Levin Landfill January 2025 Quarterly Groundwater, Surface Water and Leachate Monitoring Report

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Prepared for:
Horowhenua District Council

Prepared by:
Phil Landmark

Project/File:
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Stantec

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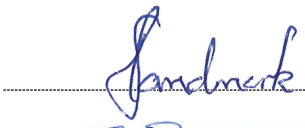
Quality Statement

Project manager	Project technical lead
K. Halder	**P. Landmark**

PREPARED BY		
P. Landmark		05/02/2025
CHECKED BY		
T. Brothersen		24/02/2025
REVIEWED BY		
K. Halder		25/02/2025
APPROVED FOR ISSUE BY		
K. Halder		07/03/2025

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Executive Summary

Horowhenua District Council (HDC) is required to carry out quarterly compliance monitoring of groundwater and monthly sampling at selected surface water monitoring locations at the Levin Landfill, as part of the conditions of Resource Consents ATH-2002003982.03 (formerly DP6009), ATH-2002003983.02 (formerly DP6010), ATH-2002003984.02 (formerly DP6011) and ATH-2002009801.02 (formerly DP102259). This report summarises the findings for the monitoring events from the third quarter (i.e., November 2024 to January 2025) sampling round and includes results for:

- Background (natural) groundwater (Bores G1s and G1d)
- Landfill leachate (manhole next to leachate pond)
- Groundwater bores, down-gradient of the new landfill (Bores D1, D2, D3rs, D4, D5, D6 and E1s)
- Groundwater bores within the old irrigation area (Bores F1, F2 and F3)
- Shallow aquifers, down-gradient of the old landfill (Bores B1, B2, B3s, C2, C2ds, E2s, G2s, Xs1 and Xs2)
- The deep aquifer (Bores C2dd, D3rd, E1d, E2d and Xd1)
- The Northern Farm Drain (TD1), and
- The Hōkio Stream (HS1A, HS1, HS2 and HS3).

Stantec has reviewed the results of this third quarter monitoring round on behalf of HDC.

Monitoring results for other aspects of the landfill operations such as for air quality, odour, and stormwater quality are reported annually, as per resource consent requirements.

Samples were collected from 27 groundwater bores from around Levin Landfill during January 2025. Additionally, five surface water sites plus the leachate pond manhole were each sampled during November 2024, December 2024, and January 2025. All samples were analysed for the parameters set out in ATH-2002003983.02, and as listed in the results tables presented in this report.

The surface water samples were all collected on the same day in each month, and groundwater samples were collected within a 3-day period in January, which also included the dates when the surface water sampling was done. Given the number of samples that needed to be taken, this is a significant effort.

The surface water samples were received by the laboratory outside the normally accepted 24-hour timeframe between sampling and reception in November and December, and the sampling time stated for the January sampling round (00:00) gives reduced confidence about delivery timeframes for those samples. HDC has provided the field sampling sheets from the Local Waters sampling team for January, and comparing them to the laboratory sheets showed there was more than 24 hours between sampling and receipt at the laboratory.

Groundwater samples ostensibly took between 22 and 24 hours from the time the samples were taken to the time they were accepted at the laboratory, but all the laboratory sheets recorded very similar sampling times, which does not seem credible. However, HDC has confirmed that all the groundwater samples were received at the laboratory within the 24-hour period.

An investigation of this issue has shown that unless the sampler enters the actual sampling date and time in the data system, the system will, by default, assign the time at which the data entry was made. Council will check what can be done to enable staff to record actual sample times in the Infrastructure Data software and so resolve this issue.

It is noted, however, that a delay of more than 24 hours only affects water samples for microbiological analysis (e.g., *E. coli*).

The resource consent for the landfill (namely, ATH-2002003983.02) establishes compliance limits for the quality of deeper and shallow groundwater which are based upon the Drinking Water Standards for New Zealand – Maximum Acceptable Values (DWSNZ MAVs), Guideline Values for aesthetic determinants (DWSNZ GVs), and the Australian and New Zealand Environment and Conservation Council 2000 Livestock Drinking Water (ANZECC LDW) trigger values, respectively. Compliance limits for surface water are based on the ANZECC 2000[1] default guideline values (DGV) for 95th percentile species protection for toxicants in freshwater, as required by the revised Resource Consent condition approved in December 2019.

The November 2024 to January 2025 monitoring results have been assessed against these limits, where they are applicable.

Twenty-one exceedances of resource consent trigger values were recorded across ten monitoring locations, as follows:

- pH at bore D2 (pH of 5.9) was lower than the minimum pH value of 6.0 stated in the ANZECC LDW standards. The pH value at D2 has been lower on two occasions, but the median value is normally 6.5, and it is not considered to be a significant occurrence.
- The *E.coli* result at E2d was 3 CFU/100mL, which is greater than the DWSNZ MAV of NIL.
- Dissolved arsenic exceeded the DWSNZ MAV of 0.01 mg/L at bore D3rd (0.021 mg/L). This is characteristic of D3rd with the levels varying between 0.017 and 0.022 mg/L on all sampling occasions.
- Dissolved manganese concentrations exceeded the DWSNZ MAV of 0.4 mg/L in bores C2dd (0.599 mg/L), E2d (0.42 mg/L), Xd1 (0.509 mg/L) and D3rd (0.463 mg/L). The results for C2dd and E2d (from 1997), Xd1 (from March 2021 when sampling started), and D3rd (from October 2021 when sampling started) are within the historical range of concentrations observed. Dissolved manganese is generally elevated in the deep aquifer bores.
- At TD1 the level of detection applied to scBOD$_5$ in November 2024 was such that, even at half the detection level (i.e., 3 mg/L), the concentration exceeded the ANZECC AE (95%ile) DGV of 2 mg/L.
- The concentrations of ammoniacal-nitrogen at TD1 in all three months (10.3mg/L, 7.4 mg/L and 21.7 mg/L, respectively) exceeded the ANZECC AE (95%ile) DGV of 2.1 mg/L.
- The concentration of copper at TD1 in January 2025 (0.0022 mg/L) exceeded the ANZECC AE (95%ile) DGV of 0.0014 mg/L.
- The level of detection applied to scBOD$_5$ in November 2024 at HS1A was such that, even at half the detection level (i.e., 3 mg/L), the concentration exceeded the ANZECC AE (95%ile) DGV of 2 mg/L.
- Nitrate-N exceeded both the ANZECC AE (95%ile) DGV and consent trigger value of 0.16 mg/L at HS1, HS2 and HS3 in November 2024, all with a value of 0.27 mg/L.
- The concentration of ammoniacal-nitrogen at HS1A in December 2024 (5.24 mg/L) exceeded the ANZECC AE (95%ile) DGV and consent trigger value of 2.1 mg/L.
- The concentrations of dissolved copper at all Hōkio Stream sites in January 2025 (ranging between 0.0025 and 0.0034 mg/L) exceeded the ANZECC AE (95%ile) DGV and consent trigger value of 0.0014 mg/L.

[1] Now superseded by the Australian and New Zealand Water Quality Guidelines 2018 (ANZG 2018), however the ANZECC 2000 guideline values are applied in accordance with the resource consent.

Of the twenty-one exceedances, seventeen are considered to be unrelated to the landfill activities as follows:

- One exceedance in the shallow aquifer down-gradient of the new landfill was for a low pH level. There is no evidence of leachate contamination from other parameters and so this is not considered to be related to landfill activities.
- Five exceedances in the deep aquifer are not unusual and are related to the existing water quality.
- One exceedance in the deep aquifer is on account of an incorrect level of detection being applied for *E.coli* testing but is considered to be a non-compliance that is unrelated to landfill activities.
- Two exceedances, one in the Northern Farm Drain and one at HS1A, are on account of incorrect levels of detection being applied for $scBOD_5$ testing and so are considered to be non-compliances that are not related to landfill activities.
- Three exceedances in the Hōkio Stream are for elevated nitrate-N levels, which are similarly elevated upstream. There is doubt that it is from landfill activities because the bores close to the "source" of the shallow groundwater contamination do not have elevated nitrate-N levels.
- Four exceedances in the Hōkio Stream are for elevated concentrations of dissolved copper. The highest levels occur upstream of the landfill property, so the upstream activities are likely to be the source, rather than landfill activities.
- One exceedance in the Hōkio Stream is for elevated ammoniacal-nitrogen which occurred upstream of the landfill property, so the upstream activities are likely to be the source.

Three exceedances for the Northern Farm Drain were on account of elevated ammoniacal-nitrogen concentrations, and one in January was due to an elevated copper concentration. These results could well be associated with leachate from the old landfill contaminating the shallow groundwater, and then daylighting into the Northern Farm Drain. Modelling of the plume has shown that there could also be unacceptable future impacts on the Hōkio Stream. This matter is being further assessed through the Leachate Best Practicable Option (BPO) project to which Council has committed. Progress with this project has been communicated to Horizons Regional Council (HRC), the Project Management Group (PMG) and the Neighbourhood Liaison Group (NLG).

The November 2024 to January 2025 'background' monitoring results were also considered in the context of relevant guidelines, both within the groundwater aquifers (shallow and deep bores) and the surface water receiving environment. Elevated iron concentrations were observed in background bore G1s, indicating that groundwater could be being impacted by up-gradient activities unrelated to the landfill operations. Because of this, bores D5, F2 and F3 have been used to represent background water quality, because of their location upstream of the new and old landfills.

Whilst the shallow groundwater down-gradient of the old landfill meets the resource consent trigger values for all parameters, it is well documented that leachate from the old landfill is extending in a plume northward and is impacting the quality of the shallow aquifer. As noted above modelling of the plume has shown that there could be unacceptable future impacts on the Hōkio Stream and is being dealt with through the Leachate BPO project.

Methane was detected in nine bores in January 2025, with readings varying between 0.01% and 0.07%. The maximum concentration reported is well below the explosive limit of 5% and therefore represents a 'safe' level. Methane is commonly detected at the landfill site, and its detection reinforces the need for sampling staff to take the necessary precautions for gas safety, generally applicable at landfill sites.

Minor concentrations of carbon dioxide were recorded at all bores, except at bore B2 which recorded 3.07%, which is somewhat high. Hydrogen sulphide was detected at 12 of the bores, all being at a concentration of 1 ppm, which is not of concern.

The possibility of encountering methane (and hydrogen sulphide) in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring.

There were fourteen occasions where the leachate effluent quality (at the leachate pond manhole sampling location) was outside of the ranges for typical leachate composition, as recorded generally at Class 1 landfills in New Zealand. Seven of these outliers were for parameters having less concentration than the typical minimal concentrations**.** Note that leachate effluent is not subject to any consent limits.

The following recommendations are made, based on the results of this reporting period:

- Council will check what can be done to enable staff to record actual sample times in the Infrastructure Data software, and so resolve the issue of having sampling times recorded incorrectly on the laboratory sheets.
- HDC should discuss with HRC the need for a further two rounds of comprehensive testing of bores D3rs and D3rd, given that out of the 15 sampling events conducted since they were installed in October 2021, comprehensive testing has been done on 13 occasions.
- The ANZECC AE DGV (95%ile species protection) for $scBOD_5$ is 2 mg/L. So, the level of detection to be applied to the surface water samples must be set at a level where half the detection limit is less than the DGV of 2 mg/L. As for the above, this is a matter that needs to be discussed with the parties involved in requesting sampling and undertaking the laboratory testing.
- Consecutive monthly sampling has occurred at all Hōkio Stream sites since October 2021. HDC has had these results assessed, as required by the conditions of the consent, to determine their significance. HDC should discuss the results of this assessment with HRC to ascertain if a reduction in sampling frequency of the surface water monitoring locations can be made.
- Gas sampling of the bores has been recorded on days different from when the groundwater sampling was undertaken. In future, the gas sampling needs to be done when groundwater samples are taken, as required by the resource consent conditions.

Acronyms / Abbreviations

Acronym / Abbreviation	Full Name
ANZECC	Australian and New Zealand Environment and Conservation Council
ANZECC AE	ANZECC Guidelines for Fresh and Marine Water Quality - Aquatic Ecosystems
ANZECC LDW	ANZECC 2000 Livestock Drinking Water
BPO	Best Practicable Option
CFU	Colony-forming unit
COD	Chemical Oxygen Demand
DGV	Default guideline value
DWSNZ	Drinking Water Standards for New Zealand
DWSNZ GV	Drinking Water Standards for New Zealand - Guideline Values for aesthetic determinants
DWSNZ MAV	Drinking Water Standards for New Zealand – Maximum Acceptable Values
HDC	Horowhenua District Council
HRC	Horizons Regional Council
mbgl	Metres below ground level
NLG	Neighbourhood Liaison Group
PMG	Project Management Group
$scBOD_5$	Soluble carbonaceous Biochemical Oxygen Demand (5-day)
WWTP	Wastewater Treatment Plant

1 Introduction

Horowhenua District Council (HDC) first commissioned Stantec New Zealand (then Montgomery Watson) to carry out environmental reporting for the discharge consent monitoring undertaken at the Levin Landfill site in the early 2000s. Monitoring has been undertaken by contractors every three months at 33 locations, as required by the resource consent conditions (namely for discharge permit ATH-2002003983.02). These sampling locations consist of 27 boreholes penetrating the sand and gravel aquifers; four surface water sampling locations within Hōkio Stream; one surface sampling location along the Northern Farm Drain (previously referenced as the Tatana Drain), and one leachate sampling point, as shown in the Site Plan in Appendix A.

The Levin Landfill site is comprised of two landfills: one old, closed, and unlined landfill and one new, lined landfill that has now been closed for the disposal of municipal solid waste. The new landfill footprint was developed in stages. The current landfill has reached capacity and has been capped with a permanent clay capping (0.7 m thick) on all sides.

The Levin Landfill site is located above two identified aquifers, a shallow sand aquifer and a deeper gravel aquifer, which are separated by an aquiclude. The shallow aquifer is unconfined, has a low to moderate permeability, and flows in a northerly direction. The deeper gravel aquifer is a confined to semi-confined aquifer. There is also an upward flow gradient from the deep aquifer to the shallow aquifer. Horizons Regional Council (HRC) hydrology staff advises that "*the general confined groundwater flow direction is towards the west*" (i.e., from the ranges to the coast). Groundwater quality in the area is highly variable because of interaction with peat deposits that are prevalent in the area, localised effects such as from grazing activities, droppings from scavenging birds and from nitrogen-fixing plants such as gorse.

Since July 2010 groundwater has been tested for dissolved metals and nutrients, rather than for total concentrations of these parameters.

A review of the resource consent conditions was finalised in December 2019. Changes have been made to some of the surface water and groundwater monitoring conditions and HDC has acted on all the changes. Sampling since the January 2021 sampling round has been in line with previous monitoring, but different reference parameters have been applied to assess the surface water sampling results, as required by the current consent conditions.

This report presents the results for the November 2024 - January 2025 quarterly monitoring period.

Laboratory detection limits are provided for all test results, which are attached in Appendix B.

2 Groundwater and Surface Water Monitoring

2.1 Sample Analyses

Surface water samples were collected by HDC's "Local Waters" team on 21 November 2024, 12 December 2024, and 14 January 2025, with the samples being received by the Eurofins ELS Ltd laboratory in Lower Hutt, Wellington. The recorded timeframe between sample collection and laboratory reception varied between 27 and 34 hours for the first two monitoring events. In January 2025 the sampling time in all cases was given as 00:00, which is clearly incorrect. HDC has provided the field sample sheets from the Local Waters sampling team, and they show the actual time that the January samples were taken, which was between 08:50 and 10:10 on 14 January. With the reception time at the laboratory being around 18:30 for the January samples on the following day, the timeframe exceeded 24 hours.

Groundwater samples were collected by the Local Waters team on 21, 22 and 23 January 2025, again with the samples being received by the Eurofins ELS Ltd laboratory in Lower Hutt, Wellington. All the laboratory sheets ostensibly recorded times of between 22 and 24 hours between the samples being taken and them being accepted at the laboratory. However, all the laboratory sheets recorded very similar sampling times being between 13:09 and 13:18 on the 21 and 22 January, and practically at the same time (13:25 and 13:26) for all bores sampled on the 23 January, which is also clearly incorrect.

An investigation of this issue has shown that unless the sampler enters the actual sampling date and time in the data system, the system will, by default, assign the time at which the data entry was made. Council will check what can be done to enable staff to record actual sample times in the Infrastructure Data software and so resolve this issue.

It is also noted that a delay of more than 24 hours only affects water samples for microbiological analysis (e.g., *E. coli*).

The monitoring schedule for July 2023 - April 2026 is summarised in Appendix C. From July 2019, *E. coli* counts analyses have been included within the indicator and comprehensive analytical suites, as agreed by HDC with HRC. This means that *E. coli* counts will be assessed more frequently throughout each year, as compared to the past monitoring regime.

Groundwater samples taken at each of the boreholes were analysed for the indicator list of parameters which is outlined in Table 2-1. Surface water samples from Hōkio Stream, the Northern Farm Drain and the manhole next to the leachate pond, were analysed for the comprehensive list of parameters.

Note that, following the revision of the resource consent conditions which were approved in December 2019, 5-day soluble carbonaceous Biochemical Oxygen Demand ($scBOD_5$) and soluble mercury have each been added to the indicator and comprehensive suites of parameters, and *E. coli* added to the comprehensive suite of parameters. The $scBOD_5$ and *E. coli* parameters replace BOD_5 and faecal coliforms, respectively. Monitoring of these additional parameters began with the April 2020 sampling round.

Table 2-1: Test Parameters

Type	Indicator Parameters	Comprehensive Parameters
Physico-chemical characteristics	pH, Electrical Conductivity	pH, Electrical Conductivity, Alkalinity, Total Hardness, Suspended Solids
Oxygen demand	Chemical Oxygen Demand (COD), $scBOD_5$**	COD, $scBOD_5$**
Nutrients*	Nitrate nitrogen, Ammoniacal-nitrogen	Nitrate nitrogen, Ammoniacal-nitrogen, Dissolved Reactive Phosphorus, Sulphate
Metals*	Aluminium, Manganese, Nickel, Lead, Mercury**	Aluminium, Arsenic, Cadmium, Chromium, Copper, Iron***, Magnesium, Manganese, Nickel, Lead, Zinc, Mercury**
Other elements	Boron, Chloride	Boron, Calcium, Chloride, Potassium, Sodium***
Biological+	*E. coli*	*E. coli*
Organics	Not required	Total organic carbon, total phenols, volatile acids

* Analyses performed for nutrients and metals are for dissolved rather than total concentrations.

** $scBOD_5$ and soluble mercury added as per revised consent conditions for Discharge Permit ATH-2002003983.02, December 2019.

*** Iron and sodium are tested at certain groundwater bores only.

+ *E.coli* added from December 2019 onwards, with first sampling in April 2020 (see Appendix C).

Those chemical constituents for which concentrations were below laboratory detection limits during the reporting period have had results set at 50% of the laboratory detection limit, which is then used to calculate a median value for annual reporting purposes. This is standard practice when dealing with chemical concentrations in water, where the constituent is not detected.

2.2 Background Groundwater Quality

The background (natural) quality of the groundwater up-gradient from the landfill site is not subject to any consent conditions. However, for comparison purposes, both the Australian and New Zealand Environment and Conservation Council 2000 Livestock Drinking Water (ANZECC LDW) trigger values and the Drinking Water Standards for New Zealand (DWSNZ) guidelines are regularly used to benchmark the quality of water up-gradient from the landfill site.

Groundwater samples were collected from the two background bores situated hydraulically up-gradient from both the new and old landfills to the southeast of the site in January 2025 (bores G1s and G1d, see Site Plan, Appendix A). These two bores were constructed in late 2009 to sample background water quality from the two main hydrogeological units. Bore F3 is also included in the background table as it is near the southern boundary of the landfill site (and further west) and is unlikely to be impacted by landfill activities. A full laboratory report containing analytical results is presented in Appendix B and the historical graphs are presented in Appendix D.

The results for the January 2025 monitoring round are presented in Table 2-2.

For bore G1s the following result was outside the range of relevant guidelines:

- Dissolved iron (1.94 mg/L) exceeded the DWSNZ limit of 0.2 mg/L, in line with historical reporting.

The monitoring results suggest that the quality of background groundwater may be being impacted by local ground conditions and/or activities up-gradient of the landfill. Background bore G1s consistently records elevated concentrations of a range of parameters. Elevated iron concentrations are likely to be related to hydrogeological conditions found at this site, and this phenomenon is common for groundwater in this area. Overall, monitoring results at G1s indicate that it is likely modified or impacted by anthropogenic activities and therefore may not be suitable to use as reliable ‘control’ location for background water quality in the future. This matter was reviewed as part of the Annual Report, with the recommendation that bores F2, F3 and D5 be used as the primary background reference bores (i.e., control bores) for shallow groundwater.

Table 2-2: Background Monitoring Results for January 2025

Determinant	Units	DWSNZ MAV	ANZECC LDW	G1s	G1d	D5	F2	F3
Sampling date				21/01/25	21/01/25	21/01/25	21/01/25	21/01/25
Water Level	mbgl	-	-	14.27	14.7	10.2	2.55	5.14
pH	pH units	7 to 8.5*	6 to 9	7.0	7.4	7.2	7.2	7.1
Conductivity	mS/m	-	-	25.6	25.1	29.1	22.5	16
COD	mg/L	-	-	43	*7.5*	*7.5*	*7.5*	*7.5*
$scBOD_5$	mg/L	-	-	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*
E. coli	CFU/100ml	NIL	100	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
Chloride	mg/L	250*	-	32.3	28.2	27.6	22.6	14.5
Nitrate-N	mg/L	11.3	90.3	*0.005*	*0.005*	1.28	0.65	2.22
Ammoniacal-N	mg/L	1.17	-	0.27	0.09	0.01	0.01	0.06
Sodium	mg/L	200*	-	33.9	n/r	n/r	n/r	19.2

Determinant	Units	DWSNZ MAV	ANZECC LDW	G1s	G1d	D5	F2	F3
Dissolved Aluminium	mg/L	0.1*	5	0.077	*0.001*	*0.001*	0.002	0.004
Dissolved Boron	mg/L	1.4	5	0.025	0.033	0.032	0.033	0.025
Dissolved Iron	mg/L	0.2*	-	**1.94**	n/r	n/r	n/r	0.143
Dissolved Lead	mg/L	0.01	0.1	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	0.4	-	0.0426	0.0591	0.0056	0.0046	0.003
Dissolved Mercury	mg/L	-	0.002	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.08	1	0.0009	*0.00025*	*0.00025*	*0.00025*	*0.00025*

Notes: *denotes guideline values for aesthetic determinants (GV)

All `<' values have been reported as half the detection limit for statistical purposes and are *expressed in italics*

Values which exceeded the DWSNZ MAV are shown in **bold**

ND – not detected n/r – not required

2.3 Groundwater Quality Hydraulically Down-Gradient of the New Landfill

Monitoring is carried out within the two main hydrogeological units for bores hydraulically up-gradient of the old landfill and hydraulically down-gradient of the new landfill.

