Sample Date/Time		16/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Karaka BAC24WI5 dry	Karaka VIR24WI1 dry	Karaka VIR24WI2 dry	Karaka VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**240816-065-13**	**240816-065-14**	**240816-065-15**	**240816-065-16**
Client Sample ID:					
Sample Date/Time:		16/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Karaka BAC24WI5 dry	Karaka VIR24WI1 dry	Karaka VIR24WI2 dry	Karaka VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	20 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	330	-	-	-

Sample Details					
Lab Sample ID:		**240816-065-17**	**240816-065-18**	**240816-065-19**	**240816-065-20**
Client Sample ID:					
Sample Date/Time		16/08/2024	16/08/2024	16/08/2024	16/08/2024
Description:		Toro ramp BAC24WI1 dry	Toro ramp BAC24WI2 dry	Toro ramp BAC24WI3 dry	Toro ramp BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	78 *	130 *	61 *	20 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	110	45	330	120

Sample Details					
Lab Sample ID:		**240816-065-21**	**240816-065-22**	**240816-065-23**	**240816-065-24**
Client Sample ID:					
Sample Date/Time		16/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Toro ramp BAC24WI5 dry	Toro ramp VIR24WI1 dry	Toro ramp VIR24WI2 dry	Toro ramp VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	140	-	-	-

Sample Details					
Lab Sample ID:		**240816-065-25**	**240816-065-26**	**240816-065-27**	**240816-065-28**
Client Sample ID:					
Sample Date/Time		16/08/2024	16/08/2024	16/08/2024	16/08/2024
Description:		Te Toro BAC24WI1 dry	Te Toro BAC24WI2 dry	Te Toro BAC24WI3 dry	Te Toro BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	20 *	<18 *	20 *	20 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	110	<18	<18

Sample Details					
Lab Sample ID:		**240816-065-29**	**240816-065-30**	**240816-065-31**	**240816-065-32**
Client Sample ID:					
Sample Date/Time		16/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Te Toro BAC24WI5 dry	Te Toro VIR24WI1 dry	Te Toro VIR24WI2 dry	Te Toro VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	-	-	-

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**240816-065-29**	**240816-065-30**	**240816-065-31**	**240816-065-32**
Client Sample ID:					
Sample Date/Time:		16/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Te Toro BAC24WI5 dry	Te Toro VIR24WI1 dry	Te Toro VIR24WI2 dry	Te Toro VIR24WI3 dry
Microbiology					
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	18	-	-	-

Sample Details					
Lab Sample ID:		**240816-065-33**	**240816-065-34**	**240816-065-35**	**240816-065-36**
Client Sample ID:					
Sample Date/Time		16/08/2024	16/08/2024	16/08/2024	16/08/2024
Description:		Gordons BAC24WI1 dry	Gordons BAC24WI2 dry	Gordons BAC24WI3 dry	Gordons BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	170 *	78 *	490 *	140 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	45	45	110	78

Sample Details					
Lab Sample ID:		**240816-065-37**	**240816-065-38**	**240816-065-39**	**240816-065-40**
Client Sample ID:					
Sample Date/Time		16/08/2024	15/08/2024	15/08/2024	15/08/2024
Description:		Gordons BAC24WI5 dry	Gordons VIR24WI1 dry	Gordons VIR24WI2 dry	Gordons VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	110 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	110	-	-	-

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

Where samples have been supplied by the client, they are tested as received.

The results of analysis contained in this report relate only to the sample(s) tested. Where sample collection was performed by the laboratory, the results of analysis contained in this report relate only to the sample(s) collected.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Microbiology				
Culturable Enteroviruses (presumptive) by Enumeration				
Enterovirus (presumptive)	In-house method MM61	4 pfu/100 g	6, 7, 8, 14, 15, 16, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland
Enterococci by MPN				
Enterococci	APHA (online edition) 9230 B	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Preparations				
Faecal coliforms (MPN)	In-house based on APHA 9221	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Shellfish Blending	In-house method		All	Auckland
Shellfish Preparation (virus)	In-house method		6, 7, 8, 14, 15, 16, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Qi Zhu

KTP Signatory

Certificate of Analysis Bacteria & virus - October 2024

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Certificate of Analysis
Laboratory Reference:241014-105

Attention:	Environmental Care	*Final Report:*	**570058-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**21-Nov-2024**
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**31-Oct-2024**
Client Reference:	**SW Clark WWTP Monitoring - Microbiology**	*Laboratory Activity Dates:*	**31-Oct-2024 - 20-Nov-2024**
Purchase Order:	**Y-3310-LB-002**	*Quote Reference :*	**16391**

Sample Details					
Lab Sample ID:		**241014-105-1**	**241014-105-2**	**241014-105-3**	**241014-105-4**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Matakawau BAC24WI 1 dry	Matakawau BAC24WI 2 dry	Matakawau BAC24WI 3 dry	Matakawau BAC24WI 4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	78 *	170 *	2300 *	330 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	460	330	490	790

Sample Details					
Lab Sample ID:		**241014-105-5**	**241014-105-6**	**241014-105-7**	**241014-105-8**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Matakawau BAC24WI 5 dry	Matakawau VIR24WI1 dry	Matakawau VIR24WI2 dry	Matakawau VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	45 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	790	-	-	-

Sample Details					
Lab Sample ID:		**241014-105-9**	**241014-105-10**	**241014-105-11**	**241014-105-12**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Karaka BAC24WI1 dry	Karaka BAC24WI2 dry	Karaka BAC24WI3 dry	Karaka BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	20 *	20 *	45 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	45	130	18	<18

Sample Details					
Lab Sample ID:		**241014-105-13**	**241014-105-14**	**241014-105-15**	**241014-105-16**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Karaka BAC24WI5 dry	Karaka VIR24WI1 dry	Karaka VIR24WI2 dry	Karaka VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**241014-105-13**	**241014-105-14**	**241014-105-15**	**241014-105-16**
Client Sample ID:					
Sample Date/Time:		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Karaka BAC24WI5 dry	Karaka VIR24WI1 dry	Karaka VIR24WI2 dry	Karaka VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	45 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	45	-	-	-

Sample Details					
Lab Sample ID:		**241014-105-17**	**241014-105-18**	**241014-105-19**	**241014-105-20**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Toro ramp BAC24WI1 dry	Toro ramp BAC24WI2 dry	Toro ramp BAC24WI3 dry	Toro ramp BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	790 *	130 *	<18 *	<18 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	78	230	<18	68

Sample Details					
Lab Sample ID:		**241014-105-21**	**241014-105-22**	**241014-105-23**	**241014-105-24**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Toro ramp BAC24WI5 dry	Toro ramp VIR24WI1 dry	Toro ramp VIR24WI2 dry	Toro ramp VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	20 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	170	-	-	-

Sample Details					
Lab Sample ID:		**241014-105-25**	**241014-105-26**	**241014-105-27**	**241014-105-28**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Te Toro BAC24WI1 dry	Te Toro BAC24WI2 dry	Te Toro BAC24WI3 dry	Te Toro BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	<18 *	<18 *	20 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	<18	<18	20

Sample Details					
Lab Sample ID:		**241014-105-29**	**241014-105-30**	**241014-105-31**	**241014-105-32**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Te Toro BAC24WI5 dry	Te Toro VIR24WI1 dry	Te Toro VIR24WI2 dry	Te Toro VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	-	-	-

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**241014-105-29**	**241014-105-30**	**241014-105-31**	**241014-105-32**
Client Sample ID:					
Sample Date/Time:		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Te Toro BAC24WI5 dry	Te Toro VIR24WI1 dry	Te Toro VIR24WI2 dry	Te Toro VIR24WI3 dry
Microbiology					
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	-	-	-

Sample Details					
Lab Sample ID:		**241014-105-33**	**241014-105-34**	**241014-105-35**	**241014-105-36**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Gordons BAC24WI1 dry	Gordons BAC24WI2 dry	Gordons BAC24WI3 dry	Gordons BAC24WI4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	<18 *	<18 *	40 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	45	20	<18	<18

Sample Details					
Lab Sample ID:		**241014-105-37**	**241014-105-38**	**241014-105-39**	**241014-105-40**
Client Sample ID:					
Sample Date/Time		30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00	30/10/2024 16:00
Description:		Gordons BAC24WI5 dry	Gordons VIR24WI1 dry	Gordons VIR24WI2 dry	Gordons VIR24WI3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	45 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	45	-	-	-

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

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Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Microbiology				
Culturable Enteroviruses (presumptive) by Enumeration				
Enterovirus (presumptive)	In-house method MM61	4 pfu/100 g	6, 7, 8, 14, 15, 16, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland
Enterococci by MPN				
Enterococci	APHA (online edition) 9230 B	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Preparations				
Faecal coliforms (MPN)	In-house based on APHA 9221	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Shellfish Blending	In-house method		All	Auckland
Shellfish Preparation (virus)	In-house method		6, 7, 8, 14, 15, 16, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Marina Fisher

KTP Signatory

Certificate of Analysis Bacteria & virus – January 2025

Watercare
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Certificate of Analysis
Laboratory Reference:250123-106