2.3.1 Shallow Aquifer

Bores D1, D2, D3rs, D4, D6, and E1s (refer to Site Plan, Appendix A) are located hydraulically up-gradient of the old landfill, but down-gradient of the new landfill. This means they are not influenced by potential leaching from the old landfill and can act as a warning system for any leaching from the new landfill.

Borehole D5 is located at the south-western corner of the site and is expected to provide an indication of shallow background groundwater quality because it is unlikely to be influenced by either landfill.

It is considered unlikely that leachate from the new landfill would significantly affect groundwater quality due to the leachate collection system which is in place at the new landfill; however, these bores would still provide early warning of any potential problems.

It is noted that bore D3r was replaced in June 2021 with two bores; D3rs, which is a shallow bore and D3rd, which is a deep bore. Both have been sampled from October 2021 onwards. It is also noted that new bores D3rs and D3rd are required to be monitored for the comprehensive suite of parameters for the first two years following installation. Since October 2021, bores D3rd and D3rs have been sampled 15 times, and on 13 of those occasions the testing has been for the comprehensive suite of parameters. Because testing has been done twice for the indicator suite (i.e., in July 2022 and April 2023), two continuous years of comprehensive testing has yet to be done. It is recommended that HDC discusses this matter with HRC to determine if the sampling regime can revert to the “normal” regime, without having to continue with the comprehensive sampling for another two rounds.

The results from the January 2025 monitoring round for these bores are presented Table 2-3 and the results have been compared with the ANZECC LDW trigger values as per the consent conditions. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There was **one exceedance of the resource consent conditions** during the quarterly (January 2025) monitoring round in samples from the shallow aquifer down-gradient of the new landfill.

- The pH at bore D2 was 5.9 which is lower than the minimum pH stated in the ANZECC LDW standards.

The value of pH has been lower on two occasions, but the median value is normally 6.5.

It is noted that the nitrate-N levels at D6 have dropped significantly from the previous monitoring round value of 41.4 mg/L to 18.4 mg/L. Similarly, the conductivity value, which was at 60.3 mS/m last monitoring round, has dropped down to 36.2 mS/m.

Table 2-3: D-Series and E1s Monitoring Bore Results for January 2025

Determinant	Units	ANZECC LDW	D1	D2	D3rs	D4	D5	D6	E1s
Sampling date			22/01/25	22/01/25	22/01/25	22/01/25	21/01/25	22/01/25	22/01/25
Water Level	mbgl	-	17.07	21.62	5.76	8.95	10.2	16.56	11.23
pH	pH units	6 to 9	8.1	**5.9**	7.8	7.5	7.2	7.7	7.6
Suspended Solids	mg/l	-	n/r	n/r	9	n/r	n/r	n/r	n/r
Phenol	mg/l	-	n/r	n/r	n/p	n/r	n/r	n/r	n/r
VFA	mg/l	-	n/r	n/r	*2.5*	n/r	n/r	n/r	n/r
TOC	mg/L	-	n/r	n/r	18.3	n/r	n/r	n/r	n/r
Alkalinity	mg $CaCO_3$/L	-	n/r	n/r	76	n/r	n/r	n/r	n/r
Conductivity	mS/m	-	53.2	67	22.7	28.4	29.1	36.2	25
COD	mg/L	-	15	39	61	*7.5*	*7.5*	*7.5*	17
$scBOD_5$	mg/L	-	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*
E. coli	CFU/100ml	100	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
Chloride	mg/L	-	25.3	99.9	19.4	29.9	27.6	24.9	28.6
Nitrate-N	mg/L	90.3	6.28	*0.005*	*0.005*	*0.005*	1.28	18.4	*0.005*
Sulphate	mg/L	1000	n/r	n/r	0.93	n/r	n/r	n/r	n/r
Ammoniacal-N	mg/L	-	0.06	0.81	1.12	0.15	0.01	*0.005*	0.16
Hardness	mg $CaCO_3$/L	-	n/r	n/r	56	n/r	n/r	n/r	n/r
Calcium	mg/L	1000	n/r	n/r	12.5	n/r	n/r	n/r	n/r
Magnesium	mg/L	-	n/r	n/r	6.04	n/r	n/r	n/r	n/r
Potassium	mg/L	-	n/r	n/r	4.84	n/r	n/r	n/r	n/r
Sodium	mg/L	-	n/r	51.2	24.9	28.9	n/r	n/r	25.7
D.R. Phosphorus	mg/L	-	n/r	n/r	0.306	n/r	n/r	n/r	n/r

Determinant	Units	ANZECC LDW	D1	D2	D3rs	D4	D5	D6	E1s
Dissolved Aluminium	mg/L	5	*0.001*	0.003	0.046	0.006	*0.001*	*0.001*	0.005
Dissolved Arsenic	mg/L	0.5	n/r	n/r	*0.0005*	n/r	n/r	n/r	n/r
Dissolved Boron	mg/L	5	0.051	0.047	0.033	0.03	0.032	0.064	0.025
Dissolved Cadmium	mg/L	0.01	n/r	n/r	*0.0001*	n/r	n/r	n/r	n/r
Dissolved Chromium (VI)	mg/L	1	n/r	n/r	0.002	n/r	n/r	n/r	n/r
Dissolved Copper	mg/L	0.4	n/r	n/r	*0.00025*	n/r	n/r	n/r	n/r
Dissolved Iron	mg/L	-	n/r	11.3	14.8	4.26	n/r	n/r	3.6
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	-	0.0008	0.644	0.418	0.218	0.0056	0.0009	0.19
Dissolved Mercury	mg/L	0.002	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	1	*0.00025*	0.0005	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Zinc	mg/L	20	n/r	n/r	*0.001*	n/r	n/r	n/r	n/r

Notes:

Bold – denotes an exceedance of the ANZECC LDW

All `<' values have been reported as half the detection limit for statistical purposes and are expressed in italic.

n/r – not require

2.3.2 Deep Gravel Aquifer

Bores E1d, C2dd, E2d, Xd1, and the new replacement bore D3rd all penetrate the deeper gravel aquifer. Deep groundwater flow at the site is assumed to be towards the northwest (as opposed to the regional groundwater flow which is towards the west – see section 1).

Boreholes E2d and C2dd are located to the north-northwest of both the landfills and are therefore considered to be hydraulically down-gradient of both landfills. Borehole E1d is located to the southwest of the old landfill and it is therefore considered that this bore would be unlikely to be affected by either landfill.

Bore Xd1 was installed in late 2020 as a requirement of the reviewed resource consent conditions (December 2019). It is located on the western boundary of the site and slightly down-gradient of the old landfill.

Results for the quarterly (January 2025) compliance monitoring round are presented in Table 2-4. The results have been compared with the DWSNZ as per the requirements of discharge consent ATH-2002003983.02. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There were **six exceedances of the DWSNZ limits** in samples from the deep gravel aquifer during the January 2025 monitoring round, as follows:

- The *E.coli* result at E2d was 3 CFU/100mL, which is greater than the DWSNZ MAV of NIL. It is not unusual for the *E. coli* levels to be elevated for this bore.
- Dissolved arsenic exceeded the DWSNZ MAV of 0.01 mg/L at bore D3rd (0.021 mg/L). This is characteristic of D3rd with the levels varying between 0.017 and 0.022 mg/L on all sampling occasions.
- Dissolved manganese concentrations exceeded the DWSNZ MAV of 0.4 mg/L in bores C2dd (0.599 mg/L), E2d (0.42 mg/L), Xd1 (0.509 mg/L) and D3rd (0.463 mg/L). The results for C2dd and E2d (from 1997), Xd1 (from March 2021 when sampling started), and D3rd (from October 2021 when sampling started) are within the historical range of concentrations observed. Dissolved manganese is generally elevated in the deep aquifer bores.

The quality of the groundwater is such that concentrations of some parameters for certain groundwater bores, regularly exceed the trigger values. This is true for elevated manganese values in four of the deep aquifer bores (C2dd, E2d, Xd1 and D3rd).

It is also true for arsenic concentrations measured in bore D3rd, which have always been elevated. This is not related to poor shallow water quality because bore D3rd is nested with bore D3rs, and that bore has consistent levels of arsenic below the trigger value.

The deep aquifer is separated from the shallow aquifer by an aquiclude, which is a layer of low permeability material that acts as a barrier between the two aquifers. Additionally, there is an up-gradient flow from the deep aquifer to the shallow aquifer, which will prevent contamination of the deep aquifer from overlying groundwater.

So, the exceedances for the deep aquifer bores are not unusual and are extremely unlikely to be related to landfill activities, particularly because of the environmental setting.

Table 2-4: Results for Monitoring Bores within the Deep Aquifer for January 2025

Determinant	Units	DWSNZ MAV	E1d	C2dd	E2d	Xd1	D3rd
Sampling date			21/01/25	21/01/25	22/01/25	23/01/25	22/01/25
Water Level	mbgl	-	10.8	2.77	4.72	2.73	6.08
pH	pH units	7 to 8.5*	7.8	8.0	8.3	7.8	7.9
Suspended Solids	mg/l	-	n/r	n/r	n/r	n/r	11
Phenol	mg/l	-	n/r	n/r	n/r	n/r	n/p
VFA	mg/l	-	n/r	n/r	n/r	n/r	*2.5*
TOC	mg/L	-	n/r	n/r	n/r	n/r	5.5
Alkalinity	mg $CaCO_3$/L	-	n/r	223	n/r	n/r	219
Conductivity	mS/m	-	44.2	56	44.2	53.3	52.3
COD	mg/L	-	16	25	18	30	21
$scBOD_5$	mg/L	-	*1.5*	1.5	*1.5*	*1.5*	*1.5*
E. coli	CFU/100ml	NIL	*0.5*	0.5	**3**	*0.5*	*0.5*
Chloride	mg/L	250*	40.8	42.8	41.3	57.5	32.8
Nitrate-N	mg/L	11.3	*0.005*	0.02	*0.005*	*0.005*	*0.005*
Sulphate	mg/L	250*	n/r	0.06	n/r	n/r	*0.01*
Ammoniacal-N	mg/L	1.17	0.2	0.33	0.01	0.81	0.38
Hardness	mg $CaCO_3$/L	200*	n/r	n/r	n/r	n/r	186
Calcium	mg/L	-	n/r	n/r	n/r	n/r	52
Magnesium	mg/L	-	n/r	n/r	n/r	n/r	13.6
Potassium	mg/L	-	n/r	n/r	n/r	n/r	6.65
Sodium	mg/L	200*	34.9	n/r	n/r	n/r	22.6
D.R. Phosphorus	mg/L	-	n/r	n/r	n/r	n/r	1.21
Dissolved Aluminium	mg/L	0.1*	0.002	0.004	0.004	*0.001*	0.002
Dissolved Arsenic	mg/L	0.01	n/r	n/r	n/r	n/r	**0.021**
Dissolved Boron	mg/L	1.4	0.049	0.063	0.052	0.044	0.043
Dissolved Cadmium	mg/L	0.004	n/r	n/r	n/r	n/r	*0.0001*
Dissolved Chromium (VI)	mg/L	0.05	n/r	n/r	n/r	n/r	*0.0005*
Dissolved Copper	mg/L	2	n/r	n/r	n/r	n/r	*0.00025*
Dissolved Iron	mg/L	0.2*	0.026	n/r	n/r	n/r	0.029

Determinant	Units	DWSNZ MAV	E1d	C2dd	E2d	Xd1	D3rd
Dissolved Lead	mg/L	0.01	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	0.4	0.237	**0.599**	**0.42**	**0.509**	**0.463**
Dissolved Mercury	mg/L	-	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.08	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Zinc	mg/L	1.5*	n/r	n/r	n/r	n/r	*0.001*

Notes:

*Denotes DWSNZ GV

Bold – denotes an exceedance of the DWSNZ MAV

All `<' values have been reported as half the detection limit for statistical purposes and are expressed in italics

n/r – not required

2.4 Impact of Old Landfill on Groundwater Quality

Water sampling is carried out to characterise the groundwater quality in a series of shallow bores situated hydraulically down-gradient from the old unlined landfill.

The Series B boreholes are located within 50 m of the old landfill in a line along its northern edge.

The Series C boreholes are located further down the hydraulic gradient from the old landfill towards Hōkio Beach Road to detect whether leachate is moving off site.

Borehole E2s is located northwest of the old landfill to detect any leachate moving directly towards the nearest house down-stream of the site.

Bore G2S was installed in late 2009 and is located to the north of the landfill site, hydraulically down-gradient of the old landfill by Hōkio Road and the entrance road to the landfill.

Bores Xs1 and Xs2 are located along Hōkio Beach Road, within the road reserve. Bore Xs1 is adjacent to the Northern Farm property and bore Xs2 is next to the driveway leading to a Council-owned property. Bore Xs2 is hydraulically upgradient of the old landfill (see Site Plan, Appendix A).

The results from the quarterly (January 2025) consent monitoring round for these bores are presented in Table 2-5 and have been compared with the ANZECC LDW trigger values as per the requirements of discharge consent ATH-2002003983.02. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There were **no exceedances** of the ANZECC LDW trigger values for the shallow boreholes down-gradient of the old landfill during the January 2025 monitoring round.

Whilst the shallow groundwater down-gradient of the old landfill meets the resource consent trigger values for all parameters for all bores, it is well documented that leachate from the old landfill is extending in a plume northward and is impacting the quality of the shallow aquifer. Modelling of the plume has shown that there could be unacceptable future impacts on the Hōkio Stream. This matter is being addressed through the Leachate Best Practicable Option (BPO) project. Progress with that project is being communicated to relevant parties, such as the HRC, Project Management Group (PMG) and Neighbourhood Liaison Group (NLG).

Table 2-5: Monitoring Results for Shallow Boreholes Down-Gradient from the Old Landfill for January 2025

Determinant	Units	ANZECC LDW	E2s	B1	B2	B3s	C1	C2	C2ds	G2S	Xs1	Xs2
Sampling date			22/01/25	23/01/25	23/01/25	23/01/25	23/01/25	23/01/25	23/01/25	21/01/25	23/01/25	23/01/25
Water level	mbgl	-	5.6	1.21	1.24	0.54	1.25	0.24	2.78	2.22	0.74	2.64
pH	pH units	6 to 9	7.6	7.5	7.3	7.3	7.5	7.2	7.4	7.2	6.7	6.8
Alkalinity	mg $CaCO_3$/L	-	n/r	n/r	996	1380	n/r	1510	712	n/r	n/r	n/r
Conductivity	mS/m	-	34.6	238	267	309	103	357	161	126	139	28.8
COD	mg/L	-	*7.5*	291	134	371	*75*	503	85	22	99	*7.5*
scBOD5	mg/L	-	*1.5*	*1.5*	*1.5*	4	*1.5*	5	*1.5*	*1.5*	*1.5*	*1.5*
E. coli	CFU/100ml	100	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	1	*0.5*	*0.5*	*0.5*	*0.5*
Chloride	mg/L	-	37.7	318	212	203	118	311	126	251	112	49.2
Nitrate-N	mg/L	90.3	*0.005*	*0.005*	6.52	0.03	0.02	*0.005*	*0.005*	*0.005*	*0.05*	0.72
Sulphate	mg/L	1,000	n/r	n/r	14.8	1.75	n/r	4.18	*0.01*	n/r	n/r	n/r
Ammoniacal-N	mg/L	-	0.09	35.4	124	199	18	195	4.09	0.03	13.3	0.19
Sodium	mg/L	-	29.2	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Dissolved Aluminium	mg/L	5	0.009	0.055	0.005	0.006	0.024	0.013	*0.001*	0.004	0.023	0.006
Dissolved Boron	mg/L	5	0.027	1.26	2.43	1.54	0.751	1.92	0.471	0.574	0.418	0.027
Dissolved Iron	mg/L	-	0.103	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r	n/r
Dissolved Lead	mg/L	0.1	0.0007	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.00025	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	-	0.265	7.7	3.92	4.69	0.211	0.303	2.55	0.308	0.975	0.0698
Dissolved Mercury	mg/L	0.002	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.00025	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	1	*0.00025*	0.006	0.0038	0.0118	0.0012	0.0074	0.002	0.0023	0.0024	*0.00025*

Notes:

All `<' values represent a non-detection and have been reported as half the detection limit for statistical purposes and are expressed in italics

n/r – not required

2.5 Groundwater Quality Down-Gradient of the Irrigation Area

The F-series boreholes intersect the shallow aquifer down-gradient of the area that was used to irrigate leachate from 2004 to October 2008. All leachate is now pumped to the Levin Wastewater Treatment Plant (WWTP). The F1 borehole is located within the area where leachate from the new landfill was irrigated. The F2 and F3 boreholes are in an area that was set aside for leachate irrigation but was never used for that purpose. It is expected that bores F2 and F3 would therefore be representative of background groundwater quality.

The results from the F series boreholes are presented in Table 2-6 and have been compared with the ANZECC LDW trigger values, as per discharge consent ATH-2002003983.02. The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

There were **no exceedances** of the resource consent conditions in samples from these bores during the January 2025 (quarterly) monitoring round.

Table 2-6: Results from Monitoring Bores in the Irrigation Area for January 2025

Determinant	Units	ANZECC LDW	F1	F2	F3
Sampling Date			21/01/25	21/01/25	21/01/25
Water level	mbgl	-	7.62	2.55	5.14
pH	pH units	6 to 9	7	7.2	7.1
Conductivity	mS/m	-	50.3	22.5	16
COD	mg/L	-	*7.5*	*7.5*	*7.5*
scBOD5	mg/L	-	*1.5*	*1.5*	*1.5*
E. coli	CFU/100ml	100	*0.5*	*0.5*	*0.5*
Chloride	mg/L	-	76	22.6	14.5
Nitrate-N	mg/L	90.3	2.16	0.65	2.22
Ammoniacal-N	mg/L	-	0.01	0.01	0.06
Sodium	mg/L	-	n/r	n/r	19.2
Dissolved Aluminium	mg/L	5	*0.001*	0.002	0.004
Dissolved Boron	mg/L	5	0.031	0.033	0.025
Dissolved Iron	mg/L	-	n/r	n/r	0.143
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	-	0.0055	0.0046	0.003
Dissolved Mercury	mg/L	0.002	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	1	0.0008	*0.00025*	*0.00025*

Notes:
All `<' values have been reported as half the detection limit for statistical purposes and are *expressed in italics*
n/r – not required

2.6 Leachate Effluent Results

Leachate effluent from the landfill is not subject to any water quality consent conditions and is sent to the Levin WWTP for treatment. However, for comparison purposes, typical leachate characteristics for landfills, as published by the Waste Management Institute New Zealand (WasteMINZ) *Technical Guidelines for Disposal to Land* (September 2023), have been compared against the leachate quality monitoring results (Table 2-7). The full laboratory report is included in Appendix B and the historical graphs are presented in Appendix D.

As stated, typical leachate concentrations are derived from tables presented in the WasteMINZ *Technical Guidelines*. The data in those tables originate from seven landfills in New Zealand and date back to between 1998 and 1999. Whilst more updated data could be sought for comparison purposes, the WasteMINZ Guidelines are the latest version, and no updated information has been provided.

Table 2-7 presents the concentrations of monitored parameters for leachate effluent samples collected in November 2024, December 2024, and January 2025.

Up until April 2022, samples of leachate were tested monthly for the comprehensive suite of parameters, as stated in Table C under condition 3H of discharge permit ATH-2002003983.02. This requirement was for 2 years and condition 3P of discharge permit ATH-2002003983.02 allows the monitoring frequency to shift to a conditional sampling frequency (i.e., six monthly comprehensive, quarterly indicator) if water sample analysis results are consistent and there is no decline in water quality over a period of at least four consecutive sampling rounds. The quality of leachate is considered to have met these criteria and so the change in monitoring from April 2022 was justified. The resource consent conditions allowed this change to occur immediately after the four consecutive sampling rounds were completed. However, it was later decided to continue monthly sampling for the duration that monthly sampling at Hōkio Stream was required.

There were **fourteen outliers** from the typical leachate characteristics in the November 2024, December 2024, and January 2025 results. **Seven** of these were for parameters having **less** concentration than the typical minimal concentrations**.**

- Alkalinity exceeded the maximum typical concentration in all three months.
- COD exceeded the maximum typical concentration in November 2024.
- Nitrate-N was less than the minimum typical concentration in all three months.
- Dissolved arsenic exceeded the maximum typical concentration in all three months.
- Dissolved cadmium was not detected in all three months and was therefore less than the minimum typical concentrations.
- Dissolved lead was less than the minimum typical concentration in November 2024.

While these results are not reflective of typical conditions at other, similar landfills around New Zealand, it is noted that they are generally consistent with the historical range of results observed at the Levin Landfill site.