Attention:		*Final Report:*	**578512-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**07-Feb-2025**
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**23-Jan-2025**
Client Reference:	**SW Clark WWTP monitoring - microbiology**	*Laboratory Activity Dates:*	**23-Jan-2025 - 06-Feb-2025**
Purchase Order:	**3310-WV-02-693040**	*Quote Reference :*	**16391**

Sample Details					
Lab Sample ID:		**250123-106-1**	**250123-106-2**	**250123-106-3**	**250123-106-4**
Client Sample ID:					
Sample Date/Time		23/01/2025	23/01/2025	23/01/2025	23/01/2025
Description:		Matakawau BAC25SU 1 dry	Matakawau BAC25SU 2 dry	Matakawau BAC25SU 3 dry	Matakawau BAC25SU 4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	460 *	790 *	2300 *	3300 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	1300	490	790	1300

Sample Details					
Lab Sample ID:		**250123-106-5**	**250123-106-6**	**250123-106-7**	**250123-106-8**
Client Sample ID:					
Sample Date/Time		23/01/2025	23/01/2025	23/01/2025	23/01/2025
Description:		Matakawau BAC25SU 5 dry	Matakawau VIR25SU 1 dry	Matakawau VIR25SU 2 dry	Matakawau VIR25SU3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	2300 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	490	-	-	-

Sample Details					
Lab Sample ID:		**250123-106-9**	**250123-106-10**	**250123-106-11**	**250123-106-12**
Client Sample ID:					
Sample Date/Time		23/01/2025	23/01/2025	23/01/2025	23/01/2025
Description:		Te Toro BAC25SU1 dry	Te Toro BAC25SU2 dry	Te Toro BAC25SU3 dry	Te Toro BAC25SU4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	<18 *	45 *	78 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	<18	<18	<18

Sample Details					
Lab Sample ID:		**250123-106-13**	**250123-106-14**	**250123-106-15**	**250123-106-16**
Client Sample ID:					
Sample Date/Time		23/01/2025	23/01/2025	23/01/2025	23/01/2025
Description:		Te Toro BAC25SU5 dry	Te Toro VIR25SU1 dry	Te Toro VIR25SU2 dry	Te Toro VIR25SU3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250123-106-13**	**250123-106-14**	**250123-106-15**	**250123-106-16**
Client Sample ID:					
Sample Date/Time:		23/01/2025	23/01/2025	23/01/2025	23/01/2025
Description:		Te Toro BAC25SU5 dry	Te Toro VIR25SU1 dry	Te Toro VIR25SU2 dry	Te Toro VIR25SU3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	-	-	-

Sample Details					
Lab Sample ID:		**250123-106-17**	**250123-106-18**	**250123-106-19**	**250123-106-20**
Client Sample ID:					
Sample Date/Time		23/01/2025	23/01/2025	23/01/2025	23/01/2025
Description:		Gordons BAC25SU1 dry	Gordons BAC25SU2 dry	Gordons BAC25SU3 dry	Gordons BAC25SU4 dry
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	170 *	68 *	68 *	45 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	93	78	170

Sample Details					
Lab Sample ID:		**250123-106-21**	**250123-106-22**	**250123-106-23**	**250123-106-24**
Client Sample ID:					
Sample Date/Time		23/01/2025	23/01/2025	23/01/2025	23/01/2025
Description:		Gordons BAC25SU5 dry	Gordons VIR25SU1 dry	Gordons VIR25SU2 dry	Gordons VIR25SU3 dry
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	-	-	-

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Culturable Enteroviruses (presumptive) by Enumeration				
Enterovirus (presumptive)	In-house method MM61	4 pfu/100 g	6, 7, 8, 14, 15, 16, 22, 23, 24	Auckland
Enterococci by MPN				
Enterococci	APHA (online edition) 9230 B	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21	Auckland
Preparations				
Faecal coliforms (MPN)	In-house based on APHA 9221	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21	Auckland
Shellfish Blending	In-house method		All	Auckland
Shellfish Preparation (virus)	In-house method		6, 7, 8, 14, 15, 16, 22, 23, 24	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited .

Marina Fisher

KTP Signatory

Certificate of Analysis Bacteria & virus – March 2025

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Certificate of Analysis
Laboratory Reference: 250307-104

Attention:		*Final Report:*	**588386-0**	*Replaces Report*	**583819-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**02-May-2025**		
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**07-Mar-2025**		
		Sampled By:	**Levi Murdoch-Tighe**		
Client Reference:	**SW Clark WWTP Monitoring - Microbiology**	*Laboratory Activity Dates:*	**07-Mar-2025 - 24-Mar-2025**		
Purchase Order:	**3310-WV-02-693040**	*Quote Reference :*	**16353**		

Amended CoA generated with corrected accreditation status.

Sample Details					
Lab Sample ID:		**250307-104-1**	**250307-104-2**	**250307-104-3**	**250307-104-4**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Matakawau BAC25MA RCH-1	Matakawau BAC25MA RCH-2	Matakawau BAC25MA RCH-3	Matakawau BAC25MA RCH-4
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	230 *	490 *	110 *	45 *

Sample Details					
Lab Sample ID:		**250307-104-5**	**250307-104-6**	**250307-104-7**	**250307-104-8**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Matakawau BAC25MA RCH-5	Matakawau VIR25MA RCH-1	Matakawau VIR25MA RCH-2	Matakawau VIR25MA RCH-3
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	130 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	-	45	78	220

Sample Details					
Lab Sample ID:		**250307-104-9**	**250307-104-10**	**250307-104-11**	**250307-104-12**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Karaka BAC25MARC H-1	Karaka BAC25MARC H-2	Karaka BAC25MARC H-3	Karaka BAC25MARC H-4
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	<18 *	78 *	45 *	78 *

Sample Details					
Lab Sample ID:		**250307-104-13**	**250307-104-14**	**250307-104-15**	**250307-104-16**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Karaka BAC25MARC H-5	Karaka VIR25MARCH -1	Karaka VIR25MARCH -2	Karaka VIR25MARCH -3
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250307-104-13**	**250307-104-14**	**250307-104-15**	**250307-104-16**
Client Sample ID:					
Sample Date/Time:		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Karaka BAC25MARC H-5	Karaka VIR25MARCH -1	Karaka VIR25MARCH -2	Karaka VIR25MARCH -3
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	45 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	-	45	78	78

Sample Details					
Lab Sample ID:		**250307-104-17**	**250307-104-18**	**250307-104-19**	**250307-104-20**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Toro Ramp BAC25MA RCH-1	Toro Ramp BAC25MA RCH-2	Toro Ramp BAC25MA RCH-3	Toro Ramp BAC25MA RCH-4
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	490 *	78 *	790 *	170 *

Sample Details					
Lab Sample ID:		**250307-104-21**	**250307-104-22**	**250307-104-23**	**250307-104-24**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Toro Ramp BAC25MA RCH-5	Toro Ramp VIR25MA RCH-1	Toro Ramp VIR25MA RCH-2	Toro Ramp VIR25MAR CH-3
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	78 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	-	45	45	<18

Sample Details					
Lab Sample ID:		**250307-104-25**	**250307-104-26**	**250307-104-27**	**250307-104-28**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Te Toro BAC25MARC H-1	Te Toro BAC25MARC H-2	Te Toro BAC25MARC H-3	Te Toro BAC25MARC H-4
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	230 *	45 *	45 *	78 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	-	20	<18	<18

Sample Details					
Lab Sample ID:		**250307-104-29**	**250307-104-30**	**250307-104-31**	**250307-104-32**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Te Toro BAC25MARC H-5	Te Toro VIR25MARCH -1	Te Toro VIR25MARCH -2	Te Toro VIR25MARCH -3
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	170 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	20	-	-	-

Sample Details					
Lab Sample ID:		**250307-104-33**	**250307-104-34**	**250307-104-35**	**250307-104-36**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Gordons BAC25MAR CH-1	Gordons BAC25MAR CH-2	Gordons BAC25MAR CH-3	Gordons BAC25MAR CH-4
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	170 *	68 *	110 *	170 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	20	<18	<18	20

Sample Details					
Lab Sample ID:		**250307-104-37**	**250307-104-38**	**250307-104-39**	**250307-104-40**
Client Sample ID:					
Sample Date/Time		06/03/2025	06/03/2025	06/03/2025	06/03/2025
Description:		Gordons BAC25MAR CH-5	Gordons VIR25MARC H-1	Gordons VIR25MARC H-2	Gordons VIR25MARC H-3
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	20 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	<18	-	-	-

*Results marked with * are not accredited to International Accreditation New Zealand. A dash indicates no test performed.*

Where samples have been supplied by the client, they are tested as received.

The results of analysis contained in this report relate only to the sample(s) tested. Where sample collection was performed by the laboratory, the results of analysis contained in this report relate only to the sample(s) collected.