Table 2-7: Results from Leachate Effluent Monitoring for November 2024, December 2024, and January 2025

Determinant	Units	Typical Leachate Characteristics* (range)	November 2024	December 2024	January 2025
Sampling Date			21/11/24	12/12/24	14/01/25
pH		5.9 - 8.5	7.7	7.7	7.9
Suspended Solids	mg/l	-	274	48	83
Phenol	mg/L	-	n/p	n/p	n/p
VFA	mg/L	-	*2.5*	4.4	*2.5*
TOC	mg/L	17.2 - 822	780	667	726
Alkalinity	mg $CaCO_3$/L	264 – 6,820	**6,990**	**6,960**	**7,130**
Conductivity	mS/m	308 – 27,900	1,530	152	1,560
COD	mg/L	84 – 5,090	**5,190**	3,010	2,480
$scBOD_5$	mg/L	12 – 3,867	102	57	87
E-Coli	CFU/100mL	-	*50*	600	300
Chloride	mg/L	45 – 2,584	1,310	1,180	1,090
Nitrate-N	mg/L	0.1 – 50**	***0.05***	***0.05***	***0.05***
Sulphate	mg/L	1 - 780	41.4	56.7	55.8
Ammonia-N	mg/L	3.4 – 1,440	1,320	1,180	1,240
Hardness	mg $CaCO_3$/L	300 – 11,500**	415	387	384
Calcium	mg/L	20 – 600***	84.7	75.1	80.4
Magnesium	mg/L	40 – 350***	49.4	48.3	44.4
Potassium	mg/L	10 – 2,500**	709	549	560
Sodium	mg/L	50 – 4,000**	1,080	815	818
D.R. Phosphorus	mg/L	-	14.9	13.6	14.5
Dissolved Aluminium	mg/L	-	0.785	0.751	0.641
Dissolved Arsenic	mg/L	0.006 – 0.191	**0.244**	**0.248**	**0.275**
Dissolved Boron	mg/L	0.54 – 20	6.09	3.39	5.27
Dissolved Cadmium	mg/L	0.0005 – 0.140**	***0.0001***	***0.0001***	***0.0001***
Dissolved Chromium	mg/L	0.005 – 50.4	0.718	0.544	0.628
Dissolved Copper	mg/L	0.004 – 1.4**	0.0049	0.004	0.0293
Dissolved Iron	mg/L	1.6 – 220	7.17	7.08	8.01
Dissolved Lead	mg/L	0.001 - 0.42	***0.00025***	0.0015	0.0017
Dissolved Manganese	mg/L	0.03 - 45***	1.19	1.12	1.05
Dissolved Mercury	mg/L	0.0002 – 0.05**	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.02 – 2.05**	0.112	0.123	0.11
Dissolved Zinc	mg/L	0.015 – 24.2	0.046	0.043	0.046

Notes:

* For Class 1-type landfills, Table 5-5, p60, Technical Guidelines for Disposal to Land, WasteMINZ September 2023

**Data taken from Table 5-4, p59 of the same guideline, for parameters for which no differences in concentrations between the phases of landfill development could be observed

***Data taken from Table 5-4, p59 of the same guideline, for parameters during the methanogenic phase

Bold – denotes a deviation from the typical leachate characteristics range

All `<' values have been reported as half the detection limit for statistical purposes and are expressed in italics

n/p – not provided

2.7 Northern Farm Drain (Tatana Property)

A drain is located on the Northern Farm, previously known as the Tatana Property (see Site Plan in Appendix A). Since July 2015 HDC has agreed to sample surface water from this drain for a selection of parameters that were set by HRC. Four sampling points were selected to represent the top of the drain (SW1), middle of the drain (SW2 and SW3) and lower drain (SW4) respectively.

The revised consent conditions have since reduced the extent of sampling to a single location. This is known as 'TD1' and is the same sampling location as for the previously denoted 'SW3'. The resource consent conditions require six monthly comprehensive and quarterly indicator sampling at TD1. However, HDC has been conducting monthly sampling at TD1, in line with the surface water sampling of the Hōkio Stream.

Results from the November 2024, December 2024 and January 2025 sampling rounds are presented in Table 2-8 and have been compared with the ANZECC Guidelines for Fresh and Marine Water Quality - Aquatic Ecosystems[2] (ANZECC AE) (95%ile) default guideline values (DGVs), as per the revised resource consent conditions.

There have been **five exceedances** of the resource consent conditions for three monitored parameters in samples from the Northern Farm property at the TD1 location during the November 2024, December 2024 and January 2025 sampling rounds.

- The level of detection applied to $scBOD_5$ in November 2024 was such that, even at half the detection level (i.e., 3 mg/L), the concentration exceeded the ANZECC AE (95%ile) DGV of 2 mg/L.
- The concentrations of ammoniacal-nitrogen in all three months (10.3mg/L, 7.4 mg/L and 21.7 mg/L, respectively) exceeded the ANZECC AE (95%ile) DGV of 2.1 mg/L.
- The concentration of copper in January 2025 (0.0022 mg/L) exceeded the ANZECC AE (95%ile) DGV of 0.0014 mg/L.

High ammoniacal-nitrogen levels are not uncharacteristic of results for the Northern Farm Drain over the last two years or so. It is well-documented that a plume of leachate originating from the old landfill is affecting the water quality of the shallow groundwater.

The concentration of copper in January 2025 was the highest recorded to date in the Northern Farm Drain. Mostly it is at levels which are undetected, and occasionally the concentration increases.

Bores close to the Northern Farm Drain and the area considered the source of contamination for the drain (i.e., bores C1, C2 and B3) show elevated ammoniacal-nitrogen levels and occasionally copper concentrations that are higher than that measured at the drain. So, the shallow groundwater is quite possibly the cause for the elevated ammoniacal-nitrogen and copper concentrations in the Northern Farm Drain. The issue of leachate affecting the groundwater that daylights into the Northern Farm Drain

[2]Australian and New Zealand Guidelines for Fresh and Marine Water Quality - Aquatic Ecosystems (AE), Australian and New Zealand Environment and Conservation Council (ANZECC), Canberra, Australia, 2000

is being addressed through the Leachate BPO project, which has been discussed with HRC, the PMG and the NLG.

Table 2-8: Northern Farm Drain Monitoring Results for November 2024, December 2024 and January 2025

Determinant	Units	ANZECC AE DGV (95%ile species protection)	TD1 (formerly SW3)		
			November 2024	December 2024	January 2025
Sampling date			21/11/24	12/12/24	14/01/25
pH	pH units	-	8.0	7.2	8.0
Suspended Solids	mg/L	-	20	9	186
Phenol	mg/L	-	*0.005*	n/p	n/p
VFA	mg/L	-	*2.5*	*2.5*	*2.5*
TOC	mg/L	-	23.6	24	37.4
Alkalinity	mg $CaCO_3$/L	-	353	316	511
Conductivity	mS/m	-	90.1	84.9	124
COD	mg/L	-	83	76	156
scBOD5	mg/L	2	***3***	*1.5*	*1.5*
E-Coli	CFU/100ml	-	100	1200	56
Chloride	mg/L	-	77.3	77.8	87.7
Nitrate-N	mg/L	0.16	0.02	0.09	0.03
Sulphate	mg/L	-	1.4	1.52	1.33
Ammoniacal-N	mg/L	2.1	**10.3**	**7.4**	**21.7**
Hardness	mg $CaCO_3$/L	-	242	183	351
Calcium	mg/L	-	54.1	45.6	86
Magnesium	mg/L	-	26	16.8	33.1
Potassium	mg/L	-	20	21.4	25.7
Sodium	mg/L	-	61.3	56.9	75.6
D.R. Phosphorus	mg/L	-	0.033	0.014	0.103
Dissolved Aluminium	mg/L	0.055	0.007	0.008	0.004
Dissolved Arsenic	mg/L	0.024	0.002	0.002	0.002
Dissolved Boron	mg/L	-	0.281	0.162	0.333
Dissolved Cadmium	mg/L	0.0002	*0.0001*	*0.0001*	*0.0001*
Dissolved Chromium	mg/L	-	0.001	0.001	0.001
Dissolved Copper	mg/L	0.0014	*0.00025*	*0.00025*	**0.0022**
Dissolved Iron	mg/L	-	0.891	2.04	0.082
Dissolved Lead	mg/L	0.0034	*0.00025*	*0.00025*	*0.00025*

Determinant	Units	ANZECC AE DGV (95%ile species protection)	TD1 (formerly SW3)		
			November 2024	December 2024	January 2025
Dissolved Manganese	mg/L	1.9	0.71	0.529	0.689
Dissolved Mercury	mg/L	0.0006	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.011	0.0016	0.0017	0.0025
Dissolved Zinc	mg/L	0.008	*0.001*	*0.001*	*0.001*

Notes:
Bold – denotes an exceedance of the ANZECC AE DGV for 95%ile species protection
All `<' values have been reported as half the detection limit for statistical purposes and are expressed in italics

2.8 Hōkio Stream

Surface water grab samples are obtained monthly from Hōkio Stream at sites HS1A, HS1, HS2 and HS3 (refer to Appendix A) to investigate whether groundwater containing leachate is having an adverse environmental effect on the stream. Sites HS1A and HS1 are situated up-stream of the old landfill, HS2 is situated alongside the old landfill and up-stream of the Northern Farm Drain discharge, and HS3 is located approximately 50 m down-stream of the landfill site property boundary and the Northern Farm Drain discharge. Samples from these monitoring locations on Hōkio Stream are analysed for a comprehensive suite of parameters every month (as shown in Appendix C).

Results from the November 2024, December 2024, and January 2025 monitoring rounds are presented in Table 2-9 and have been compared with the ANZECC AE (95%ile) DGVs, as per the revised resource consent conditions (2019). Sampling of HS1A commenced in April 2020.

There were **nine exceedances** of the resource consent conditions in samples from the Hōkio Stream during the November 2024, December 2024, and January 2025 sampling rounds.

- The level of detection applied to $scBOD_5$ in November 2024 at HS1A was such that, even at half the detection level (i.e., 3 mg/L), the concentration exceeded the ANZECC AE (95%ile) DGV of 2 mg/L.
- Nitrate-N exceeded both the ANZECC AE (95%ile) DGV and consent trigger value of 0.16 mg/L at HS1, HS2 and HS3 in November 2024, all with a value of 0.27 mg/L.
- The concentration of ammoniacal-nitrogen at HS1A in December 2024 (5.24 mg/L) exceeded the ANZECC AE (95%ile) DGV and consent trigger value of 2.1 mg/L.
- The concentrations of dissolved copper at all sites in January 2025 (ranging between 0.0025 and 0.0034 mg/L) exceeded the ANZECC AE (95%ile) DGV and consent trigger value of 0.0014 mg/L.

For this monitoring period overall, the differences in monitoring results between the sites are generally marginal and for most determinants there is little to no change in concentrations between upstream and downstream sites on the Hōkio Stream, except for ammoniacal-nitrogen at HS1A in December 2024.

HS1A had an ammoniacal-nitrogen concentration value of 5.24 mg/L in December 2024, which was by far the highest value recorded at this site, and the second highest value ever recorded at any of the Hōkio Stream surface water monitoring locations. The highest value was at HS2 in October 2016 (7.66 mg/L). Yet the downstream sites did not record values even close to this. It is noted that the ammoniacal-nitrogen value recorded at HS3 in January 2025 (1.75 mg/L) is the highest value recorded to date at that location, but was still within the consent trigger value of 2.1 mg/L.

E. coli counts have shown some significant differences between sites and sampling rounds. However, the *E. coli* counts noted in this report are within the historical range since sampling began in 1994.

Nitrate-N concentrations upstream of the landfill property (i.e., at HS1, though not at HS1A) are already elevated in November 2024, and the concentrations downstream do not increase, and so cannot be definitively attributed to landfill activities. The bores closest to the considered source of contamination of the shallow groundwater (i.e., bores C1, C2 and B3) have low nitrate-N levels, so there are likely other activities that are causing nitrate-N levels to maintain the same levels between the upstream and downstream monitoring locations.

Dissolved copper was most elevated at HS1A in January 2025, which is upstream of the landfill and so the elevated levels downstream cannot be attributed to the landfill activities.

Consecutive monthly sampling and testing for the comprehensive suite of parameters has occurred at all Hōkio Stream sites since October 2021. HDC has had the results of monthly sampling events assessed, as required by the conditions of the consent, to determine the significance of the results, and should discuss the results with HRC to determine if a reduction in sampling frequency can be made.

Table 2-9: Hōkio Stream Monitoring Results for November 2024, December 2024, and January 2025

Determinant	Units	ANZECC AE DGV (95%ile species protection)	Consent Trigger Values (Table C1)	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3
				November 2024				December 2024				January 2025			
Sampling date				21/11/24	21/11/24	21/11/24	21/11/24	12/12/24	12/12/24	12/12/24	12/12/24	14/01/25	14/01/25	14/01/25	14/01/25
pH	pH units	-	-	6.9	7.6	7.6	7.6	7.4	7.3	6.5	7.2	7.6	7.3	7.4	7.6
Suspended Solids	mg/l	-	-	44	10	8	11	10	*3*	*3*	*3*	54	17	16	8
Phenol	mg/l			*0.005*	*0.005*	*0.005*	*0.005*	n/p	n/p	n/p	n/p	n/p	n/p	n/p	n/p
VFA	mg/l			*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*	*2.5*
TOC	mg/L	-	-	7.6	6.6	6.9	6.4	6.1	6.2	5.6	5.9	10.4	10.9	9.8	9.7
Alkalinity	mg $CaCO_3$/L	-	-	64	47	49	51	52	50	51	52	63	63	68	69
Conductivity	mS/m	-	-	22.4	21.8	22.3	22.5	21.5	21.5	21.9	22.1	24.5	24.5	25.8	26.1
COD	mg/L	-	-	96	40	34	27	18	28	16	26	43	33	28	25
$scBOD_5$	mg/L	2	Monthly Avg. 2	***3***	2	2	2	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*	*1.5*
E. coli	CFU/ 100ml	-	-	100	100	4,200	100	100	600	900	6,000	1,400	100	300	200
Chloride	mg/L	-	-	19.4	20.9	22.6	21.7	21.4	21.4	21.7	22.1	22.6	24.2	25.3	25.2
Nitrate-N	mg/L	0.16	0.16	0.02	**0.27**	**0.27**	**0.27**	0.06	0.08	0.11	0.16	*0.005*	0.02	0.02	0.03
Sulphate	mg/L	-	-	10.5	18.9	19.1	18.4	16.7	17.2	16.5	16.4	10.6	11.6	11.3	10.7
Ammoniacal-N	mg/L	2.1	Max. 2.1 Avg. 0.400	0.67	0.17	0.18	0.19	**5.24**	0.15	0.63	0.15	0.24	0.54	0.58	1.75
Hardness	mg $CaCO_3$/L	-	-	62	56	56	56	44	41	50	43	64	66	68	72
Calcium	mg/L	-	-	13.5	10.5	10.6	10.6	9.22	9.01	10.4	9.41	12.4	13	13.6	14.5

Determinant	Units	ANZECC AE DGV (95%ile species protection)	Consent Trigger Values (Table C1)	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3
				November 2024				December 2024				January 2025			
Magnesium	mg/L	-	-	6.95	7.3	7.26	7.24	5.08	4.56	5.84	4.7	7.97	8.22	8.21	8.58
Potassium	mg/L	-	-	5.89	3.01	2.96	2.96	3.08	2.88	3.25	2.93	4.24	4.4	4.38	4.56
Sodium	mg/L	-	-	18.3	19.9	19.8	19.9	19.3	18.7	20.4	18.7	23.6	23.9	23.9	25
D.R. Phosphorus	mg/L	-	-	0.023	0.119	0.141	0.137	0.112	0.124	0.127	0.143	0.099	0.142	0.125	0.137
Dissolved Aluminium	mg/L	0.055	Med. 0.055	0.011	0.014	0.016	0.028	0.006	0.005	0.005	0.004	0.007	0.003	0.004	0.004
Dissolved Arsenic	mg/L	0.024	Med. 0.024	0.002	0.002	0.002	0.002	0.002	0.003	0.002	0.002	0.002	0.002	0.002	0.002
Dissolved Boron	mg/L	0.370	-	0.045	0.055	0.057	0.057	0.033	0.031	0.037	0.031	0.051	0.05	0.052	0.053
Dissolved Cadmium	mg/L	0.0002	Med. 0.0002	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*	*0.0001*
Dissolved Chromium (VI)	mg/L	0.001	-	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*	*0.0005*
Dissolved Copper	mg/L	0.0014	Med. 0.0014	0.0007	0.0009	0.0009	0.0010	*0.00025*	*0.00025*	*0.00025*	*0.00025*	**0.0034**	**0.0030**	**0.0031**	**0.0025**
Dissolved Iron	mg/L	-	-	1.44	0.153	0.206	0.208	0.085	0.096	0.116	0.147	0.041	0.046	0.057	0.062
Dissolved Lead	mg/L	0.0034	Med. 0.0034	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.00025	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	1.9	-	0.641	0.0677	0.0806	0.0837	0.0093	0.0086	0.0122	0.0165	0.144	0.205	0.191	0.246
Dissolved Mercury	mg/L	0.0006	Med. 0.0006	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.011	Med. 0.011	0.0009	0.0005	*0.00025*	0.0008	0.0006	*0.00025*	*0.00025*	*0.00025*	0.0006	0.0005	*0.00025*	*0.00025*

Determinant	Units	ANZECC AE DGV (95%ile species protection)	Consent Trigger Values (Table C1)	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3	HS1A	HS1	HS2	HS3
				November 2024				December 2024				January 2025			
Dissolved Zinc	mg/L	0.008	Med. 0.008	0.006	*0.001*	*0.001*	0.002	*0.001*	*0.001*	*0.001*	*0.001*	0.004	*0.001*	*0.001*	*0.001*

Notes:

Bold – denotes an exceedance of the ANZECC AE 95% protection level trigger values

Underlined – denotes exceedance of the Consent Trigger Value.

All `<' values have been reported as half the detection limit for statistical purposes and are expressed in italic

3 Landfill Gas Detection in Monitoring Wells

Condition 4 of Discharge Permit ATH-2002003984.02 (DP 6011) requires that: "…*groundwater monitoring wells shall be sampled for landfill gas when groundwater samples are taken from the wells. As a minimum, sampling shall be undertaken for methane, carbon dioxide and oxygen*…"

Appendix E summarises the results of landfill gas monitoring undertaken on 14, 15, 16 and 22 January 2025. As noted in previous reports, the gas monitoring was not done on the date of sampling of the groundwater bores, except for the 22 January 2025. This somewhat nullifies part of the reason for doing the gas monitoring when the groundwater sampling is done, as is required by the resource consent condition.

Note that landfill gas monitoring results for bore C2 have been assumed since two sets of results were labelled as bore C2ds.

Of the 27 groundwater monitoring bores:

- Methane was recorded at nine bores in concentrations varying between 0.01% and 0.07%. In the previous monitoring round methane was reported as being detected at 20 of the bores. The maximum concentration reported is well below the explosive limit of 5% and therefore represents a 'safe' level. Methane is commonly detected at the landfill site, and its detection reinforces the need for sampling staff to take the necessary precautions for gas safety, generally applicable at landfill sites.
- Carbon dioxide was recorded at all bores, but mostly at relatively minor concentrations, except for the concentration at bore B2, which was 3.07%, which is somewhat high.
- Hydrogen sulphide was detected at 12 of the bores, all being at a concentration of 1 ppm, which is not of concern.
- The landfill gas levels in January 2025 appear to reinforce the previous sampling rounds' observed reduction in measured gases in comparison to previous quarters. Gas results may be due to season variations (e.g., different ground temperatures and/or groundwater levels), or may be related to prevailing weather conditions (e.g., different air pressures).

The possibility of encountering methane (and hydrogen sulphide) in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring. No smoking should be permitted when personnel undertake groundwater sampling and when in the vicinity of the groundwater monitoring wells, or in fact anywhere else on the Levin Landfill site. For sake of safety a personal gas detector should be worn by all staff when working in the vicinity of the landfill.

4 Sampling Quality Control and Assurance

The landfill extends over a significant area and there are many sampling locations. However, it is important that the time span of the sampling period is kept as short as possible because more infrequent (or erratic) sampling can make it difficult to compare results between rounds and determine trends at individual monitoring locations.

The surface water samples were all collected on the same day in each month, and groundwater samples were collected within a 3-day period in January, which also included the date when the surface water sampling was done. Given the number of samples that needed to be taken, this is a significant effort.

The surface water samples from the Hōkio Stream were received by the laboratory outside the normally accepted 24-hour timeframe between sampling and reception in November and December. Additionally, given the sampling time stated to be 00:00 for the January sampling round, which is clearly an error, it appears that it also took longer than 24 hours between sampling and delivery to the laboratory in January. This was confirmed from the field sampling sheets. This could affect the reliability of the results that require microbiological analysis (i.e., *E.coli*), which reduces the confidence in comparing the results with historical data.

Groundwater samples took ostensibly between 22 and 24 hours from the time the samples were taken to the time they were accepted at the laboratory. However, because all the laboratory sheets recorded very similar sampling times (i.e., being between 13:09 and 13:18 for samples taken on 21 and 22 January, and between 13:25 and 13:26 for samples taken on 23 January), it is questionable whether the period of 22 to 24 hours is accurate. However, HDC has confirmed that all the groundwater samples were received at the laboratory within the 24-hour period.

An investigation of this issue has shown that unless the sampler enters the actual sampling date and time in the data system, the system will, by default, assign the time at which the data entry was made. Council will check what can be done to enable staff to record actual sample times in the Infrastructure Data software and so resolve this issue.

5 Consent Compliance

Discharge permit ATH-2002003983.02 states that quarterly and annual monitoring results for the shallow groundwater aquifer (sand aquifer) shall comply with the ANZECC LDW trigger values, and samples from the deep groundwater (gravel aquifer) shall comply with the applicable DWSNZ values. Furthermore, samples taken from surface water bodies shall comply with ANZECC AE (95%ile) DGVs. Should any parameters exceed these standards, the permit holder shall report to the Regional Council as soon as practicable on the significance of the results and, where the change can be attributed to the influence of landfill leachate, consult with the Regional Council to determine if further investigations or remedial measures are required.

Background Groundwater Quality

The quality of the natural background groundwater up-gradient from the landfill site is not subject to any consent conditions.

Overall, monitoring results at G1s indicate that it is likely modified or impacted by anthropogenic activities and therefore may not be suitable to use as reliable 'control' location for background water quality in the future. This matter has been reviewed as part of the Annual Report, with the recommendation that bores F2, F3 and D5 be used as the primary background reference bores for shallow groundwater, which has been done in this report.

Shallow Aquifer and Irrigation Area

There was **one exceedance** of consent conditions hydraulically up-gradient of the old landfill and down-gradient of the new landfill during this quarterly (January 2025) monitoring period. This was for pH at bore D2 (pH of 5.9) which was lower than the minimum pH value stated in the ANZECC LDW standards. The pH value at D2 has been lower on two occasions, but the median value is normally 6.5, and it is not considered to be a significant occurrence.

There were **no exceedances** of the resource consent conditions during this quarterly (January 2025) sampling round for samples obtained from bores within the old irrigation area.

There were **no exceedances** of consent conditions hydraulically down-gradient of the old landfill during this quarterly (January 2025) monitoring period.

Deeper Gravel Aquifer

There were **six exceedances** of the DWSNZ limits in samples from the deep gravel aquifer during the January 2025 monitoring round, as follows:

- The *E.coli* result at E2d was 3 CFU/100mL, which is greater than the DWSNZ MAV of NIL.
- Dissolved arsenic exceeded the DWSNZ MAV of 0.01 mg/L at bore D3rd (0.021 mg/L). This is characteristic of D3rd with the levels varying between 0.017 and 0.022 mg/L on all sampling occasions.
- Dissolved manganese concentrations exceeded the DWSNZ MAV of 0.4 mg/L in bores C2dd (0.599 mg/L), E2d (0.42 mg/L), Xd1 (0.509 mg/L) and D3rd (0.463 mg/L). The results for C2dd and E2d (from 1997), Xd1 (from March 2021 when sampling started), and D3rd (from October 2021 when sampling started) are within the historical range of concentrations observed. Dissolved manganese is generally elevated in the deep aquifer bores.

E.coli levels in bore E2d have been elevated previously, so this is not an unusual occurrence.

As noted in section 2.3.2, the six exceedances are not unusual and are related to the quality of the groundwater regularly observed with respect to manganese concentrations (for boresC2dd, E2d, Xd1 and D3rd), and arsenic concentrations (for bore D3rd).

These six exceedances do not appear to be attributable to the landfill activities, particularly because there is an aquiclude between the shallow aquifer and the deep aquifer, with a flow gradient from the deep aquifer upwards (i.e., sub-artesian conditions exist).

Leachate Effluent

Leachate effluent from the Levin Landfill is not subject to any water quality consent conditions and is sent to the Levin WWTP for treatment.

There were **fourteen outliers** from the typical leachate characteristics in the November 2024, December 2024, and January 2025 results. **Seven** of these were for parameters having **less** concentration than the typical minimal concentrations**.**

Northern Farm Drain

There have been **five exceedances** of the resource consent conditions for three monitored parameters in samples from the Northern Farm property at the TD1 location during the November 2024, December 2024 and January 2025 sampling rounds.

- The level of detection applied to $scBOD_5$ in November 2024 was such that, even at half the detection level (i.e., 3 mg/L), the concentration exceeded the ANZECC AE (95%ile) DGV of 2 mg/L.
- The concentrations of ammoniacal-nitrogen in all three months (10.3mg/L, 7.4 mg/L and 21.7 mg/L, respectively) exceeded the ANZECC AE (95%ile) DGV of 2.1 mg/L.
- The concentration of copper in January 2025 (0.0022 mg/L) exceeded the ANZECC AE (95%ile) DGV of 0.0014 mg/L.

Three exceedances for the Northern Farm Drain were on account of elevated ammoniacal-nitrogen concentrations. Ammoniacal-N levels have frequently exceeded trigger levels. The elevated ammoniacal-nitrogen level could well be associated with leachate from the Old Landfill contaminating the groundwater. This is well recognised and is being further assessed through the Leachate BPO project, which has been communicated to HRC, the PMG and the NLG.

The exceedance due to an elevated level of copper (0.0022 mg/L) in January 2025 is somewhat unusual. This is the highest concentration measured for copper to date, being well above the median value of 0.0006 mg/L. Copper levels at C1 and C2 have had similar concentrations in the past, so this elevated copper level could be associated with leachate from the Old Landfill contaminating the groundwater, as noted above.

The ANZECC AE DGV (95%ile species protection) for $scBOD_5$ is 2 mg/L. In November 2024, the laboratory test applied had a level of detection of 6 mg/L. Since no $scBOD_5$ was detected, the result must be recorded as half the detection limit (i.e., at 3 mg/L), which still exceeds the DGV, and so represents a non-compliance.

Hōkio Stream

There were **nine exceedances** of the resource consent conditions in samples from the Hōkio Stream during the November 2024, December 2024, and January 2025 sampling rounds.

- The level of detection applied to $scBOD_5$ in November 2024 at HS1A was such that, even at half the detection level (i.e., 3 mg/L), the concentration exceeded the ANZECC AE (95%ile) DGV of 2 mg/L.
- Nitrate-N exceeded both the ANZECC AE (95%ile) DGV and consent trigger value of 0.16 mg/L at HS1, HS2 and HS3 in November 2024, all with a value of 0.27 mg/L.
- The concentration of ammoniacal-nitrogen at HS1A in December 2024 (5.24 mg/L) exceeded the ANZECC AE (95%ile) DGV and consent trigger value of 2.1 mg/L.
- The concentrations of dissolved copper at all sites in January 2025 (ranging between 0.0025 and 0.0034 mg/L) exceeded the ANZECC AE (95%ile) DGV and consent trigger value of 0.0014 mg/L.

Three of the exceedances are for elevated nitrate-N concentrations. However, the nitrate-N concentration at HS1, upstream of the landfill property, is the same as that at the downstream HS2 and HS3 locations, so these elevated concentrations cannot be definitively attributed to landfill activities. The bores closest to the considered source of contamination of the shallow groundwater (i.e., bores C1, C2 and B3) have low nitrate-N levels, so there are likely other activities that are causing an increase in nitrate-N levels between the upstream and downstream monitoring locations.

Four of the exceedances were for elevated concentrations of dissolved copper which occurred at all sites in January 2025. The most elevated level was measured at HS1A (i.e., upstream of the landfill), and so upstream activities are likely to be the cause.

Similarly, one exceedance was for ammoniacal-nitrogen which was significantly elevated at HS1A in December 2024. Being upstream of the landfill, this cannot be attributed to the landfill activities. This is the second-highest level of ammoniacal-nitrogen measured at any of the Hōkio Stream monitoring locations to date, but a similar order of magnitude level was not measured at any of the downstream locations in that month.

It is noted that HS3 had a concentration of 1.75 mg/L for ammoniacal-nitrogen in January 2025, which is the highest recorded to date at that location, but this did not exceed the consent trigger limit.

6 Conclusions

During the November 2024 to January 2025 monitoring period, there were twenty-one exceedances of the trigger values set out in the resource consent conditions: one from the shallow aquifer up-gradient of the Old Landfill, and down-gradient of the New Landfill, six from the deep gravel aquifer, five in the samples from the Northern Farm Drain (formerly known as Tatana Property Drain), and the remaining nine from surface water monitoring locations along the Hōkio Stream.

Of the twenty-one exceedances, seventeen are considered to be unrelated to the landfill activities as follows:

- One exceedance in the shallow aquifer down-gradient of the new landfill was for a low pH level. There is no evidence of leachate contamination from other parameters and so this is not considered to be related to landfill activities.
- Five exceedances in the deep aquifer are not unusual and are related to the existing water quality.
- One exceedance in the deep aquifer is on account of an incorrect level of detection being applied for *E.coli* testing but is considered to be a non-compliance that is unrelated to landfill activities.
- Two exceedances, one in the Northern Farm Drain and one at HS1A, are on account of incorrect levels of detection being applied for $scBOD_5$ testing and so are considered to be non-compliances that are not related to landfill activities.
- Three exceedances in the Hōkio Stream are for elevated nitrate-N levels, which are similarly elevated upstream. There is doubt that it is from landfill activities because the bores close to the "source" of the shallow groundwater contamination do not have elevated nitrate-N levels.
- Four exceedances in the Hōkio Stream are for elevated concentrations of dissolved copper. The highest levels occur upstream of the landfill property, so the upstream activities are likely to be the source, rather than landfill activities.
- One exceedance in the Hōkio Stream is for elevated ammoniacal-nitrogen which occurred upstream of the landfill property, so the upstream activities are likely to be the source.

Whilst the shallow groundwater down-gradient of the old landfill meets the resource consent trigger values for all parameters, it is well documented that leachate from the old landfill is extending in a plume northward and is impacting the quality of the shallow aquifer. Modelling of the plume has shown that there could be unacceptable future impacts on the Hōkio Stream, and this is being dealt with through the Leachate BPO project.

Elevated ammoniacal-nitrogen concentrations occurred in the Northern Farm Drain on each of the monitoring occasions. This could be related to the contaminated groundwater plume emanating from the Old Landfill and as noted above, is being dealt with through the Leachate BPO project.

Similarly, the elevated level of copper in the Northern Farm Drain in January 2025 is somewhat unusual. However, nearby bores C1 and C2 have had similar elevated concentrations in the past, so this occurrence could be associated with leachate from the Old Landfill contaminating the shallow groundwater.

Methane was detected in nine bores in January 2025, with readings varying between 0.01% and 0.07%. The maximum concentration reported is well below the explosive limit of 5% and therefore represents a 'safe' level. Methane is commonly detected at the landfill site, and its detection reinforces the need for sampling staff to take the necessary precautions for gas safety, generally applicable at landfill sites.

Minor concentrations of carbon dioxide were recorded at all bores, except at bore B2 which recorded 3.07%, which is somewhat high. Hydrogen sulphide was detected at 12 of the bores, all being at a concentration of 1 ppm, which is not of concern.

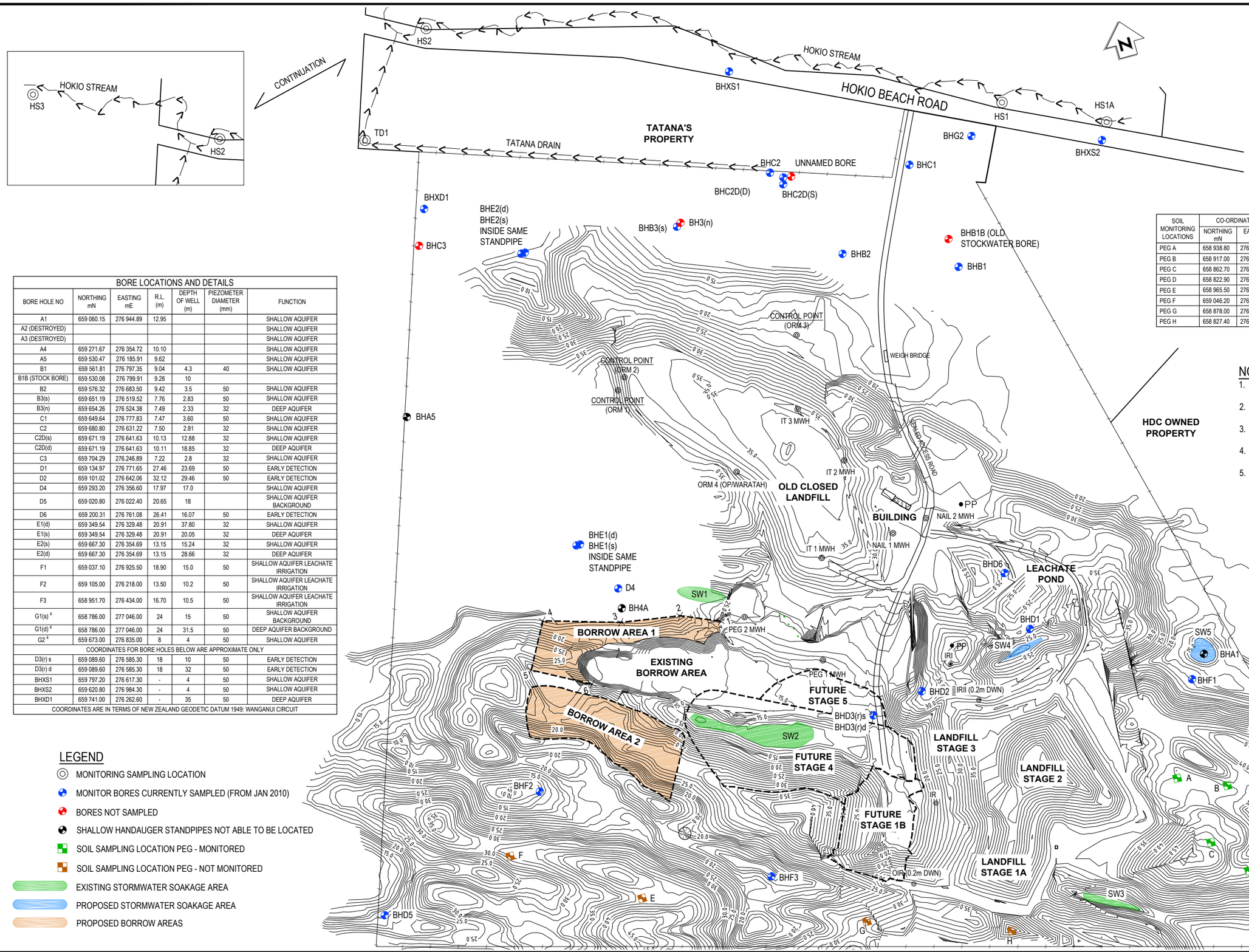
The possibility of encountering methane (and hydrogen sulphide) in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring.

The following recommendations are made, based on the results of this reporting period:

- Council will check what can be done to enable staff to record actual sample times in the Infrastructure Data software, and so resolve the issue of having sampling times recorded incorrectly on the laboratory sheets.
- HDC should discuss with HRC the need for a further two rounds of comprehensive testing of bores D3rs and D3rd, given that out of the 15 sampling events conducted since they were installed in October 2021, comprehensive testing has been done on 13 occasions.
- The ANZECC AE DGV (95%ile species protection) for $scBOD_5$ is 2 mg/L. So, the level of detection to be applied to the surface water samples must be set at a level where half the detection limit is less than the DGV of 2 mg/L. As for the above, this is a matter that needs to be discussed with the parties involved in requesting sampling and undertaking the laboratory testing.
- Consecutive monthly sampling has occurred at all Hōkio Stream sites since October 2021. HDC has had these results assessed, as required by the conditions of the consent, to determine their significance. HDC should discuss the results of this assessment with HRC to ascertain if a reduction in sampling frequency of the surface water monitoring locations can be made.
- Gas sampling of the bores has been recorded on days different from when the groundwater sampling was undertaken. In future, the gas sampling needs to be done when groundwater samples are taken, as required by the resource consent conditions.

Appendices

Appendix A Site Plan



COORDINATES OF SURVEY CONTROL MARKS			
PT	NORTHING mN	EASTING mE	RL
ORM 1	659 498.38	276 412.21	38.94
ORM 2	659 510.09	276 422.72	34.98
ORM 3	659 505.14	276 612.86	21.10
ORM 4(OP/W)	659 380.16	276 511.94	30.92
MWH NAIL 1	659 272.67	276 656.87	27.61
MWH NAIL 2	659 278.98	276 695.22	28.40
MWH IT 1	659 267.33	276 576.02	30.03
MWH IT 2	659 361.94	276 627.00	33.70
MWH IT 3	659 428.24	276 593.00	32.74
MWH PEG 1	659 160.94	276 548.30	32.99
MWH PEG 2	659 227.86	276 479.35	30.49
IRII	659 075.85	276 698.70	30.04
OIR	658 903.62	276 579.37	30.35
IRI	659 121.09	276 679.47	40.00
IR	276 625.10	658 981.29	21.30
COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 1949: WANGANUI CIRCUIT			

SOIL MONITORING LOCATIONS	CO-ORDINATES		LEVEL (m)
	NORTHING mN	EASTING mE	
PEG A	658 938.80	276 882.30	39.2
PEG B	658 917.00	276 932.10	39.5
PEG C	658 862.70	276 899.00	46.1
PEG D	658 822.90	276 930.40	40.4
PEG E	658 965.50	276 294.00	36.6
PEG F	659 046.20	276 169.10	32.9
PEG G	658 878.00	276 520.20	32.6
PEG H	658 827.40	276 667.60	23.5

BORROW AREA 1 SET-OUT COORDINATES		
POINT NO.	NORTHINGS mN	EASTINGS mE
1	659 230.38	276 453.28
2	659 247.32	276 413.49
3	659 257.33	276 349.62
4	659 280.93	276 269.42
5	659 233.27	276 243.39
6	659 201.34	276 302.68

BORE LOCATIONS AND DETAILS						
BORE HOLE NO	NORTHING mN	EASTING mE	R.L. (m)	DEPTH OF WELL (m)	PIEZOMETER DIAMETER (mm)	FUNCTION
A1	659 060.15	276 944.89	12.95			SHALLOW AQUIFER
A2 (DESTROYED)						SHALLOW AQUIFER
A3 (DESTROYED)						SHALLOW AQUIFER
A4	659 271.67	276 354.72	10.10			SHALLOW AQUIFER
A5	659 530.47	276 185.91	9.62			SHALLOW AQUIFER
B1	659 561.81	276 797.35	9.04	4.3	40	SHALLOW AQUIFER
B1B (STOCK BORE)	659 530.08	276 799.91	9.28	10		
B2	659 576.32	276 683.50	9.42	3.5	50	SHALLOW AQUIFER
B3(s)	659 651.19	276 519.52	7.76	2.83	50	SHALLOW AQUIFER
B3(n)	659 654.26	276 524.38	7.49	2.33	32	DEEP AQUIFER
C1	659 649.64	276 777.83	7.47	3.60	50	SHALLOW AQUIFER
C2	659 680.80	276 631.22	7.50	2.81	32	SHALLOW AQUIFER
C2D(s)	659 671.19	276 641.63	10.13	12.88	32	SHALLOW AQUIFER
C2D(d)	659 671.19	276 641.63	10.11	18.85	32	DEEP AQUIFER
C3	659 704.29	276.246.89	7.22	2.8	32	SHALLOW AQUIFER
D1	659 134.97	276 771.65	27.46	23.69	50	EARLY DETECTION
D2	659 101.02	276 642.06	32.12	29.46	50	EARLY DETECTION
D4	659 293.20	276 356.60	17.97	17.0		SHALLOW AQUIFER
D5	659 020.80	276 022.40	20.65	18		SHALLOW AQUIFER BACKGROUND
D6	659 200.31	276 761.08	26.41	16.07	50	EARLY DETECTION
E1(d)	659 349.54	276 329.48	20.91	37.80	32	SHALLOW AQUIFER
E1(s)	659 349.54	276 329.48	20.91	20.05	32	DEEP AQUIFER
E2(s)	659 667.30	276 354.69	13.15	15.24	32	SHALLOW AQUIFER
E2(d)	659 667.30	276 354.69	13.15	28.66	32	DEEP AQUIFER
F1	659 037.10	276 925.50	18.90	15.0	50	SHALLOW AQUIFER LEACHATE IRRIGATION
F2	659 105.00	276 218.00	13.50	10.2	50	SHALLOW AQUIFER LEACHATE IRRIGATION
F3	658 951.70	276 434.00	16.70	10.5	50	SHALLOW AQUIFER LEACHATE IRRIGATION
G1(s) [4]	658 786.00	277 046.00	24	15	50	SHALLOW AQUIFER BACKGROUND
G1(d) [4]	658 786.00	277 046.00	24	31.5	50	DEEP AQUIFER BACKGROUND
G2 [4]	659 673.00	276 835.00	8	4	50	SHALLOW AQUIFER
COORDINATES FOR BORE HOLES BELOW ARE APPROXIMATE ONLY						
D3(r) s	659 089.60	276 585.30	18	10	50	EARLY DETECTION
D3(r) d	659 089.60	276 585.30	18	32	50	EARLY DETECTION
BHXS1	659 797.20	276 617.30	-	4	50	SHALLOW AQUIFER
BHXS2	659 620.80	276 984.30	-	4	50	SHALLOW AQUIFER
BHXD1	659 741.00	276 262.60	-	35	50	DEEP AQUIFER
COORDINATES ARE IN TERMS OF NEW ZEALAND GEODETIC DATUM 1949: WANGANUI CIRCUIT						

LEGEND

- MONITORING SAMPLING LOCATION
- MONITOR BORES CURRENTLY SAMPLED (FROM JAN 2010)
- BORES NOT SAMPLED
- SHALLOW HANDAUGER STANDPIPES NOT ABLE TO BE LOCATED
- SOIL SAMPLING LOCATION PEG - MONITORED
- SOIL SAMPLING LOCATION PEG - NOT MONITORED
- EXISTING STORMWATER SOAKAGE AREA
- PROPOSED STORMWATER SOAKAGE AREA
- PROPOSED BORROW AREAS

NOTES:

1. LEVELS ARE TOP OF STANDPIPE. WHERE THERE IS NO STANDPIPE, LEVELS ARE TOP OF PVC PIPE.
2. BHA2, BHA3 AND BHD3 HAVE BEEN LOST DUE TO SITE WORKS.
3. "A" SERIES BORE HOLES ARE AUGER HOLES ONLY AND MAY NOT BE ABLE TO BE LOCATED.
4. BORES INSTALLED IN AUG 2009. DETAILS ARE APPROXIMATE.
5. CONTOUR INTERVALS: 5m MAJOR, 1m MINOR

DO NOT SCALE - IF IN DOUBT, ASK

ORIGINAL SIZE A1

REV	REVISIONS	DRN	CHK	APP	DATE
E	FOR INFORMATION - BHD3(r)s AND BHD3(r)d ADDED, AND CONTOURS UPDATED FROM JULY 2021 SURVEY	BCJ	PSL	PSL	24.09.21
D	FOR INFORMATION - BORROW AREA 2 RELOCATED, DEFINED AREAS OF FUTURE STAGES 1B, 4 AND 5	BCJ	PSL	PSL	01.06.21
C	FOR INFORMATION - BORROW AREA AND LANDFILL AREA UPDATES AND BORE HOLES AND SAMPLING LOCATIONS ADDED FOR HOKIO STREAM AND TATANA DRAIN	BCJ	PSL	PSL	24.03.21
B	FOR INFORMATION - BORROW AREA AND LANDFILL AREA UPDATES	BCJ	PSL	PSL	22.09.20
A	FOR INFORMATION	BCJ	PSL	PSL	26.08.19

SURVEYED	MWH	
DESIGNED	N/A	-
DRAWN	Brent James	08.2019
CAD REVIEW	Brent James	23.09.21
APPROVED	Phil Landmark	23.09.21
PROF REGISTRATION:		