Reference Methods

The sample(s) referred to in this report were analysed by the following method(s)

Analyte	Method Reference	MDL	Samples	Location
Microbiology				
Culturable Enteroviruses (presumptive) by Enumeration				
Enterovirus (presumptive)	In-house method MM61	4 pfu/100 g	6, 7, 8, 14, 15, 16, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland
Enterococci by MPN				
Enterococci	APHA (online edition) 9230 B	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Preparations				
Faecal coliforms (MPN)	In-house based on APHA 9221	2 MPN/100g	6, 7, 8, 14, 15, 16, 22, 23, 24, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Shellfish Blending	In-house method		All	Auckland
Shellfish Preparation (virus)	In-house method		6, 7, 8, 14, 15, 16, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

Samples, with suitable preservation and stability of analytes, will be held by the laboratory for a period of two weeks after results have been reported, unless otherwise advised by the submitter.

Watercare Laboratory Services is a division of Watercare Services Limited.

Robyn Abernethy
Compliance and Projects Manager

Certificate of Analysis Bacteria & virus – May 2025

Watercare
Laboratory Services

Watercare Services Limited
52 Aintree Ave, Māngere, Auckland, 2022
PO Box 107028, Auckland, 2150
T: 0800 522 365
clientsupport@water.co.nz
www.watercarelabs.co.nz

Certificate of Analysis
Laboratory Reference: 250515-136

Attention:	General -	*Final Report:*	**591914-0**
Client:	**WATERCARE SERVICES LTD**	*Report Issue Date:*	**05-Jun-2025**
Address:	**PO Box 92521, Wellesley Street, 1141**	*Received Date:*	**21-May-2025**
		Sampled By:	**Levi-Murdoch-Tighe**
Client Reference:	**SW Clark WWTP monitoring - microbiology**	*Laboratory Activity Dates:*	**21-May-2025 - 05-Jun-2025**
Purchase Order:	**3310-WV-02-693040**	*Quote Reference :*	**16353**

Sample Details					
Lab Sample ID:		**250515-136-1**	**250515-136-2**	**250515-136-3**	**250515-136-4**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Matakawau BAC25MA Y-1	Matakawau BAC25MA Y-2	Matakawau BAC25MA Y-3	Matakawau BAC25MA Y-4
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	170 *	140 *	78 *	170 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	20	45	40	230

Sample Details					
Lab Sample ID:		**250515-136-5**	**250515-136-6**	**250515-136-7**	**250515-136-8**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Matakawau BAC25MA Y-5	Matakawau VIR25MA Y-1	Matakawau VIR25MA Y-2	Matakawau VIR25MA Y-3
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	<4.0
Enterococci by MPN					
Enterococci	MPN/100g	130 *	-	-	-
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	270	-	-	-

Sample Details					
Lab Sample ID:		**250515-136-9**	**250515-136-10**	**250515-136-11**	**250515-136-12**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Karaka BAC25MAY-1	Karaka BAC25MAY-2	Karaka BAC25MAY-3	Karaka BAC25MAY-4
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	130 *	330 *	700 *	130 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	45	230	45	45

Sample Details					
Lab Sample ID:		**250515-136-13**	**250515-136-14**	**250515-136-15**	**250515-136-17**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Karaka BAC25MAY-5	Karaka VIR25MAY-1	Karaka VIR25MAY-2	Toro Ramp BAC25MA Y-1
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	-	<4.0	<4.0	-

Sample Details (continued)		ENV_BIOL	ENV_BIOL	ENV_BIOL	ENV_BIOL
Lab Sample ID:		**250515-136-13**	**250515-136-14**	**250515-136-15**	**250515-136-17**
Client Sample ID:					
Sample Date/Time:		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Karaka BAC25MAY-5	Karaka VIR25MAY-1	Karaka VIR25MAY-2	Toro Ramp BAC25MA Y-1
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	45 *	-	-	230 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	130	-	-	230

Sample Details					
Lab Sample ID:		**250515-136-18**	**250515-136-19**	**250515-136-20**	**250515-136-21**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Toro Ramp BAC25MA Y-2	Toro Ramp BAC25MA Y-3	Toro Ramp BAC25MA Y-4	Toro Ramp BAC25MA Y-5
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	330 *	140 *	230 *	330 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	170	330	78	790

Sample Details					
Lab Sample ID:		**250515-136-22**	**250515-136-23**	**250515-136-24**	**250515-136-25**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Toro Ramp VIR25MAY -1	Toro Ramp VIR25MAY -2	Toro Ramp VIR25MAY -3	Te Toro BAC25MAY-1
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	<4.0	<4.0	<4.0	-
Enterococci by MPN					
Enterococci	MPN/100g	-	-	-	78 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	-	-	-	170

Sample Details					
Lab Sample ID:		**250515-136-26**	**250515-136-27**	**250515-136-28**	**250515-136-29**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Te Toro BAC25MAY-2	Te Toro BAC25MAY-3	Te Toro BAC25MAY-4	Te Toro BAC25MAY-5
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	790 *	110 *	78 *	110 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	20	20	20	230

Sample Details					
Lab Sample ID:		**250515-136-30**	**250515-136-31**	**250515-136-32**	**250515-136-33**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Te Toro VIR25MAY-1	Te Toro VIR25MAY-2	Te Toro VIR25MAY-3	Gordons BAC25MAY-1
Microbiology					
Culturable Enteroviruses (presumptive) by Enumeration					
Enterovirus (presumptive)	pfu/100 g	<4.0	<4.0	<4.0	-
Enterococci by MPN					
Enterococci	MPN/100g	-	-	-	78 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	-	-	-	310

Sample Details					
Lab Sample ID:		**250515-136-34**	**250515-136-35**	**250515-136-36**	**250515-136-37**
Client Sample ID:					
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025	20/05/2025
Description:		Gordons BAC25MAY-2	Gordons BAC25MAY-3	Gordons BAC25MAY-4	Gordons BAC25MAY-5
Microbiology					
Enterococci by MPN					
Enterococci	MPN/100g	68 *	1300 *	1300 *	220 *
Faecal coliforms by MPN					
Faecal coliforms (MPN)	MPN/100g	130	<18	20	78

Sample Details				
Lab Sample ID:		**250515-136-38**	**250515-136-39**	**250515-136-40**
Client Sample ID:				
Sample Date/Time		20/05/2025	20/05/2025	20/05/2025
Description:		Gordons VIR25MAY-1	Gordons VIR25MAY-2	Gordons VIR25MAY-3
Microbiology				
Culturable Enteroviruses (presumptive) by Enumeration				
Enterovirus (presumptive)	pfu/100 g	<4.0	<4.0	<4.0

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Enterovirus (presumptive)	In-house method MM61	4 pfu/100 g	6, 7, 8, 14, 15, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland
Enterococci by MPN				
Enterococci	APHA (online edition) 9230 B	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Preparations				
Faecal coliforms (MPN)	In-house based on APHA 9221	2 MPN/100g	1, 2, 3, 4, 5, 9, 10, 11, 12, 13, 17, 18, 19, 20, 21, 25, 26, 27, 28, 29, 33, 34, 35, 36, 37	Auckland
Shellfish Blending	In-house method		All	Auckland
Shellfish Preparation (virus)	In-house method		6, 7, 8, 14, 15, 22, 23, 24, 30, 31, 32, 38, 39, 40	Auckland

The method detection limit (MDL) listed is the limit attainable in a relatively clean matrix. If dilutions are required for analysis the detection limit may be higher. For more information please contact the Compliance and Projects Manager.

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Robyn Abernethy
Compliance and Projects Manager

Report Number: **591914-0** Watercare Laboratory Services **Page 3 of 3**

APPENDIX 4 WILD SHELLFISH POPULATION MONITORING

Table A 4.1 Wild Oyster Lengths (mm)

Site	K1		K2		C3Oys		K3		K4	
Size Bin	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25
0	0	0	0	0	0	0	0	0	0	0
5	0	0	0	0	0	0	0	0	0	0
10	0	0	0	0	0	0	0	0	0	0
15	0	0	0	0	0	0	0	0	0	0
20	0	2	4	0	1	0	0	1	0	1
25	12	7	32	8	17	2	1	8	7	10
30	23	22	38	10	35	11	4	9	14	18
35	23	31	24	31	19	20	5	14	29	27
40	19	14	19	23	18	22	12	18	22	21
45	18	11	11	15	15	16	12	13	17	18
50	15	8	8	8	12	13	20	13	12	7
55	5	3	8	7	6	8	21	7	4	10
60	3	1	7	0	9	5	17	11	3	5
65	2	3	4	1	0	1	10	5	2	3
70	0	0	2	0	0	3	4	0	1	4
75	0	2	0	2	0	2	4	1	1	0
80	0	0	1	0	0	0	4	0	1	0
85	0	0	0	0	0	1	0	0	0	0
90	0	0	0	0	0	1	0	0	0	0
95	1	0	0	0	0	0	0	0	0	0
100	0	0	0	0	0	0	0	0	0	0
n	**121**	**104**	**147**	**105**	**132**	**105**	**114**	**100**	**113**	**124**
Mean	**37.25**	**36.45**	**34.85**	**37.86**	**30.00**	**41.74**	**51.16**	**41.74**	**38.82**	**39.01**
S.D.	11.03	10.51	12.21	9.25	32.00	11.97	11.68	11.97	10.25	11.23
±95%CI	**1.99**	**2.04**	**1.92**	**1.79**	**23.00**	**2.37**	**2.17**	**2.37**	**1.91**	**2.00**
Min	21	18	16	21	41	20	25	20	22	20
Max	95	72	77	72	22	73	80	73	79	69