Stantec

Client:

HOROWHENUA DISTRICT COUNCIL
LEVIN LANDFILL

MONITORING BORES, SOIL SAMPLING LOCATIONS & BORROW AREAS
SITE PLAN, LOCATION AND DETAILS

Status Stamp: FOR INFORMATION ONLY
Date Stamp: 24.09.21
Scales: 1:2000 (A1) 1:4000 (A3)
Drawing No.: 310101088-19-001-G001
Rev.: E

26/08/2019 9:35 a.m.

pw:\\stantec-ap-pw.bentley.com:stantec-ap-pw-01\Documents\New Zealand Clients\Horowhenua District Council\80500724 (310101088) - Levin Landfill Volumes\2019\General\310101088-19-001-G001

Appendix B Analytical Results

Levin

Form ID: 13

Lechate, Hokio, Tatana
Landfill

Local Waters

Supervisor	Aaron Lane		
Sample Date	14/1/25	**Sent to Lab by**	Walter
Sampled by	Walter	**Entered in ID by**	Walter

Sampling Point	Sample Time	Temp °C	Conductivity (ms/cm)	pH	Flow (m/s)	Depth to Water (m)
Landfill Lechate	10.10	19.09	7262	8.07	—	—
Tatana Drain 1	9.55	14.09	978	7.23	—	—
Hokio Stream 1	9.15	17.02	235	6.96	2(m/s)	1(m)
Hokio Stream 1A	8.50	17.01	155	6.82	2(m/s)	1(m)
Hokio Stream 2	9.25	17.06	233	6.99	2(m/s)	1(m)
Hokio Stream 3	9.40	17.08	198	7.17	2(m/s)	1(m)
XS1						
XS2						
C2						
C2DS						

Note: No samples collected. Readings only

Levin

Form ID: 13

Lechate, Hokio, Tatana
Landfill

Local Waters

Supervisor	Aaron Lane		
Sample Date	12/02/25	**Sent to Lab by**	Walter
Sampled by	Walter	**Entered in ID by**	Walter

Sampling Point	Sample Time	Temp °C	Conductivity (ms/cm)	pH	Flow (m/s)	Depth to Water (m)
Landfill Lechate	12.20	20.08	1594	8.19	—	—
Tatana Drain 1	12.00	16.08	1232	7.66	—	—
Hokio Stream 1	11.00	19.05	284	7.30	2(s)	2(m)
Hokio Stream 1A	10.40	19.07	272	7.32	2(s)	2(m)
Hokio Stream 2	11.20	19.03	302	7.30	2(s)	2(m)
Hokio Stream 3	11.40	19.01	306	7.64	2(s)	2(m)
XS1						
XS2						
C2						
C2DS						

Note: No samples collected. Readings only

eurofins

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-008021-01	REPORT DATE	05/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00012631		
Sample Name	386294-0		
Product:	Ground water		
Sampling Point code:	WIL-B1	**Sampling Point name:**	Levin B1
Reception Date & Time:	24/01/2025 13:17		
Analysis Started on:	24/01/2025	**Analysis Ending Date:**	05/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:25
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	35.4	(± 3.54) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	291	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	318	(± 31.8) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	238	(± 4.8) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.055	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	1.26	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	7.70	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0060	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.5 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Leo Cleave Senior Analyst Microbiology

Gabriela Carvalhaes Business Unit Manager

EXPLANATORY NOTE

①Test is not accredited
②Test is subcontracted within Eurofins group and is accredited
③Test is subcontracted within Eurofins group and is not accredited
④Test is subcontracted outside Eurofins group and is accredited
⑤Test is subcontracted outside Eurofins group and is not accredited
⑥Test result is provided by the customer and is not accredited
⑦Tested at the sampling point by Eurofins and is not accredited
⑧Tested at the sampling point by Eurofins and is accredited
⑨Test is RLP accredited
⑩Test is subcontracted within Eurofins group and is RLP accredited

N/A means Not Applicable
Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.
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Accreditation does not apply to comments or graphical representations.
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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-008023-01	REPORT DATE	05/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00012635		
Sample Name	386255-0		
Product:	Ground water		
Sampling Point code:	WIL-B2	**Sampling Point name:**	Levin B2
Reception Date & Time:	24/01/2025 13:20		
Analysis Started on:	25/01/2025	**Analysis Ending Date:**	05/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:25
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	124	(± 12.4) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	134	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	212	(± 21.2) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	267	(± 5.3) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.005	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	2.43	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	3.92	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0038	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	6.52	(± 0.65) mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.3	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	14.8	(± 1.48) mg/l	0.02
NW003	**Total Alkalinity**			
	Alkalinity total	996	mg CaCO3/l	1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B	NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Leo Cleave Senior Analyst Microbiology

Gabriela Carvalhaes Business Unit Manager

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-008026-01	REPORT DATE	05/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00012643		
Sample Name	386256-0		
Product:	Ground water		
Sampling Point code:	WIL-B3	**Sampling Point name:**	Levin B3s
Reception Date & Time:	24/01/2025 13:25		
Analysis Started on:	25/01/2025	**Analysis Ending Date:**	05/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:25
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	199	(± 19.9) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	4	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	371	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	203	(± 20.3) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	309	(± 6.2) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.006	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	1.54	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	4.69	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0118	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.03	(± 0.00) mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.3	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	1.75	(± 0.17) mg/l	0.02
NW003	**Total Alkalinity**			
	Alkalinity total	1380	mg CaCO3/l	1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B	NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007260-01	REPORT DATE	01/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011486		
Sample Name	386292-0		
Product:	Ground water		
Sampling Point code:	WIL-C1	**Sampling Point name:**	Levin C1
Reception Date & Time:	23/01/2025 11:31		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:13
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	18.0	(± 1.80) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	75	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	118	(± 11.8) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	103	(± 2.1) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.024	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.751	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.211	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0012	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.02	(± 0.00) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.5 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
Microbiology

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-008022-01	REPORT DATE	05/02/2025

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NEW ZEALAND

Phone (06) 367 2705
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Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE 812-2025-00012632

Sample Name	386253-0		
Product:	Ground water		
Sampling Point code:	WIL-C2	**Sampling Point name:**	Levin C2
Reception Date & Time:	24/01/2025 13:19		
Analysis Started on:	25/01/2025	**Analysis Ending Date:**	05/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:25
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	195	(± 19.5) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	5	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	503	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	311	(± 31.1) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	357	(± 7.1) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.013	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	1.92	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.303	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0074	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.2	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	4.18	(± 0.42) mg/l	0.02
NW003	**Total Alkalinity**			
	Alkalinity total	1510	mg CaCO3/l	1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B	NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006483-01	REPORT DATE	30/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010615		
Sample Name	386290-0		
Product:	Ground water		
Sampling Point code:	WIL-C2dd	**Sampling Point name:**	Levin C2dd
Reception Date & Time:	22/01/2025 13:17		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	30/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:17
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.33	(± 0.03) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	25	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	42.8	(± 4.28) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	56.0	(± 1.1) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.004	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.063	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.599	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZMF1E	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.02	(± 0.00) mg/l	0.01

		RESULTS	(UNCERTAINTY)	LOQ
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	8.0	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	0.06	(± 0.01) mg/l	0.02
NW003	**Total Alkalinity**			
	Alkalinity total	223	mg CaCO3/l	1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B	NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZMF1E	**Escherichia coli E (Water) [NZ] <1 >80 /100 ml (0) MI Agar-F:** SMEWW 9222K; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Leo Cleave Senior Analyst
Microbiology

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

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✓ (Satisfactory) means meets the specification
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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-008024-01	REPORT DATE	05/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00012636		
Sample Name	386254-0		
Product:	Ground water		
Sampling Point code:	WIL-C2ds	**Sampling Point name:**	Levin C2ds
Reception Date & Time:	24/01/2025 13:21		
Analysis Started on:	25/01/2025	**Analysis Ending Date:**	05/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:25
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	4.09	(± 0.41) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	85	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	126	(± 12.6) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	161	(± 3.2) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	<0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.471	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	2.55	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0020	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.4	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	<0.02	(± 0.01) mg/l	0.02
NW003	**Total Alkalinity**			
	Alkalinity total	712	mg CaCO3/l	1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B	NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Leo Cleave Senior Analyst Microbiology

Gabriela Carvalhaes Business Unit Manager

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007056-01	REPORT DATE	01/02/2025

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4741 Levin
NEW ZEALAND

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Email labresults@horowhenua.govt.nz

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Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011467		
Sample Name	386257-0		
Product:	Ground water		
Sampling Point code:	WIL-D1	**Sampling Point name:**	Levin D1
Reception Date & Time:	23/01/2025 11:20		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:10
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.06	(± 0.01) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	25.3	(± 2.53) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	53.2	(± 1.1) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	<0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.051	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0008	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	6.28	(± 0.63) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	8.1 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
Microbiology

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007053-01	REPORT DATE	01/02/2025

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Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011464		
Sample Name	386258-0		
Product:	Ground water		
Sampling Point code:	WIL-D2	**Sampling Point name:**	Levin D2
Reception Date & Time:	23/01/2025 11:16		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:10
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.81	(± 0.08) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	39	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	99.9	(± 9.99) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	67.0	(± 1.3) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.003	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.047	mg/l	0.005
NW109	**Dissolved Iron**			
	Iron (Fe)	11.3	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.644	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0005	mg/l	0.0005
NW120	**Dissolved Sodium**			
	Sodium (Na)	51.2	mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	5.9	(± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.	NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst
Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
Microbiology

EXPLANATORY NOTE

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LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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Eurofins will not be required to store samples and may destroy or otherwise dispose of the samples or return the samples to the Customer (at the Customer's cost in all respects) immediately following analysis of the samples.
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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007049-01	REPORT DATE	01/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011454		
Sample Name	386363-0		
Product:	Ground water		
Sampling Point code:	WIL-D3rd	**Sampling Point name:**	Levin D3rd
Reception Date & Time:	23/01/2025 11:08		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:11
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	0.38	(± 0.04) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	21	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	32.8	(± 3.28) mg/l	0.02
NW023 **Conductivity**			
Conductivity	52.3	(± 1.0) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.002	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.021	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	0.043	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	52.0	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.029	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	13.6	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.463	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	6.65	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	1.21	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	22.6	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.9	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	<0.02	(± 0.01) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	11	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	219	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	186	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	5.5	mg/l	0.1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007055-01	REPORT DATE	01/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011466		
Sample Name	386364-0		
Product:	Ground water		
Sampling Point code:	WIL-D3rs	**Sampling Point name:**	Levin D3rs
Reception Date & Time:	23/01/2025 11:19		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:12
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	1.12	(± 0.11) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	61	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	19.4	(± 1.94) mg/l	0.02
NW023 **Conductivity**			
Conductivity	22.7	(± 0.5) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.046	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	<0.001	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	0.033	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	12.5	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	0.002	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	14.8	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	6.04	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.418	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	4.84	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.306	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	24.9	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.8	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	0.93	(± 0.09) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	9	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	76	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	56	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	18.3	mg/l	0.1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
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NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007050-01	REPORT DATE	01/02/2025

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Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011461		
Sample Name	386293-0		
Product:	Ground water		
Sampling Point code:	WIL-D4	**Sampling Point name:**	Levin D4
Reception Date & Time:	23/01/2025 11:12		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:13
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.15	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	29.9	(± 2.99) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	28.4	(± 0.6) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.006	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.030	mg/l	0.005
NW109	**Dissolved Iron**			
	Iron (Fe)	4.26	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.218	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW120	**Dissolved Sodium**			
	Sodium (Na)	28.9	mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.5	(± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.	NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Jennifer Mont Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist Technical Specialist

Hannah Smith Laboratory Supervisor Microbiology

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006631-01	REPORT DATE	31/01/2025

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Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010619		
Sample Name	386298-0		
Product:	Ground water		
Sampling Point code:	WIL-D5	**Sampling Point name:**	Levin D5
Reception Date & Time:	22/01/2025 13:22		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	31/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:16
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.01	(± 0.00) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	27.6	(± 2.76) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	29.1	(± 0.6) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	<0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.032	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0056	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	1.28	(± 0.13) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.2 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
Microbiology

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007057-01	REPORT DATE	01/02/2025

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Lab Results
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4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

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Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011468		
Sample Name	386297-0		
Product:	Ground water		
Sampling Point code:	WIL-D6	**Sampling Point name:**	Levin D6
Reception Date & Time:	23/01/2025 11:24		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:12
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	<0.01	mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	24.9	(± 2.49) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	36.2	(± 0.7) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	<0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.064	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0009	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	18.4	(± 1.84) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.7 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006628-01	REPORT DATE	31/01/2025

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P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010614		
Sample Name	386250-0		
Product:	Ground water		
Sampling Point code:	WIL-E1d	**Sampling Point name:**	Levin E1d
Reception Date & Time:	22/01/2025 13:16		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	31/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:18
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

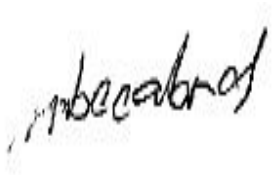
		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.20	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	16	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	40.8	(± 4.08) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	44.2	(± 0.9) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.049	mg/l	0.005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.026	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.237	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW120	**Dissolved Sodium**			
	Sodium (Na)	34.9	mg/l	0.01

	RESULTS (UNCERTAINTY)		LOQ
ZMF1E	**Enumeration of Escherichia coli by Membrane Filtration**		
	Escherichia coli	<1 cfu/100 ml	1
NW010	**Nitrate-N**		
	Nitrate-N	<0.01 (± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**		
	pH	7.8 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.	NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZMF1E	**Escherichia coli E (Water) [NZ] <1 >80 /100 ml (0) MI Agar-F:** SMEWW 9222K; APHA 24th Edition

Signature



Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Leo Cleave Senior Analyst
Microbiology

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

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END OF REPORT

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007058-01	REPORT DATE	01/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011469		
Sample Name	386295-0		
Product:	Ground water		
Sampling Point code:	WIL-E1s	**Sampling Point name:**	Levin E1s
Reception Date & Time:	23/01/2025 11:25		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:12
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.16	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	17	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	28.6	(± 2.86) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	25.0	(± 0.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.005	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.025	mg/l	0.005
NW109	**Dissolved Iron**			
	Iron (Fe)	3.60	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.190	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW120	**Dissolved Sodium**			
	Sodium (Na)	25.7	mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.6	(± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
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NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007054-01	REPORT DATE	01/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011465		
Sample Name	386251-0		
Product:	Ground water		
Sampling Point code:	WIL-E2d	**Sampling Point name:**	Levin E2d
Reception Date & Time:	23/01/2025 11:18		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:09
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.01	(± 0.00) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	18	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	41.3	(± 4.13) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	44.2	(± 0.9) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.004	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.052	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.420	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZMF1E	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	3	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	8.3 (± 0.2)	0.1

LIST OF METHODS

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NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZMF1E	**Escherichia coli E (Water) [NZ] <1 >80 /100 ml (0) MI Agar-F:** SMEWW 9222K; APHA 24th Edition

Signature

Jennifer Mont Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst Eurofins ELS Limited

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007051-01	REPORT DATE	01/02/2025

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Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229115

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00011462		
Sample Name	386296-0		
Product:	Ground water		
Sampling Point code:	WIL-E2s	**Sampling Point name:**	Levin E2s
Reception Date & Time:	23/01/2025 11:13		
Analysis Started on:	23/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	22/01/2025 13:13
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.09	(± 0.01) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	37.7	(± 3.77) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	34.6	(± 0.7) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.009	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.027	mg/l	0.005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.103	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	0.0007	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.265	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW120	**Dissolved Sodium**			
	Sodium (Na)	29.2	mg/l	0.01

	RESULTS (UNCERTAINTY)		LOQ
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**		
	Escherichia coli	<1 cfu/100 ml	1
NW010	**Nitrate-N**		
	Nitrate-N	<0.01 (± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**		
	pH	7.6 (± 0.2)	0.1

LIST OF METHODS

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NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006629-01	REPORT DATE	31/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010616		
Sample Name	386299-0		
Product:	Ground water		
Sampling Point code:	WIL-F1	**Sampling Point name:**	Levin F1
Reception Date & Time:	22/01/2025 13:18		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	31/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:17
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.01	(± 0.00) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	76.0	(± 7.60) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	50.3	(± 1.0) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	<0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.031	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0055	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0008	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	2.16	(± 0.22) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.0 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
Microbiology

EXPLANATORY NOTE

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⑧ Tested at the sampling point by Eurofins and is accredited
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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006484-01	REPORT DATE	30/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010618		
Sample Name	386261-0		
Product:	Ground water		
Sampling Point code:	WIL-F2	**Sampling Point name:**	Levin F2
Reception Date & Time:	22/01/2025 13:20		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	30/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:17
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.01	(± 0.00) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	22.6	(± 2.26) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	22.5	(± 0.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.033	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0046	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.65	(± 0.07) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.2 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
Microbiology

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006630-01	REPORT DATE	31/01/2025

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Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010617		
Sample Name	386262-0		
Product:	Ground water		
Sampling Point code:	WIL-F3	**Sampling Point name:**	Levin F3
Reception Date & Time:	22/01/2025 13:19		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	31/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:17
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

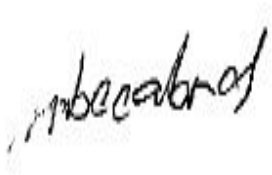
		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.06	(± 0.01) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	14.5	(± 1.45) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	16.0	(± 0.3) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.004	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.025	mg/l	0.005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.143	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0030	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW120	**Dissolved Sodium**			
	Sodium (Na)	19.2	mg/l	0.01

		RESULTS (UNCERTAINTY)		LOQ
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	2.22	(± 0.22) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.1	(± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.	NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature



Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006633-01	REPORT DATE	31/01/2025

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Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010642		
Sample Name	386252-0		
Product:	Ground water		
Sampling Point code:	WIL-G1D	**Sampling Point name:**	Levin G1D
Reception Date & Time:	22/01/2025 13:26		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	31/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:15
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.09	(± 0.01) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	28.2	(± 2.82) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	25.1	(± 0.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	<0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.033	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0591	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZMF1E	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.4 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZMF1E	**Escherichia coli E (Water) [NZ] <1 >80 /100 ml (0) MI Agar-F:** SMEWW 9222K; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Leo Cleave Senior Analyst
Microbiology

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-006632-01	REPORT DATE	31/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010641		
Sample Name	386259-0		
Product:	Ground water		
Sampling Point code:	WIL-G1S	**Sampling Point name:**	Levin G1S
Reception Date & Time:	22/01/2025 13:24		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	31/01/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:16
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

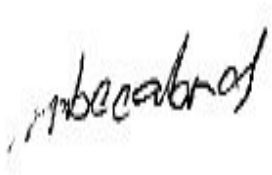
		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.27	(± 0.03) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	43	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	32.3	(± 3.23) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	25.6	(± 0.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.077	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.025	mg/l	0.005
NW109	**Dissolved Iron**			
	Iron (Fe)	1.94	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0426	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0009	mg/l	0.0005
NW120	**Dissolved Sodium**			
	Sodium (Na)	33.9	mg/l	0.01

	RESULTS (UNCERTAINTY)		LOQ
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**		
	Escherichia coli	<1 cfu/100 ml	1
NW010	**Nitrate-N**		
	Nitrate-N	<0.01 mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**		
	pH	7.0 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.	NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature



Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

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Technical Specialist

Hannah Smith Laboratory Supervisor
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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007038-01	REPORT DATE	01/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00228811

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00010643		
Sample Name	386260-0		
Product:	Ground water		
Sampling Point code:	WIL-G2	**Sampling Point name:**	Levin G2s
Reception Date & Time:	22/01/2025 13:27		
Analysis Started on:	22/01/2025	**Analysis Ending Date:**	01/02/2025
Product Type	Ground water	**Sampled Date & Time**	21/01/2025 13:16
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.03	(± 0.00) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	22	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	251	(± 25.1) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	126	(± 2.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.004	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.574	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.308	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0023	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.2 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Cody Forbes Technical Specialist
Technical Specialist

Hannah Smith Laboratory Supervisor
Microbiology

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007898-01	REPORT DATE	04/02/2025

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Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE 812-2025-00012626

Sample Name	386291-0		
Product:	Ground water		
Sampling Point code:	WIL-Xd1	**Sampling Point name:**	Levin Xd1
Reception Date & Time:	24/01/2025 13:15		
Analysis Started on:	25/01/2025	**Analysis Ending Date:**	04/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:26
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.81	(± 0.08) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	30	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	57.5	(± 5.75) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	53.3	(± 1.1) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	<0.002	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.044	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.509	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZMF1E	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	7.8 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZMF1E	**Escherichia coli E (Water) [NZ] <1 >80 /100 ml (0) MI Agar-F:** SMEWW 9222K; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Leo Cleave Senior Analyst Microbiology

Gabriela Carvalhaes Business Unit Manager

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-008025-01	REPORT DATE	05/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00012642		
Sample Name	386300-0		
Product:	Ground water		
Sampling Point code:	WIL-Xs1	**Sampling Point name:**	Levin Xs1
Reception Date & Time:	24/01/2025 13:24		
Analysis Started on:	25/01/2025	**Analysis Ending Date:**	05/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:26
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	13.3	(± 1.33) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	99	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	112	(± 11.2) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	139	(± 2.8) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.023	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.418	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.975	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0024	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.1	mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	6.7 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Leo Cleave Senior Analyst
Microbiology

Gabriela Carvalhaes Business Unit Manager

EXPLANATORY NOTE

①Test is not accredited
②Test is subcontracted within Eurofins group and is accredited
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N/A means Not Applicable
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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-007899-01	REPORT DATE	04/02/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00229489

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2025-00012627		
Sample Name	386301-0		
Product:	Ground water		
Sampling Point code:	WIL-Xs2	**Sampling Point name:**	Levin Xs2
Reception Date & Time:	24/01/2025 13:16		
Analysis Started on:	25/01/2025	**Analysis Ending Date:**	04/02/2025
Product Type	Ground water	**Sampled Date & Time**	23/01/2025 13:26
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.19	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	<15	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	49.2	(± 4.92) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	28.8	(± 0.6) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.006	mg/l	0.002
NW103	**Dissolved Boron**			
	Boron (B)	0.027	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0698	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<1	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.72	(± 0.07) mg/l	0.01

	RESULTS (UNCERTAINTY)	LOQ
NW195 pH (Tested beyond 15 minute APHA holding time)		
pH	6.8 (± 0.2)	0.1

LIST OF METHODS

NW007	**Chloride:** APHA Online Edition 4110 B	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Leo Cleave Senior Analyst Microbiology

Gabriela Carvalhaes Business Unit Manager

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-074409-01	REPORT DATE	30/11/2024

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Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Landmark (Phil.Landmark@stantec.com), Wardlaw (Scottw@horowhenua.govt.nz)

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00218171

Purchase Order Number: Landfill

SAMPLE CODE	812-2024-00175690

Sample Name 378346-0
Product: Ground water
Sampling Point code: WIL-HS1
Sampling Point name: Levin HS1
Reception Date & Time: 22/11/2024 9:40
Analysis Started on: 22/11/2024
Analysis Ending Date: 30/11/2024
Product Type Ground water
Sampled Date & Time 21/11/2024 07:00
Sampler(s) Client nominated external sampler
Sampled by Eurofins No

ORGANICS		RESULTS	(UNCERTAINTY)	LOQ
NW00U	**Chlorophenols**			
	2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
	2,4-Dichlorophenol	<0.01	mg/l	0.01
	2,6-Dichlorophenol	<0.2	mg/l	0.2
	2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
	3,4,5-Trichlorophenol	<0.01	mg/l	0.01
	4-Chloro-3-cresol	<0.01	mg/l	0.01
	Pentachlorophenol	<0.005	mg/l	0.005
	Phenol	<0.01	mg/l	0.01
	Total of 2,4,5 & 2,4,6 -Trichlorophenol	<0.02	mg/l	0.02
①**NWWG6**	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS	(UNCERTAINTY)	LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.17	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	2	mg/l	1

		RESULTS	(UNCERTAINTY)	LOQ
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	40	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	20.9	(± 2.09) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	21.8	(± 0.4) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.014	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.055	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	10.5	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0009	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.153	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	7.30	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0677	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	3.01	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.119	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	19.9	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM2GA	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	100	cfu/100 ml	100
NW010	**Nitrate-N**			
	Nitrate-N	0.27	(± 0.03) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.6	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	18.9	(± 1.89) mg/l	0.02

		RESULTS (UNCERTAINTY)		LOQ
NW206	**Suspended Solids**			
	Suspended Solids	10	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	47	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	56	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	6.6	mg/l	0.1

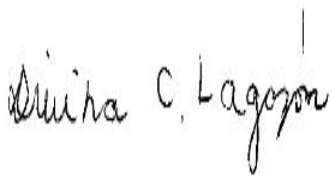
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW00U	**Chlorophenols:** Internal Method, LC-MS/MS
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.
NW007	**Chloride:** APHA Online Edition 4110 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM2GA	**Escherichia coli E (Water) [NZ] <100 >6 000 000 /100 ml (0-3) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager - Wellington

Hannah Smith Laboratory Supervisor Microbiology

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-080867-01	REPORT DATE	26/12/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00222678

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2024-00189560		
Sample Name	381169-0		
Product:	Ground water		
Sampling Point code:	WIL-HS1	**Sampling Point name:**	Levin HS1
Reception Date & Time:	13/12/2024 18:14		
Analysis Started on:	14/12/2024	**Analysis Ending Date:**	25/12/2024
Product Type	Ground water	**Sampled Date & Time**	12/12/2024 08:00
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
①NWWG6	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.15	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	28	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	21.4	(± 2.14) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	21.5	(± 0.4) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.005	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.003	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	0.031	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	9.01	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.096	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	4.56	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0086	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	2.88	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.124	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	18.7	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	600	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.08	(± 0.01) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.3	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	17.2	(± 1.72) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	<6	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	50	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	41	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	6.2	mg/l	0.1

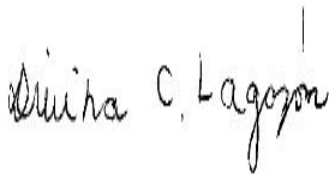
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

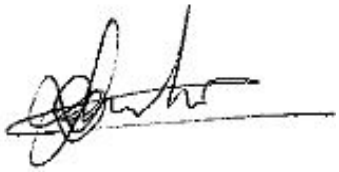
Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst
Eurofins ELS Limited



Ganesh Ilancko Supervisor Eurofins ELS Limited

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

EXPLANATORY NOTE

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⑤ Test is subcontracted outside Eurofins group and is not accredited
⑥ Test result is provided by the customer and is not accredited
⑦ Tested at the sampling point by Eurofins and is not accredited
⑧ Tested at the sampling point by Eurofins and is accredited
⑨ Test is RLP accredited
⑩ Test is subcontracted within Eurofins group and is RLP accredited

N/A means Not Applicable
Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓ (Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE **AR-25-NW-005948-01** REPORT DATE **29/01/2025**

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill
Order code: EUNZWE-00227605

SAMPLE CODE **812-2025-00006937**

Sample Name 386302-0
Product: Levin SH1
Sampling Point code: WIL-HS1
Sampling Point name: Levin HS1
Reception Date & Time: 15/01/2025 18:35
Analysis Started on: 16/01/2025
Analysis Ending Date: 29/01/2025
Sampled Date & Time 14/01/2025 00:00
Sampler(s) Customer

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	0.54	(± 0.05) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	33	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	24.2	(± 2.42) mg/l	0.02
NW023 **Conductivity**			
Conductivity	24.5	(± 0.5) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.003	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.002	mg/l	0.001
NW103 **Dissolved Boron**			
Boron (B)	0.050	mg/l	0.005

		RESULTS (UNCERTAINTY)		LOQ
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	13.0	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0030	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.046	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	8.22	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.205	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	4.40	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.142	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	23.9	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	100	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.02	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.3	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	11.6	(± 1.16) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	17	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	63	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	66	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	10.9	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW007 **Chloride:** APHA Online Edition 4110 B

Eurofins ELS Limited
85 Port Road
Seaview
Lower Hutt
Wellington 5010
NEW ZEALAND

Phone +64 4 576 5016
www.eurofins.co.nz

NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW030	**Total Hardness:** APHA Online Edition 2340 B	NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.	NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.	NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.	NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.	NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B	NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B	NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.	NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition		

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

EXPLANATORY NOTE

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⑥Test result is provided by the customer and is not accredited
⑦Tested at the sampling point by Eurofins and is not accredited
⑧Tested at the sampling point by Eurofins and is accredited
⑨Test is RLP accredited
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END OF REPORT

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-074410-01	REPORT DATE	30/11/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Landmark (Phil.Landmark@stantec.com), Wardlaw (Scottw@horowhenua.govt.nz)

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00218171

Purchase Order Number: Landfill

SAMPLE CODE	812-2024-00175693		
Sample Name	378347-0		
Product:	Ground water		
Sampling Point code:	WIL-HS1A	**Sampling Point name:**	Levin HS1A
Reception Date & Time:	22/11/2024 9:40		
Analysis Started on:	22/11/2024	**Analysis Ending Date:**	30/11/2024
Product Type	Ground water	**Sampled Date & Time**	21/11/2024 07:15
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
NW00U	**Chlorophenols**			
	2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
	2,4-Dichlorophenol	<0.01	mg/l	0.01
	2,6-Dichlorophenol	<0.2	mg/l	0.2
	2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
	3,4,5-Trichlorophenol	<0.01	mg/l	0.01
	4-Chloro-3-cresol	<0.01	mg/l	0.01
	Pentachlorophenol	<0.005	mg/l	0.005
	Phenol	<0.01	mg/l	0.01
	Total of 2,4,5 & 2,4,6 -Trichlorophenol	<0.02	mg/l	0.02
①**NWWG6**	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.67	(± 0.07) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<6	mg/l	1

		RESULTS	(UNCERTAINTY)	LOQ
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	96	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	19.4	(± 1.94) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	22.4	(± 0.4) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.011	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.045	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	13.5	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0007	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	1.44	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	6.95	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.641	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0009	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	5.89	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.023	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	18.3	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	0.006	mg/l	0.002
ZM2GA	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	100	cfu/100 ml	100
NW010	**Nitrate-N**			
	Nitrate-N	0.02	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	6.9	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	10.5	(± 1.05) mg/l	0.02

	RESULTS (UNCERTAINTY)		LOQ
NW206 Suspended Solids			
Suspended Solids	44	mg/l	3
NW003 Total Alkalinity			
Alkalinity total	64	mg CaCO3/l	1
NW030 Total Hardness			
Hardness	62	mg CaCO3/l	1
NW210 Total Non-Purgeable Organic Carbon			
Total Organic Carbon	7.6	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW00U **Chlorophenols:** Internal Method, LC-MS/MS

NW011 **Sulphate:** APHA Online Edition 4110 B

NW023 **Conductivity:** APHA 24th Edition 2510 B

NW098 **Dissolved Aluminium:** APHA Online Edition 3125 B mod.

NW104 **Dissolved Cadmium:** APHA Online Edition 3125 B mod.

NW106 **Dissolved Chromium:** APHA Online Edition 3125 B mod.

NW109 **Dissolved Iron:** APHA Online Edition 3125 B mod.

NW112 **Dissolved Magnesium:** APHA Online Edition 3125 B mod.

NW114 **Dissolved Mercury:** APHA Online Edition 3125 B mod.

NW117 **Dissolved Potassium:** APHA Online Edition 3125 B mod.

NW125 **Dissolved Zinc:** APHA Online Edition 3125 B mod.

NW193 **Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G

NW206 **Suspended Solids:** APHA Online Edition 2540 D

NW341 **BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B

NWWG6 **Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

NW007 **Chloride:** APHA Online Edition 4110 B

NW010 **Nitrate-N:** APHA Online Edition 4110 B

NW020 **Chemical Oxygen Demand:** APHA Online Edition 5220 D

NW030 **Total Hardness:** APHA Online Edition 2340 B

NW103 **Dissolved Boron:** APHA Online Edition 3125 B mod.

NW105 **Dissolved Calcium:** APHA Online Edition 3125 B mod.

NW108 **Dissolved Copper:** APHA Online Edition 3125 B mod.

NW110 **Dissolved Lead:** APHA Online Edition 3125 B mod.

NW113 **Dissolved Manganese:** APHA Online Edition 3125 B mod.

NW116 **Dissolved Nickel:** APHA Online Edition 3125 B mod.

NW120 **Dissolved Sodium:** APHA Online Edition 3125 B mod.

NW179 **Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H

NW195 **pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B

NW210 **Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B

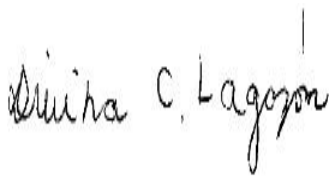
NW583 **Dissolved Arsenic:** APHA Online Edition 3125 B mod.

ZM2GA **Escherichia coli E (Water) [NZ] <100 >6 000 000 /100 ml (0-3) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager - Wellington

Hannah Smith Laboratory Supervisor Microbiology

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⑧ Tested at the sampling point by Eurofins and is accredited
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Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓ (Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-080866-01	REPORT DATE	26/12/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00222678

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2024-00189559		
Sample Name	381170-0		
Product:	Ground water		
Sampling Point code:	WIL-HS1A	**Sampling Point name:**	Levin HS1A
Reception Date & Time:	13/12/2024 18:03		
Analysis Started on:	14/12/2024	**Analysis Ending Date:**	25/12/2024
Product Type	Ground water	**Sampled Date & Time**	12/12/2024 07:45
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
① NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	5.24	(± 0.52) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	18	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	21.4	(± 2.14) mg/l	0.02
NW023 **Conductivity**			
Conductivity	21.5	(± 0.4) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.006	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.002	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	0.033	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	9.22	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.085	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	5.08	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0093	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0006	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	3.08	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.112	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	19.3	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	100	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.06	(± 0.01) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.4	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	16.7	(± 1.67) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	10	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	52	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	44	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	6.1	mg/l	0.1

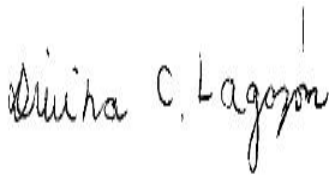
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

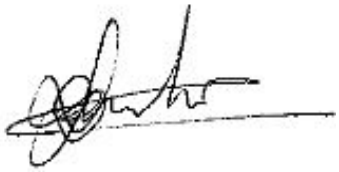
Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst
Eurofins ELS Limited



Ganesh Ilancko Supervisor Eurofins ELS Limited

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

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LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓ (Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE **AR-25-NW-005950-01** REPORT DATE **29/01/2025**

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill
Order code: EUNZWE-00227605

SAMPLE CODE **812-2025-00006940**

Sample Name 386303-0
Product: Levin HS1A
Sampling Point code: WIL-HS1A
Sampling Point name: Levin HS1A
Reception Date & Time: 15/01/2025 18:35
Analysis Started on: 16/01/2025
Analysis Ending Date: 29/01/2025
Sampled Date & Time 14/01/2025 00:00
Sampler(s) Customer

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	0.24	(± 0.02) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	43	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	22.6	(± 2.26) mg/l	0.02
NW023 **Conductivity**			
Conductivity	24.5	(± 0.5) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.007	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.002	mg/l	0.001
NW103 **Dissolved Boron**			
Boron (B)	0.051	mg/l	0.005

		RESULTS (UNCERTAINTY)		LOQ
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	12.4	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0034	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.041	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	7.97	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.144	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0006	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	4.24	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.099	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	23.6	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	0.004	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	1400	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.01	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.6	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	10.6	(± 1.06) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	54	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	63	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	64	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	10.4	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW007 **Chloride:** APHA Online Edition 4110 B

Eurofins ELS Limited
85 Port Road
Seaview
Lower Hutt
Wellington 5010
NEW ZEALAND

Phone +64 4 576 5016
www.eurofins.co.nz

NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW030	**Total Hardness:** APHA Online Edition 2340 B	NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.	NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.	NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.	NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.	NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B	NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B	NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.	NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition		

Signature

Marylou Cabral	Laboratory Manager Eurofins ELS Limited	Jennifer Mont	Supervisor Eurofins ELS Limited	Ganesh Ilancko	Supervisor Eurofins ELS Limited
Gabriela Carvalhaes	Business Unit Manager	Vineel Chandra	Laboratory Supervisor Microbiology	Cody Forbes	Technical Specialist Technical Specialist

EXPLANATORY NOTE

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⑤Test is subcontracted outside Eurofins group and is not accredited
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N/A means Not Applicable
Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-074408-01	REPORT DATE	30/11/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Landmark (Phil.Landmark@stantec.com), Wardlaw (Scottw@horowhenua.govt.nz)

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00218171

Purchase Order Number: Landfill

SAMPLE CODE	812-2024-00175689

Sample Name	378358-0		
Product:	Ground water		
Sampling Point code:	WIL-HS2	**Sampling Point name:**	Levin HS2
Reception Date & Time:	22/11/2024 9:40		
Analysis Started on:	22/11/2024	**Analysis Ending Date:**	30/11/2024
Product Type	Ground water	**Sampled Date & Time**	21/11/2024 07:30
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
NW00U	**Chlorophenols**			
	2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
	2,4-Dichlorophenol	<0.01	mg/l	0.01
	2,6-Dichlorophenol	<0.2	mg/l	0.2
	2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
	3,4,5-Trichlorophenol	<0.01	mg/l	0.01
	4-Chloro-3-cresol	<0.01	mg/l	0.01
	Pentachlorophenol	<0.005	mg/l	0.005
	Phenol	<0.01	mg/l	0.01
	Total of 2,4,5 & 2,4,6 -Trichlorophenol	<0.02	mg/l	0.02
①**NWWG6**	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.18	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	2	mg/l	1

		RESULTS	(UNCERTAINTY)	LOQ
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	34	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	22.6	(± 2.26) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	22.3	(± 0.4) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.016	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.057	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	10.6	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0009	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.206	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	7.26	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0806	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	2.96	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.141	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	19.8	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM2GA	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	4200	cfu/100 ml	100
NW010	**Nitrate-N**			
	Nitrate-N	0.27	(± 0.03) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.6	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	19.1	(± 1.91) mg/l	0.02

	RESULTS (UNCERTAINTY)		LOQ
NW206 Suspended Solids			
Suspended Solids	8	mg/l	3
NW003 Total Alkalinity			
Alkalinity total	49	mg CaCO3/l	1
NW030 Total Hardness			
Hardness	56	mg CaCO3/l	1
NW210 Total Non-Purgeable Organic Carbon			
Total Organic Carbon	6.9	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW00U **Chlorophenols:** Internal Method, LC-MS/MS

NW011 **Sulphate:** APHA Online Edition 4110 B

NW023 **Conductivity:** APHA 24th Edition 2510 B

NW098 **Dissolved Aluminium:** APHA Online Edition 3125 B mod.

NW104 **Dissolved Cadmium:** APHA Online Edition 3125 B mod.

NW106 **Dissolved Chromium:** APHA Online Edition 3125 B mod.

NW109 **Dissolved Iron:** APHA Online Edition 3125 B mod.

NW112 **Dissolved Magnesium:** APHA Online Edition 3125 B mod.

NW114 **Dissolved Mercury:** APHA Online Edition 3125 B mod.

NW117 **Dissolved Potassium:** APHA Online Edition 3125 B mod.

NW125 **Dissolved Zinc:** APHA Online Edition 3125 B mod.

NW193 **Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G

NW206 **Suspended Solids:** APHA Online Edition 2540 D

NW341 **BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B

NWWG6 **Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

NW007 **Chloride:** APHA Online Edition 4110 B

NW010 **Nitrate-N:** APHA Online Edition 4110 B

NW020 **Chemical Oxygen Demand:** APHA Online Edition 5220 D

NW030 **Total Hardness:** APHA Online Edition 2340 B

NW103 **Dissolved Boron:** APHA Online Edition 3125 B mod.

NW105 **Dissolved Calcium:** APHA Online Edition 3125 B mod.

NW108 **Dissolved Copper:** APHA Online Edition 3125 B mod.

NW110 **Dissolved Lead:** APHA Online Edition 3125 B mod.

NW113 **Dissolved Manganese:** APHA Online Edition 3125 B mod.

NW116 **Dissolved Nickel:** APHA Online Edition 3125 B mod.

NW120 **Dissolved Sodium:** APHA Online Edition 3125 B mod.

NW179 **Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H

NW195 **pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B

NW210 **Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B

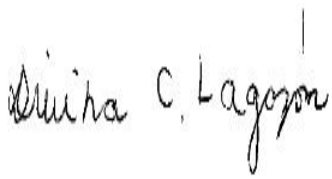
NW583 **Dissolved Arsenic:** APHA Online Edition 3125 B mod.

ZM2GA **Escherichia coli E (Water) [NZ] <100 >6 000 000 /100 ml (0-3) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager - Wellington

Hannah Smith Laboratory Supervisor Microbiology

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⑨ Test is RLP accredited
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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-080419-01	REPORT DATE	23/12/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00222678

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2024-00189558		
Sample Name	381156-0		
Product:	Ground water		
Sampling Point code:	WIL-HS2	**Sampling Point name:**	Levin HS2
Reception Date & Time:	13/12/2024 18:03		
Analysis Started on:	14/12/2024	**Analysis Ending Date:**	23/12/2024
Product Type	Ground water	**Sampled Date & Time**	12/12/2024 08:20
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	0.63	(± 0.06) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	16	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	21.7	(± 2.17) mg/l	0.02
NW023 **Conductivity**			
Conductivity	21.9	(± 0.4) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.005	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.002	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	0.037	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	10.4	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.116	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	5.84	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0122	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	3.25	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.127	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	20.4	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	900	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.11	(± 0.01) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	6.5	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	16.5	(± 1.65) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	<6	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	51	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	50	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	5.6	mg/l	0.1

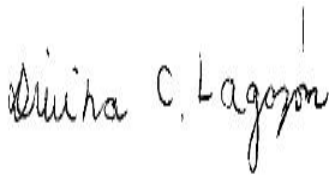
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

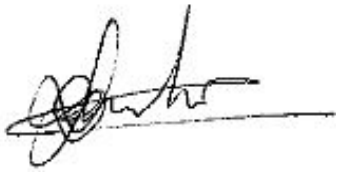
Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst
Eurofins ELS Limited



Ganesh Ilancko Supervisor Eurofins ELS Limited

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

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Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-005947-01	REPORT DATE	29/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00227605

SAMPLE CODE	812-2025-00006936		
Sample Name	386265-0		
Product:	Levin HS2		
Sampling Point code:	WIL-HS2	**Sampling Point name:**	Levin HS2
Reception Date & Time:	15/01/2025 18:35		
Analysis Started on:	16/01/2025	**Analysis Ending Date:**	29/01/2025
Sampled Date & Time	14/01/2025 00:00	**Sampler(s)**	Customer

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
①NWWG6	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.58	(± 0.06) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	28	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	25.3	(± 2.53) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	25.8	(± 0.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.004	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.052	mg/l	0.005

		RESULTS (UNCERTAINTY)		LOQ
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	13.6	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0031	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.057	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	8.21	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.191	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	4.38	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.125	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	23.9	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	300	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.02	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.4	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	11.3	(± 1.13) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	16	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	68	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	68	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	9.8	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW007 **Chloride:** APHA Online Edition 4110 B

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85 Port Road
Seaview
Lower Hutt
Wellington 5010
NEW ZEALAND

Phone +64 4 576 5016
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NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW030	**Total Hardness:** APHA Online Edition 2340 B	NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.	NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.	NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.	NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.	NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B	NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B	NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.	NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition		

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-074406-01	REPORT DATE	30/11/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Landmark (Phil.Landmark@stantec.com), Wardlaw (Scottw@horowhenua.govt.nz)

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00218171

Purchase Order Number: Landfill

SAMPLE CODE	812-2024-00175682		
Sample Name	378359-0		
Product:	Ground water		
Sampling Point code:	WIL-HS3	**Sampling Point name:**	Levin HS3
Reception Date & Time:	22/11/2024 9:40		
Analysis Started on:	22/11/2024	**Analysis Ending Date:**	30/11/2024
Product Type	Ground water	**Sampled Date & Time**	21/11/2024 07:40
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
NW00U	**Chlorophenols**			
	2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
	2,4-Dichlorophenol	<0.01	mg/l	0.01
	2,6-Dichlorophenol	<0.2	mg/l	0.2
	2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
	3,4,5-Trichlorophenol	<0.01	mg/l	0.01
	4-Chloro-3-cresol	<0.01	mg/l	0.01
	Pentachlorophenol	<0.005	mg/l	0.005
	Phenol	<0.01	mg/l	0.01
	Total of 2,4,5 & 2,4,6 -Trichlorophenol	<0.02	mg/l	0.02
①**NWWG6**	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	0.19	(± 0.02) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	2	mg/l	1

		RESULTS	(UNCERTAINTY)	LOQ
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	27	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	21.7	(± 2.17) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	22.5	(± 0.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.028	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.057	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	10.6	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0010	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.208	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	7.24	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0837	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0008	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	2.96	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.137	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	19.9	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	0.002	mg/l	0.002
ZM2GA	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	100	cfu/100 ml	100
NW010	**Nitrate-N**			
	Nitrate-N	0.27	(± 0.03) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.6	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	18.4	(± 1.84) mg/l	0.02

		RESULTS (UNCERTAINTY)		LOQ
NW206	**Suspended Solids**			
	Suspended Solids	11	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	51	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	56	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	6.4	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW00U **Chlorophenols:** Internal Method, LC-MS/MS

NW011 **Sulphate:** APHA Online Edition 4110 B

NW023 **Conductivity:** APHA 24th Edition 2510 B

NW098 **Dissolved Aluminium:** APHA Online Edition 3125 B mod.