Table A 4.2 Wild Oyster Density (nb/0.25m²)

Site	K1		K2		C3Oys		K3		K4	
Quadrat	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25
1	0	0	40	33	56	7	0	0	21	0
2	0	0	53	37	76	2	0	9	7	50
3	1	0	65	23	21	1	0	2	14	36
4	7	0	13	12	47	2	0	0	6	38
5	0	0	85	48	9	4	0	7	0	40
6	2	0	24	37	58	41	0	3	0	35
7	1	0	18	41	11	1	0	0	0	55
8	5	0	63	13	36	1	0	5	3	25
9	0	0	39	48	41	0	3	1	8	28
10	0	0	76	28	63	16	10	0	32	52
11	0	0	11	0	0	0	8	3	3	36
12	1	0	0	3	70	0	2	11	0	51
13	2	0	8	1	1	7	5	2	0	0
14	0	1	7	2	0	0	15	4	0	59
15	7	0	9	49	4	0	0	1	19	57
16	9	0	0	56	1	22	0	2	0	54
17	0	0	12	14	4	0	0	0	2	0
18	2	2	6	4	0	0	0	0	43	18
19	0	1	7	33	3	13	0	0	20	0
20	3	0	22	6	0	8	1	0	37	0
21	2	4	27	3	0	0	1	0	8	0
22	0	0	44	6	0	7	0	0	51	0
23	0	21	33	14	1	14	0	0	96	0
24	8	0	5	51	0	169	0	0	77	0
25	2	0	3	16	0	71	3	0	89	0
26	24	0	9	10	3	96	0	0	98	2
27	1	11	7	0	5	54	0	0	88	0
28	0	0	1	0	0	21	0	0	49	0
29	18	8	0	0	0	5	0	0	15	0
30	1	13	0	0	0	0	0	0	0	0
31	25	43					29	50		
32							19			
33							18			
n	**121**	**104**	**687**	**588**	**510**	**562**	**114**	**100**	**786**	**636**
Mean	**3.90**	**3.35**	**22.90**	**19.60**	**17.00**	**18.73**	**3.45**	**3.23**	**26.20**	**21.20**
SD	6.72	8.79	24.50	18.85	25.18	36.53	7.00	9.13	32.65	23.19
±95%CI	**2.37**	**3.09**	**8.77**	**6.75**	**9.01**	**13.07**	**2.39**	**3.21**	**11.69**	**8.30**

Table A 4.3 Cockle size frequency data

Site	Co1		Co2		Co3		Co4		Co5	
Size (mm)	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25
<8	21	10	51	0	14	13	3	0	26	13
8	3	7	9	0	13	8	6	1	13	6
9	0	9	8	0	11	5	8	0	6	6
10	1	6	7	3	11	17	13	5	4	5
11	0	2	7	2	6	23	11	4	2	3
12	1	0	8	4	8	19	11	4	7	10
13	2	0	9	2	11	16	12	5	16	5
14	3	0	4	6	9	10	7	10	12	9
15	8	2	1	13	15	13	15	12	16	14
16	17	1	4	14	7	13	15	11	13	19
17	32	1	8	15	7	6	19	14	26	23
18	25	6	7	8	1	16	20	20	15	30
19	25	12	2	12	5	3	25	17	8	23
20	13	13	1	7	6	6	20	11	7	18
21	15	11	3	15	0	1	24	6	5	8
22	3	9	0	14	0	1	10	4	4	9
23	1	7	0	12	0	0	9	0	2	2
24	1	3	1	11	0	0	3	0	0	1
25	1	1	1	7	0	0	1	0	0	1
26	0	0	0	4	0	0	0	0	0	0
27	0	0	1	6	0	0	0	0	1	0
28	0	0	0	1	0	0	0	0	0	0
29	0	0	0	2	0	0	0	0	0	0
30	0	0	0	2	0	0	0	0	0	0
31	0	0	0	0	0	0	0	0	0	0
32	0	0	0	0	0	0	0	0	0	0
33	0	0	0	0	0	0	0	0	0	0
34	0	0	0	0	0	0	0	0	0	0
35	0	0	0	0	0	0	0	0	0	0
36	0	0	0	0	0	0	0	0	0	0
37	0	0	0	0	0	0	0	0	0	0
38	0	0	0	0	0	0	0	0	0	0
39	0	0	0	0	0	0	0	0	0	0
40	0	0	0	0	0	0	0	0	0	0
>40	0	0	0	0	0	0	0	0	0	0
n	**172**	**100**	**132**	**160**	**124**	**170**	**232**	**124**	**183**	**205**
Mean	**16.22**	**16.25**	**10.22**	**19.66**	**12.2**	**12.9**	**16.50**	**16.66**	**13.84**	**15.95**
CL	**0.74**	**1.22**	**0.94**	**0.69**	**0.72**	**0.58**	**0.56**	**0.55**	**0.73**	**0.62**
% edible	**1**	**1**	**2**	**14**	**0**	**0**	**0**	**0**	**1**	**1**
Min	**4**	**4**	**4**	**10**	**4**	**4**	**12**	**8**	**4**	**8**
Max	**25**	**25**	**27**	**30**	**20**	**22**	**25**	**22**	**27**	**25**