NW104 **Dissolved Cadmium:** APHA Online Edition 3125 B mod.

NW106 **Dissolved Chromium:** APHA Online Edition 3125 B mod.

NW109 **Dissolved Iron:** APHA Online Edition 3125 B mod.

NW112 **Dissolved Magnesium:** APHA Online Edition 3125 B mod.

NW114 **Dissolved Mercury:** APHA Online Edition 3125 B mod.

NW117 **Dissolved Potassium:** APHA Online Edition 3125 B mod.

NW125 **Dissolved Zinc:** APHA Online Edition 3125 B mod.

NW193 **Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G

NW206 **Suspended Solids:** APHA Online Edition 2540 D

NW341 **BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B

NWWG6 **Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

NW007 **Chloride:** APHA Online Edition 4110 B

NW010 **Nitrate-N:** APHA Online Edition 4110 B

NW020 **Chemical Oxygen Demand:** APHA Online Edition 5220 D

NW030 **Total Hardness:** APHA Online Edition 2340 B

NW103 **Dissolved Boron:** APHA Online Edition 3125 B mod.

NW105 **Dissolved Calcium:** APHA Online Edition 3125 B mod.

NW108 **Dissolved Copper:** APHA Online Edition 3125 B mod.

NW110 **Dissolved Lead:** APHA Online Edition 3125 B mod.

NW113 **Dissolved Manganese:** APHA Online Edition 3125 B mod.

NW116 **Dissolved Nickel:** APHA Online Edition 3125 B mod.

NW120 **Dissolved Sodium:** APHA Online Edition 3125 B mod.

NW179 **Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H

NW195 **pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B

NW210 **Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B

NW583 **Dissolved Arsenic:** APHA Online Edition 3125 B mod.

ZM2GA **Escherichia coli E (Water) [NZ] <100 >6 000 000 /100 ml (0-3) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager - Wellington

Hannah Smith Laboratory Supervisor Microbiology

EXPLANATORY NOTE

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85 Port Road
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Phone +64 4 576 5016
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The Customer acknowledges that the Services are provided using the current state of technology and methods developed and generally applied by Eurofins and involve analysis, interpretations, consulting work and conclusions. Eurofins shall use commercially reasonable degree of care in providing the Services.
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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-080868-01	REPORT DATE	26/12/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00222678

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2024-00189561		
Sample Name	381157-0		
Product:	Ground water		
Sampling Point code:	WIL-HS3	**Sampling Point name:**	Levin HS3
Reception Date & Time:	13/12/2024 18:14		
Analysis Started on:	14/12/2024	**Analysis Ending Date:**	25/12/2024
Product Type	Ground water	**Sampled Date & Time**	12/12/2024 08:35
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	0.15	(± 0.02) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	26	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	22.1	(± 2.21) mg/l	0.02
NW023 **Conductivity**			
Conductivity	22.1	(± 0.4) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.004	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.002	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	0.031	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	9.41	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.147	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	4.70	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.0165	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	2.93	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.143	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	18.7	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	>6000	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.16	(± 0.02) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.2	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	16.4	(± 1.64) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	<6	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	52	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	43	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	5.9	mg/l	0.1

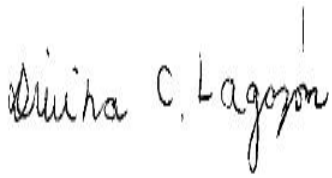
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

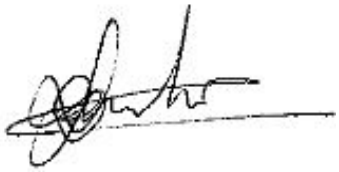
Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst
Eurofins ELS Limited



Ganesh Ilancko Supervisor Eurofins ELS Limited

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

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⑤Test is subcontracted outside Eurofins group and is not accredited
⑥Test result is provided by the customer and is not accredited
⑦Tested at the sampling point by Eurofins and is not accredited
⑧Tested at the sampling point by Eurofins and is accredited
⑨Test is RLP accredited
⑩Test is subcontracted within Eurofins group and is RLP accredited

N/A means Not Applicable
Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-005621-01	REPORT DATE	28/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill
Order code: EUNZWE-00227605

SAMPLE CODE	812-2025-00006941		
Sample Name	386286-0		
Product:	Levin HS3		
Sampling Point code:	WIL-HS3	**Sampling Point name:**	Levin HS3
Reception Date & Time:	15/01/2025 18:35		
Analysis Started on:	16/01/2025	**Analysis Ending Date:**	28/01/2025
Sampled Date & Time	14/01/2025 00:00	**Sampler(s)**	Customer

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
①NWWG6	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	1.75	(± 0.18) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	25	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	25.2	(± 2.52) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	26.1	(± 0.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.004	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.053	mg/l	0.005

		RESULTS (UNCERTAINTY)		LOQ
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	14.5	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	<0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0025	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.062	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	8.58	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.246	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	<0.0005	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	4.56	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.137	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	25.0	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	200	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.03	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.6	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	10.7	(± 1.07) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	8	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	69	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	72	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	9.7	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW007 **Chloride:** APHA Online Edition 4110 B

NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW030	**Total Hardness:** APHA Online Edition 2340 B	NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.	NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.	NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.	NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.	NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B	NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B	NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.	NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition		

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

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⑤Test is subcontracted outside Eurofins group and is not accredited
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⑦Tested at the sampling point by Eurofins and is not accredited
⑧Tested at the sampling point by Eurofins and is accredited
⑨Test is RLP accredited
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Not Detected means not detected at or above the Limit of Quantification (LOQ)
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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-075066-01	REPORT DATE	03/12/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Landmark (Phil.Landmark@stantec.com), Wardlaw (Scottw@horowhenua.govt.nz)

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00218171

Purchase Order Number: Landfill

SAMPLE CODE	812-2024-00175675		
Sample Name	378357-0		
Product:	Ground water		
Sampling Point code:	WIL-LP	**Sampling Point name:**	Levin Leachate Pond
Reception Date & Time:	22/11/2024 9:40		
Analysis Started on:	22/11/2024	**Analysis Ending Date:**	03/12/2024
Product Type	Ground water	**Sampled Date & Time**	21/11/2024 08:30
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS	RESULTS	(UNCERTAINTY)	LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS	(UNCERTAINTY)	LOQ
NW179 Ammonia Nitrogen			
Ammoniacal nitrogen (N)	1320	(± 132) mg/l	0.01
NW341 BOD5 - Soluble Carbonaceous			
BOD5	102	mg/l	1
NW020 Chemical Oxygen Demand			
Chemical oxygen demand (COD)	5190	mg/l	15
NW007 Chloride			
Chloride (Cl)	1310	(± 131) mg/l	0.02
NW023 Conductivity			
Conductivity	1530	(± 30.7) mS/m	0.1
NW098 Dissolved Aluminium			
Aluminium	0.785	mg/l	0.002
NW583 Dissolved Arsenic			
Arsenic (As)	0.244	mg/l	0.001
NW103 Dissolved Boron			

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	6.09	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	84.7	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	0.718	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0049	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	7.17	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	49.4	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	1.19	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.112	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	709	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	14.9	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	1080	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	0.046	mg/l	0.002
ZM2GA	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	<100	cfu/100 ml	100
NW010	**Nitrate-N**			
	Nitrate-N	<0.1	mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.7	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	41.4	(± 4.14) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	274	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	6990	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	415	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	780	mg/l	0.1

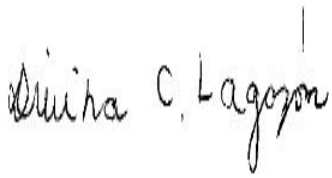
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM2GA	**Escherichia coli E (Water) [NZ] <100 >6 000 000 /100 ml (0-3) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

Marylou Cabral Laboratory Manager Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager - Wellington

Vineel Chandra Laboratory Supervisor Microbiology

EXPLANATORY NOTE

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②Test is subcontracted within Eurofins group and is accredited
③Test is subcontracted within Eurofins group and is not accredited
④Test is subcontracted outside Eurofins group and is accredited
⑤Test is subcontracted outside Eurofins group and is not accredited
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⑧Tested at the sampling point by Eurofins and is accredited
⑨Test is RLP accredited
⑩Test is subcontracted within Eurofins group and is RLP accredited

N/A means Not Applicable
Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓ (Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-000364-01	REPORT DATE	04/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00222678

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2024-00189553		
Sample Name	381155-0		
Product:	Ground water		
Sampling Point code:	WIL-LP	**Sampling Point name:**	Levin Leachate Pond
Reception Date & Time:	13/12/2024 17:25		
Analysis Started on:	14/12/2024	**Analysis Ending Date:**	04/01/2025
Product Type	Ground water	**Sampled Date & Time**	12/12/2024 21:10
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
①NWWG6	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	9.6	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	4.4	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	1180	(± 118) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	57	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	3010	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	1180	(± 118) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	152	(± 3.0) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.751	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.248	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	3.39	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	75.1	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	0.544	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0040	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	7.08	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	0.0015	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	48.3	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	1.12	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.123	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	549	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	13.6	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	815	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	0.043	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	>600	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.1	mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.7	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	56.7	(± 5.67) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	48	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	6960	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	387	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	667	mg/l	0.1

LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

Marylou Cabral	Laboratory Manager Eurofins ELS Limited	**Jennifer Mont**	Supervisor Eurofins ELS Limited	**Divina Cunanan Lagazon**	Supervisor Eurofins ELS Limited
Gordon McArthur	Senior Laboratory Analyst Eurofins ELS Limited	**Ganesh Ilancko**	Supervisor Eurofins ELS Limited	**Gabriela Carvalhaes**	Business Unit Manager
Vineel Chandra	Laboratory Supervisor Microbiology	**Cody Forbes**	Technical Specialist Technical Specialist		

EXPLANATORY NOTE

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⑦ Tested at the sampling point by Eurofins and is not accredited
⑧ Tested at the sampling point by Eurofins and is accredited
⑨ Test is RLP accredited
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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE **AR-25-NW-005949-01** REPORT DATE **29/01/2025**

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill
Order code: EUNZWE-00227605

SAMPLE CODE **812-2025-00006939**

Sample Name 386264-0
Product: Levin Leachate Pond
Sampling Point code: WIL-LP
Sampling Point name: Levin Leachate Pond
Reception Date & Time: 15/01/2025 18:35
Analysis Started on: 16/01/2025
Analysis Ending Date: 29/01/2025
Sampled Date & Time 14/01/2025 00:00
Sampler(s) Customer

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	1240	(± 124) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	87	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	2480	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	1090	(± 109) mg/l	0.02
NW023 **Conductivity**			
Conductivity	1560	(± 31.1) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.641	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.275	mg/l	0.001
NW103 **Dissolved Boron**			
Boron (B)	5.27	mg/l	0.005

		RESULTS (UNCERTAINTY)		LOQ
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	80.4	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	0.628	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0293	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	8.01	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	0.0017	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	44.4	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	1.05	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.110	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	560	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	14.5	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	818	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	0.046	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	300	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	<0.1	mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.9	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	55.8	(± 5.58) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	83	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	7130	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	384	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	726	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW007 **Chloride:** APHA Online Edition 4110 B

Eurofins ELS Limited
85 Port Road
Seaview
Lower Hutt
Wellington 5010
NEW ZEALAND

Phone +64 4 576 5016
www.eurofins.co.nz

NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW030	**Total Hardness:** APHA Online Edition 2340 B	NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.	NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.	NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.	NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.	NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B	NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B	NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.	NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition		

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

EXPLANATORY NOTE

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LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
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✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

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END OF REPORT

Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-074407-01	REPORT DATE	30/11/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Landmark (Phil.Landmark@stantec.com), Wardlaw (Scottw@horowhenua.govt.nz)

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00218171

Purchase Order Number: Landfill

SAMPLE CODE	812-2024-00175686

Sample Name 378356-0
Product: Ground water
Sampling Point code: WIL-TD1
Sampling Point name: Levin TD1
Reception Date & Time: 22/11/2024 9:40
Analysis Started on: 22/11/2024
Analysis Ending Date: 30/11/2024
Product Type Ground water
Sampled Date & Time 21/11/2024 07:55
Sampler(s) Client nominated external sampler
Sampled by Eurofins No

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
NW00U Chlorophenols			
2,3,4,6-Tetrachlorophenol	<0.01	mg/l	0.01
2,4-Dichlorophenol	<0.01	mg/l	0.01
2,6-Dichlorophenol	<0.2	mg/l	0.2
2-Chlorophenol (o-chlorophenol)	<0.01	mg/l	0.01
3,4,5-Trichlorophenol	<0.01	mg/l	0.01
4-Chloro-3-cresol	<0.01	mg/l	0.01
Pentachlorophenol	<0.005	mg/l	0.005
Phenol	<0.01	mg/l	0.01
Total of 2,4,5 & 2,4,6 -Trichlorophenol	<0.02	mg/l	0.02
①NWWG6 Volatile Fatty Acids (VFA)			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 Ammonia Nitrogen			
Ammoniacal nitrogen (N)	10.3	(± 1.03) mg/l	0.01
NW341 BOD5 - Soluble Carbonaceous			
BOD5	<6	mg/l	1

		RESULTS (UNCERTAINTY)		LOQ
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	83	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	77.3	(± 7.73) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	90.1	(± 1.8) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.007	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.281	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	54.1	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.891	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	26.0	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.710	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0016	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	20.0	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.033	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	61.3	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM2GA	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	100	cfu/100 ml	100
NW010	**Nitrate-N**			
	Nitrate-N	0.02	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	8.0	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	1.40	(± 0.14) mg/l	0.02

		RESULTS (UNCERTAINTY)		LOQ
NW206	**Suspended Solids**			
	Suspended Solids	20	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	353	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	242	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	23.6	mg/l	0.1

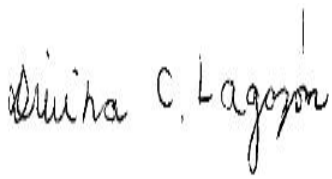
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B	NW007	**Chloride:** APHA Online Edition 4110 B
NW00U	**Chlorophenols:** Internal Method, LC-MS/MS	NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B	NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW023	**Conductivity:** APHA 24th Edition 2510 B	NW030	**Total Hardness:** APHA Online Edition 2340 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.	NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.	NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.	NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.	NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.	NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.	NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.	NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.	NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G	NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW206	**Suspended Solids:** APHA Online Edition 2540 D	NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B	NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.	ZM2GA	**Escherichia coli E (Water) [NZ] <100 >6 000 000 /100 ml (0-3) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition

Signature

Marylou Cabral Laboratory Manager Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager - Wellington

Hannah Smith Laboratory Supervisor Microbiology

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-24-NW-080865-01	REPORT DATE	26/12/2024

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill

Order code: EUNZWE-00222678

Purchase Order Number: 144482 - landfill

SAMPLE CODE	812-2024-00189555		
Sample Name	381154-0		
Product:	Ground water		
Sampling Point code:	WIL-TD1	**Sampling Point name:**	Levin TD1
Reception Date & Time:	13/12/2024 17:31		
Analysis Started on:	14/12/2024	**Analysis Ending Date:**	25/12/2024
Product Type	Ground water	**Sampled Date & Time**	12/12/2024 08:55
Sampler(s)	Client nominated external sampler	**Sampled by Eurofins**	No

ORGANICS	RESULTS (UNCERTAINTY)		LOQ
①NWWG6 **Volatile Fatty Acids (VFA)**			
Acetic acid	<5	mg/l	5
Butyric acid	<5	mg/l	5
Heptanoic acid	<5	mg/l	5
Hexanoic acid	<5	mg/l	5
Isocaproic acid	<5	mg/l	5
Isobutyric acid	<5	mg/l	5
Isovaleric acid	<5	mg/l	5
Propionic acid	<5	mg/l	5
Valeric acid	<5	mg/l	5
Volatile fatty acids as acetic acid	<5	mg/l	5

	RESULTS (UNCERTAINTY)		LOQ
NW179 **Ammonia Nitrogen**			
Ammoniacal nitrogen (N)	7.40	(± 0.74) mg/l	0.01
NW341 **BOD5 - Soluble Carbonaceous**			
BOD5	<3	mg/l	1
NW020 **Chemical Oxygen Demand**			
Chemical oxygen demand (COD)	76	mg/l	15
NW007 **Chloride**			
Chloride (Cl)	77.8	(± 7.78) mg/l	0.02
NW023 **Conductivity**			
Conductivity	84.9	(± 1.7) mS/m	0.1
NW098 **Dissolved Aluminium**			
Aluminium	0.008	mg/l	0.002
NW583 **Dissolved Arsenic**			
Arsenic (As)	0.002	mg/l	0.001

		RESULTS (UNCERTAINTY)		LOQ
NW103	**Dissolved Boron**			
	Boron (B)	0.162	mg/l	0.005
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	45.6	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	<0.0005	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	2.04	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	16.8	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.529	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0017	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	21.4	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.014	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	56.9	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	1200	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.09	(± 0.01) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	7.2	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	1.52	(± 0.15) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	9	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	316	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	183	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	24.0	mg/l	0.1

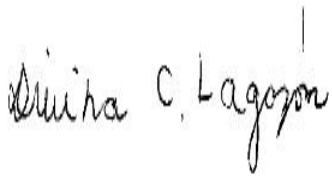
LIST OF METHODS

NW003	**Total Alkalinity:** APHA Online Edition 2320 B
NW010	**Nitrate-N:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D
NW030	**Total Hardness:** APHA Online Edition 2340 B
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition
NW007	**Chloride:** APHA Online Edition 4110 B
NW011	**Sulphate:** APHA Online Edition 4110 B
NW023	**Conductivity:** APHA 24th Edition 2510 B
NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.