Table A 4.4 Cockle Density (nb/m²)

Cell	Station	Co1		Co2		Co3		Co4		Co5	
		Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25	Oct-24	Feb-25
1	1	1184	1600	60	160	1984	2720	880	880	1296	1488
	2	1568	1104	468	504	3776	3200	2832	1104	1632	1792
	Cell Mean	**1376**	**1352**	**264**	**332**	**2880**	**2960**	**1856**	**992**	**1464**	**1640**
2	3	1344	1056	352	616	1808	3648	2928	2248	1440	1168
	4	800	1568	24	64	2208	3504	1536	1328	1840	1232
	Cell Mean	**1072**	**1312**	**188**	**340**	**2008**	**3576**	**2232**	**1888**	**1640**	**1200**
3	5	896	1776	12	40	2576	1952	3456	4400	2240	2288
	6	1408	1472	32	72	3136	1280	1744	1664	2336	1392
	Cell Mean	**1152**	**1624**	**22**	**56**	**2856**	**1616**	**2600**	**3032**	**2288**	**1840**
4	7	912	848	156	216	2560	3808	1184	2384	2720	2768
	8	1152	1936	384	744	1264	3104	592	880	4368	1632
	Cell Mean	**1032**	**1392**	**270**	**480**	**1912**	**3456**	**888**	**1632**	**3544**	**2200**
5	9	1296	2512	400	816	1936	2816	2080	1024	496	3888
	10	1248	3344	92	216	1376	2816	1408	1776	560	2448
	Cell Mean	**1272**	**2928**	**246**	**516**	**1656**	**2816**	**1744**	**1400**	**528**	**3168**
6	11	1696	1360	960	752	2272	3312	1488	2672	1456	2576
	12	2272	2672	40	304	1904	2496	1936	2640	1632	1488
	Cell Mean	**1984**	**2016**	**500**	**528**	**2088**	**2904**	**1712**	**2656**	**1544**	**2032**
7	13	1248	2096	340	288	3968	3568	1776	1840	1952	3152
	14	688	2496	236	200	3056	1840	1552	1120	2304	2096
	Cell Mean	**968**	**2296**	**288**	**244**	**3512**	**2704**	**1664**	**1480**	**2128**	**2624**
8	15	960	1216	180	488	2480	2144	672	1216	1472	2352
	16	912	1232	492	744	816	1072	528	288	1472	1264
	Cell Mean	**936**	**1224**	**336**	**616**	**1648**	**1608**	**600**	**752**	**1472**	**1808**
9	17	2160	1408	908	216	448	560	320	656	2224	2016
	18	848	1744	116	216	96	96	304	0	2096	2624
	Cell Mean	**1504**	**1576**	**512**	**216**	**272**	**328**	**312**	**328**	**2160**	**2320**
10	19	880	1392	368	1432	800	832	304	768	2016	2336
	20	1200	1776	124	760	1328	1984	752	448	1216	1888
	Cell Mean	**1040**	**1584**	**246**	**1096**	**1064**	**1408**	**528**	**608**	**1616**	**2112**
11	21	944	2112	504	1416	2672	3552	1376	1584	1680	4864
	22	1760	2048	1232	1448	1808	1552	944	1744	312	216
	Cell Mean	**1352**	**2080**	**868**	**1432**	**2240**	**2552**	**1160**	**1664**	**996**	**2540**
12	23	1808	1728	1716	1456	3296	0	1664	1808	432	848
	24	1536	496	720	1224	160	2176	1168	144	0	784
	Cell Mean	**1672**	**1112**	**1218**	**1340**	**1728**	**1088**	**1416**	**976**	**216**	**816**
Site Mean		**1280**	**1708**	**413.2**	**599.7**	**1989**	**2251**	**1392.7**	**1450.7**	**1664**	**2069.3**
Site SD		427.6	633.5	426.5	483.0	1069.0	1157.2	840.6	987.0	883.1	972.6
Site CI		171.1	253.5	170.6	193.3	427.7	463.0	336.3	394.9	353.3	389.1

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