Signature

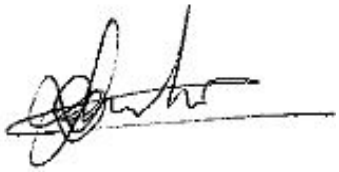
Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited



Divina Cunanan Lagazon Supervisor Eurofins ELS Limited

Gordon McArthur Senior Laboratory Analyst
Eurofins ELS Limited



Ganesh Ilancko Supervisor Eurofins ELS Limited

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END OF REPORT

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Food & Water Testing

ANALYTICAL REPORT

REPORT CODE	AR-25-NW-005620-01	REPORT DATE	28/01/2025

Attention Horowhenua District Council
Lab Results
P O Box 642
4741 Levin
NEW ZEALAND

Phone (06) 367 2705
Email labresults@horowhenua.govt.nz

Copy to: McMillan (Davidm@horowhenua.govt.nz), Results (labresults@horowhenua.govt.nz), Landmark

Contact for your orders: Gabriela Carvalhaes
Contract: Levin Landfill
Order code: EUNZWE-00227605

SAMPLE CODE	812-2025-00006938		
Sample Name	386263-0		
Product:	Levin TD 1		
Sampling Point code:	WIL-TD1	**Sampling Point name:**	Levin TD1
Reception Date & Time:	15/01/2025 18:35		
Analysis Started on:	16/01/2025	**Analysis Ending Date:**	28/01/2025
Sampled Date & Time	14/01/2025 00:00	**Sampler(s)**	Customer

ORGANICS		RESULTS (UNCERTAINTY)		LOQ
①NWWG6	**Volatile Fatty Acids (VFA)**			
	Acetic acid	<5	mg/l	5
	Butyric acid	<5	mg/l	5
	Heptanoic acid	<5	mg/l	5
	Hexanoic acid	<5	mg/l	5
	Isocaproic acid	<5	mg/l	5
	Isobutyric acid	<5	mg/l	5
	Isovaleric acid	<5	mg/l	5
	Propionic acid	<5	mg/l	5
	Valeric acid	<5	mg/l	5
	Volatile fatty acids as acetic acid	<5	mg/l	5

		RESULTS (UNCERTAINTY)		LOQ
NW179	**Ammonia Nitrogen**			
	Ammoniacal nitrogen (N)	21.7	(± 2.17) mg/l	0.01
NW341	**BOD5 - Soluble Carbonaceous**			
	BOD5	<3	mg/l	1
NW020	**Chemical Oxygen Demand**			
	Chemical oxygen demand (COD)	156	mg/l	15
NW007	**Chloride**			
	Chloride (Cl)	87.7	(± 8.77) mg/l	0.02
NW023	**Conductivity**			
	Conductivity	124	(± 2.5) mS/m	0.1
NW098	**Dissolved Aluminium**			
	Aluminium	0.004	mg/l	0.002
NW583	**Dissolved Arsenic**			
	Arsenic (As)	0.002	mg/l	0.001
NW103	**Dissolved Boron**			
	Boron (B)	0.333	mg/l	0.005

		RESULTS (UNCERTAINTY)		LOQ
NW104	**Dissolved Cadmium**			
	Cadmium (Cd)	<0.0002	mg/l	0.0002
NW105	**Dissolved Calcium**			
	Calcium (Ca)	86.0	mg/l	0.05
NW106	**Dissolved Chromium**			
	Chromium (Cr)	0.001	mg/l	0.001
NW108	**Dissolved Copper**			
	Copper (Cu)	0.0022	mg/l	0.0005
NW109	**Dissolved Iron**			
	Iron (Fe)	0.082	mg/l	0.005
NW110	**Dissolved Lead**			
	Lead (Pb)	<0.0005	mg/l	0.0005
NW112	**Dissolved Magnesium**			
	Magnesium (Mg)	33.1	mg/l	0.01
NW113	**Dissolved Manganese**			
	Manganese (Mn)	0.689	mg/l	0.0005
NW114	**Dissolved Mercury**			
	Mercury (Hg)	<0.0005	mg/l	0.0005
NW116	**Dissolved Nickel**			
	Nickel (Ni)	0.0025	mg/l	0.0005
NW117	**Dissolved Potassium**			
	Potassium (K)	25.7	mg/l	0.01
NW193	**Dissolved Reactive Phosphorus**			
	Phosphorus (soluble reactive)	0.103	mg/l	0.005
NW120	**Dissolved Sodium**			
	Sodium (Na)	75.6	mg/l	0.01
NW125	**Dissolved Zinc**			
	Zinc (Zn)	<0.002	mg/l	0.002
ZM0UX	**Enumeration of Escherichia coli by Membrane Filtration**			
	Escherichia coli	56	cfu/100 ml	1
NW010	**Nitrate-N**			
	Nitrate-N	0.03	(± 0.00) mg/l	0.01
NW195	**pH (Tested beyond 15 minute APHA holding time)**			
	pH	8.0	(± 0.2)	0.1
NW011	**Sulphate**			
	Sulphate	1.33	(± 0.13) mg/l	0.02
NW206	**Suspended Solids**			
	Suspended Solids	186	mg/l	3
NW003	**Total Alkalinity**			
	Alkalinity total	511	mg CaCO3/l	1
NW030	**Total Hardness**			
	Hardness	351	mg CaCO3/l	1
NW210	**Total Non-Purgeable Organic Carbon**			
	Total Organic Carbon	37.4	mg/l	0.1

LIST OF METHODS

NW003 **Total Alkalinity:** APHA Online Edition 2320 B

NW007 **Chloride:** APHA Online Edition 4110 B

NW010	**Nitrate-N:** APHA Online Edition 4110 B	NW011	**Sulphate:** APHA Online Edition 4110 B
NW020	**Chemical Oxygen Demand:** APHA Online Edition 5220 D	NW023	**Conductivity:** APHA 24th Edition 2510 B
NW030	**Total Hardness:** APHA Online Edition 2340 B	NW098	**Dissolved Aluminium:** APHA Online Edition 3125 B mod.
NW103	**Dissolved Boron:** APHA Online Edition 3125 B mod.	NW104	**Dissolved Cadmium:** APHA Online Edition 3125 B mod.
NW105	**Dissolved Calcium:** APHA Online Edition 3125 B mod.	NW106	**Dissolved Chromium:** APHA Online Edition 3125 B mod.
NW108	**Dissolved Copper:** APHA Online Edition 3125 B mod.	NW109	**Dissolved Iron:** APHA Online Edition 3125 B mod.
NW110	**Dissolved Lead:** APHA Online Edition 3125 B mod.	NW112	**Dissolved Magnesium:** APHA Online Edition 3125 B mod.
NW113	**Dissolved Manganese:** APHA Online Edition 3125 B mod.	NW114	**Dissolved Mercury:** APHA Online Edition 3125 B mod.
NW116	**Dissolved Nickel:** APHA Online Edition 3125 B mod.	NW117	**Dissolved Potassium:** APHA Online Edition 3125 B mod.
NW120	**Dissolved Sodium:** APHA Online Edition 3125 B mod.	NW125	**Dissolved Zinc:** APHA Online Edition 3125 B mod.
NW179	**Ammonia Nitrogen:** APHA Online Edition 4500-NH3 H	NW193	**Dissolved Reactive Phosphorus:** APHA Online Edition 4500-P G
NW195	**pH (Tested beyond 15 minute APHA holding time):** APHA 24th Edition 4500-H B	NW206	**Suspended Solids:** APHA Online Edition 2540 D
NW210	**Total Non-Purgeable Organic Carbon:** APHA Online Edition 5310 B	NW341	**BOD5 - Soluble Carbonaceous:** APHA Online Edition 5210 B
NW583	**Dissolved Arsenic:** APHA Online Edition 3125 B mod.	NWWG6	**Volatile Fatty Acids (VFA):** APHA 24th Edition 5560 D mod.
ZM0UX	**Escherichia coli E (Water) [NZ] <1 >6 000 /100 ml (0) m-FC Agar-F:** SMEWW 9222I; APHA 24th Edition		

Signature

Marylou Cabral Laboratory Manager
Eurofins ELS Limited

Jennifer Mont Supervisor Eurofins ELS Limited

Ganesh Ilancko Supervisor Eurofins ELS Limited

Gabriela Carvalhaes Business Unit Manager

Vineel Chandra Laboratory Supervisor Microbiology

Cody Forbes Technical Specialist
Technical Specialist

EXPLANATORY NOTE

①Test is not accredited
②Test is subcontracted within Eurofins group and is accredited
③Test is subcontracted within Eurofins group and is not accredited
④Test is subcontracted outside Eurofins group and is accredited
⑤Test is subcontracted outside Eurofins group and is not accredited
⑥Test result is provided by the customer and is not accredited
⑦Tested at the sampling point by Eurofins and is not accredited
⑧Tested at the sampling point by Eurofins and is accredited
⑨Test is RLP accredited
⑩Test is subcontracted within Eurofins group and is RLP accredited

N/A means Not Applicable
Not Detected means not detected at or above the Limit of Quantification (LOQ)
LOQ means Limit of Quantification and the unit of LOQ is the same as the result unit
✗ (Unsatisfactory) means does not meet the specification
✓(Satisfactory) means meets the specification
MAV means Maximum Allowable Value

The Customer acknowledges and accepts that: (a) where Eurofins is not responsible for sampling, the test result(s) in this report apply only to the sample as received. Customer is solely responsible for the sampling process and warrants that the sample provided to Eurofins is representative of the lot / batch from which the samples were drawn; and (b) Eurofins expresses no opinion and accepts no liability in respect of the Customer's production process or homogeneity of the product.
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END OF REPORT

Appendix C Sampling Schedule

LEVIN LANDFILL - SUMMARY OF SURFACE AND GROUNDWATER MONITORING REQUIREMENTS (July 2023 - April 2026).

(The testing regime is based on Consent Conditions following the completion of the 2015 Resource Consent Review process).

Reports Due		Sampling Month	Table A (Condition 3, ATH-2002003983.02, formerly DP 6010)						Table B (Condition 3, ATH-2002003983.02, formerly DP 6010)																				Table C (Condition 3, ATH-2002003983.02, formerly DP 6010)					
			Deep Aquifer Bores						Shallow Aquifer Bores																Irrigation Bores				Hokio Stream[4], [8]				Northern Farm Drain[9]	Leachate Pond[5]
Annual	Quarterly		C2dd	E1d	E2d	G1d	Xd1	D3rd[1]	C1	C2[6]	C2ds[6]	D4	B1	B2	B3s	E1s	E2s	D1[2]	D2[2]	D3rs[1,2]	D6[2]	G1s	G2s	Xs1[6]	Xs2[6]	D5[3]	F1[3]	F2[3]	F3[3]	HS1	HS1A	HS2	HS3	TD1[7]	
Sep-23	**Aug-23**	**Jul-23**	I	I + SW	I	I	C	C	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	C + SW	I	I + SW	I	C	C	I	I	I	I + SW	Monthly Compre.	Monthly Compre.	Monthly Compre.	Monthly Compre.	Monthly Compre.	Monthly Compre.
	Nov-23	**Oct-23**	I	I + SW	I	I	C	C	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	C + SW	I	I + SW	I	C	C	I	I	I	I + SW						
	Feb-24	**Jan-24**	I	I + SW	I	I	C	C	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	C + SW	I	I + SW	I	C	C	I	I	I	I + SW		I	I	I	I	I
	May-24	**Apr-24**	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A		C	C	C	C	C + A
Sep-24	**Aug-24**	**Jul-24**	I	I + SW	I	I	I	C	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	C + SW	I	I + SW	I	I	I	I	I	I	I + SW		I	I	I	I	I
	Nov-24	**Oct-24**	I	I + SW	I	I	I	C	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	C + SW	I	I + SW	I	I	I	I	I	I	I + SW		C	C	C	C	C
	Feb-25	**Jan-25**	I	I + SW	I	I	I	C	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	C + SW	I	I + SW	I	I	I	I	I	I	I + SW		I	I	I	I	I
	May-25	**Apr-25**	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A		C	C	C	C	C + A
Sep-25	**Aug-25**	**Jul-25**	I	I + SW	I	I	I	I	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	I + SW	I	I + SW	I	I	I	I	I	I	I + SW		I	I	I	I	I
	Nov-25	**Oct-25**	I	I + SW	I	I	I	I	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	I + SW	I	I + SW	I	I	I	I	I	I	I + SW		C	C	C	C	C
	Feb-26	**Jan-26**	I	I + SW	I	I	I	I	I	I	I	I + SW	I	I	I	I + SW	I + SW	I	I + SW	I + SW	I	I + SW	I	I	I	I	I	I	I + SW		I	I	I	I	I
	May-26	**Apr-26**	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A	C + A		C	C	C	C	C + A

Sampling at HS1 to be discontinued when HRC advises.

Measure groundwater level and sample all bores for CH_4, CO_2 and O_2 each time that groundwater is sampled (Condition 4a of DP 6011)

Notes:

(1) Replacement bore D3r consists of two nested piezometers that have been called D3rs and D3rd. Testing for comprehensive to continue to provide 2 year's of comprehensive monitoring.
(2) See table below
(3) If irrigation re-commences then the annual sampling is to change from comprehensive + 3 times indicator to bi-annual comprehensive + indicator (Clause D of Condition 3, DP 6010) .
(4) See table below
(5) See table below
(6) Measure water level at C2, C2ds, Xs1 and Xs2 when taking monthly samples at TD1 and within the Hokio Stream. Testing of X-series bores to continue at comprehensive to provide 2 year's of comprehensive data.
(7) Start taking comprehensive samples at TD1 every month when sampling the Hokio Stream sites. Also note the depth of water in the drain invert at TD1. Continue monthly comprehensive sampling to October 2023 to give 24 month's continuous data.
(8) Start measuring approximately the depth of flow in the Hokio Stream at each sampling site when sampling monthly. Monthly sampling at comprehensive level to continue to, and including, October 2023, to give a full continuous 24 months of data.
(9) Northern Farm Drain is a name change from the former 'Tatana Drain'
C Comprehensive list (see below)
I Indicator list (see below)
A Pesticide and SVOC analysis
SW Add sodium and iron analysis (for stormwater consent 102559)

A reduction in sampling frequency at any **groundwater monitoring point** is conditional on (Clauses A - D of Condition 3, DP 6010):

A. Completion of the initial monitoring program;
B. Good consistency of groundwater sample analysis results, or a clearly identified reason for inconsistent results that excludes the contaminant source being landfill operations, stored waste or leachate;
C. No decline in groundwater quality as determined from indicator parameter trends over a period of four consecutive sampling rounds;
D. If a well being monitored on a conditional frequency becomes non-compliant with condition C, the monitoring frequency for that well should return to the initial monitoring frequency until conditions B and C are again being fulfilled.

(2) If site management planning indicates any **early detection monitoring well** is likely to become buried or otherwise destroyed within the following year as a result of normal operations (Clauses E - H, Condition 3, DP 6010):

E. This must be communicated to the regional council;
F. A replacement well is to be constructed in a position agreed upon with Horizons Regional Council
G. The replacement well should be installed in a position suitable to act as a early detection well and be classed as an early detection well;
H. The replacement well should be constructed as a nested well (or two separate wells) with screens positioned in both shallow and deep aquifers.

(4) A reduction in sampling frequency at the **Hokio Stream monitoring locations (HS1A, HS2 and HS3)** is conditional on (Clauses I - L, Condition 3 of DP 6010):

I. No signficant increases in the concentrations between monitoring sites HS1A and HS3, for parameters exceeding the trigger values contained in Table C1 at Site HS3.
J. A statistical analysis approach is to be used to determine if there is a significant increase in contaminant levels between HS1A and HS3.
K. Following the 24 month monitoring period, there shall be no significant increases in concentrations between monitoring sites HS1A and HS3.
L. If the Hokio Stream monitoring locations are being sampled on a conditional frequency and do not meet condition K, the monitoring frequency for all three monitoring locations (HS1A, HS2 and HS3) shall return to the base case intensive monitoring until conditions J and K are again being fulfilled.

(5) A reduction in sampling frequency at the **leachate pond outlet** is conditional on (Clauses M - P, Condition 3, DP 6010):

M. Completion of the initial 2 year monitoring program;
N. Good consistency of water sample analysis results, or a clearly identified reason for inconsistent results;
O. No decline in water quality over a period of four consecutive sampling rounds;
P. If the leachate pond outlet is being sampled on a conditional frequency and becomes non-compliant with condition O, the monitoring frequency should return to the base case intensive monitoring until conditions N and O are again being fulfilled.

COMPREHENSIVE PARAMETER LIST (Table E of Condition 3, DP 6010)

Characterising parameters	pH
	electrical conductivity (EC)
	alkalinity
	total hardness
	suspended solids
Oxygen demand	COD and $scBOD_5$
Nutrients*	NO3-N, NH4-N, DRP and SO_4
Metals*	Al, As, Cd, Cr, Cu, Fe, Mg, Mn, Ni, Pb, Zn and Hg
Other elements	B, Ca, Cl, K and Na
Organics	Total organic carbon, total phenols, volatile acids
Biological	E. coli

* Analyses performed for nutrients and metals are for dissolved rather than total concentrations

INDICATOR PARAMETER LIST (Table F, Condition 3, DP 6010)

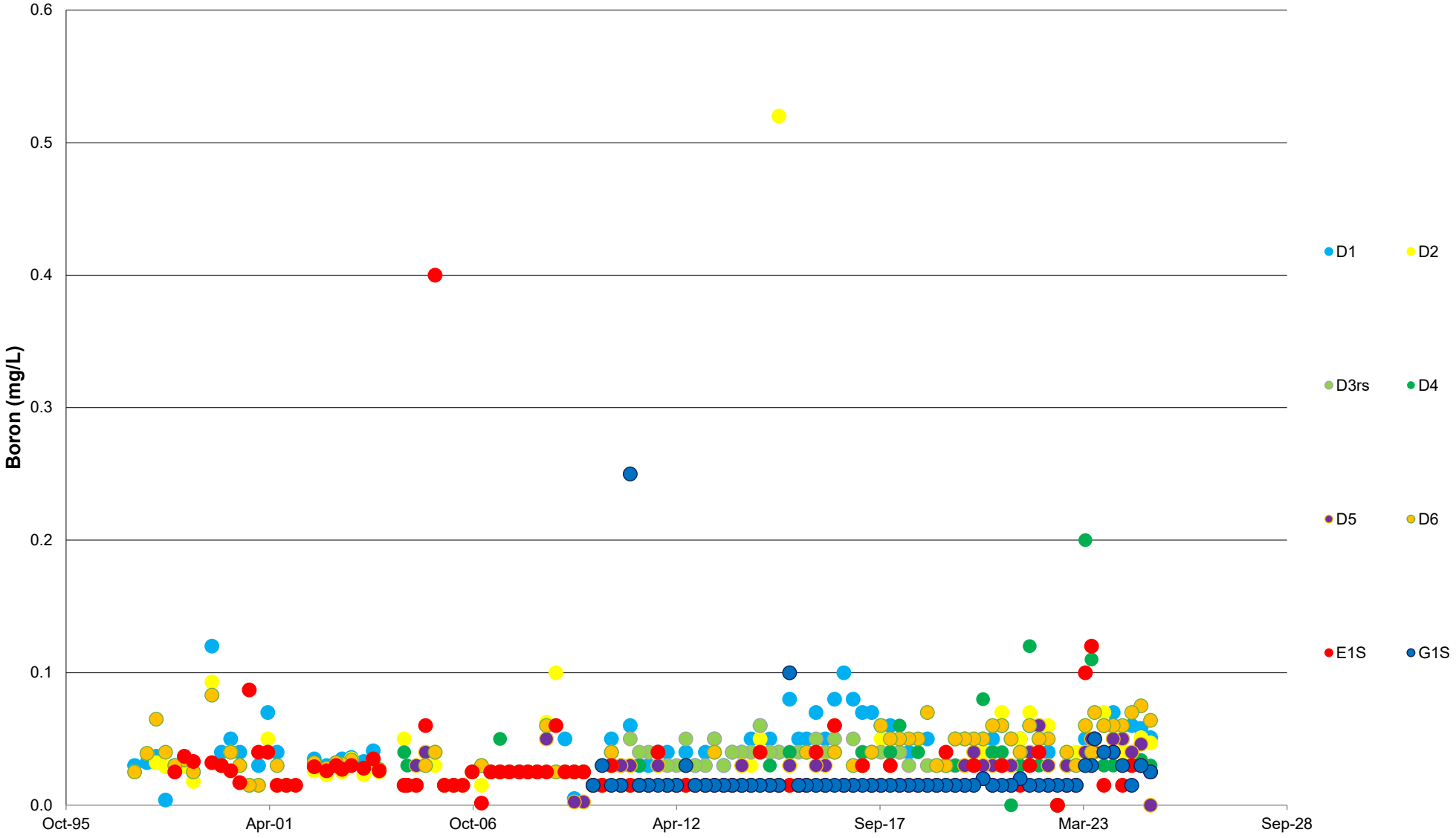
Characterising parameters	pH
	electrical conductivity (EC)
Oxygen demand	COD and $scBOD_5$
Nutrients*	NO3-N and NH4-N
Metals*	AL, Mn, Ni, Pb and Hg
Other elements	B and Cl
Biological+	E. coli

* Analyses performed for nutrients and metals are for dissolved rather than total concentrations

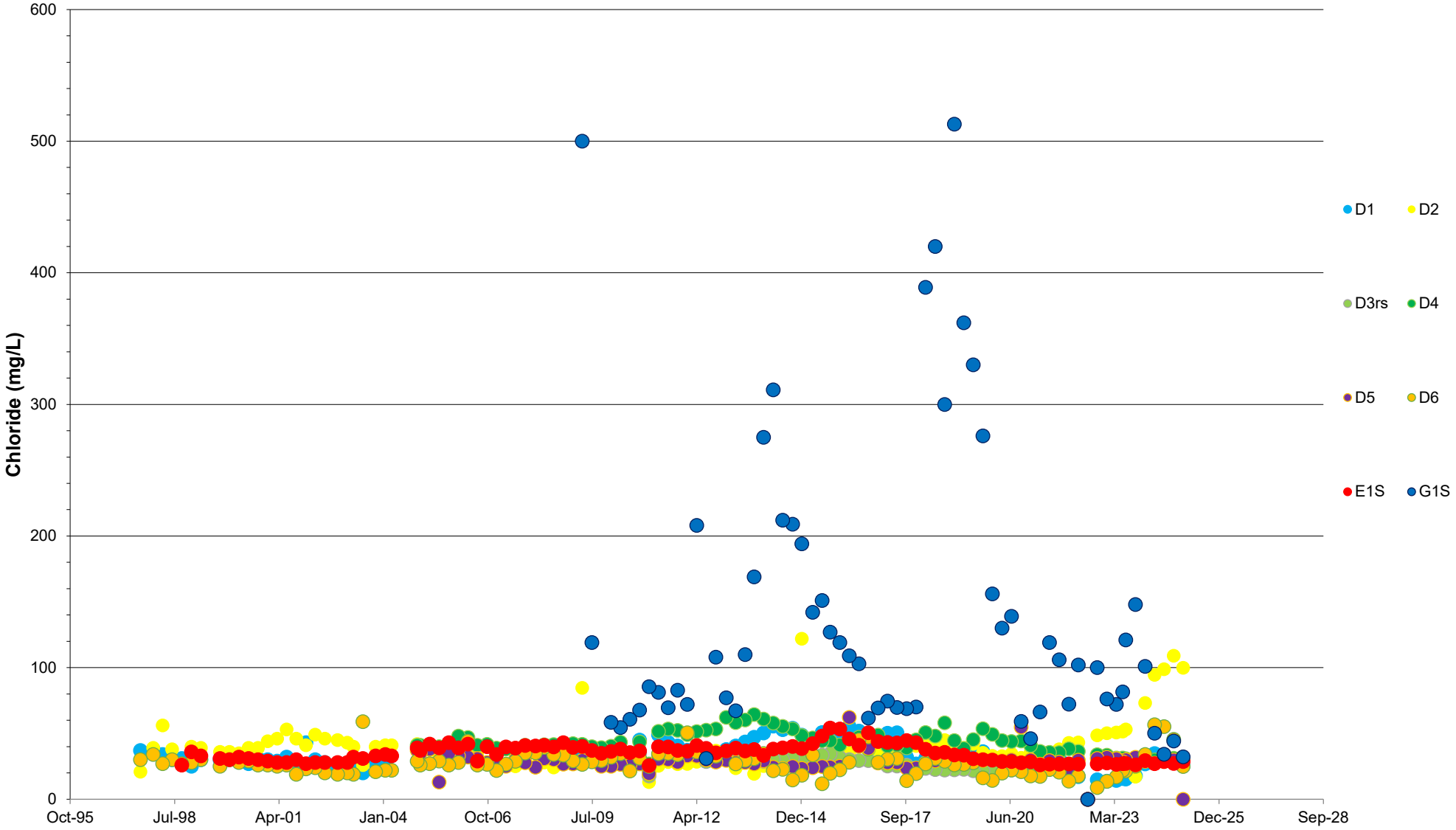
+ E. coli added from December 2019, with first sampling from April 2020 onwards

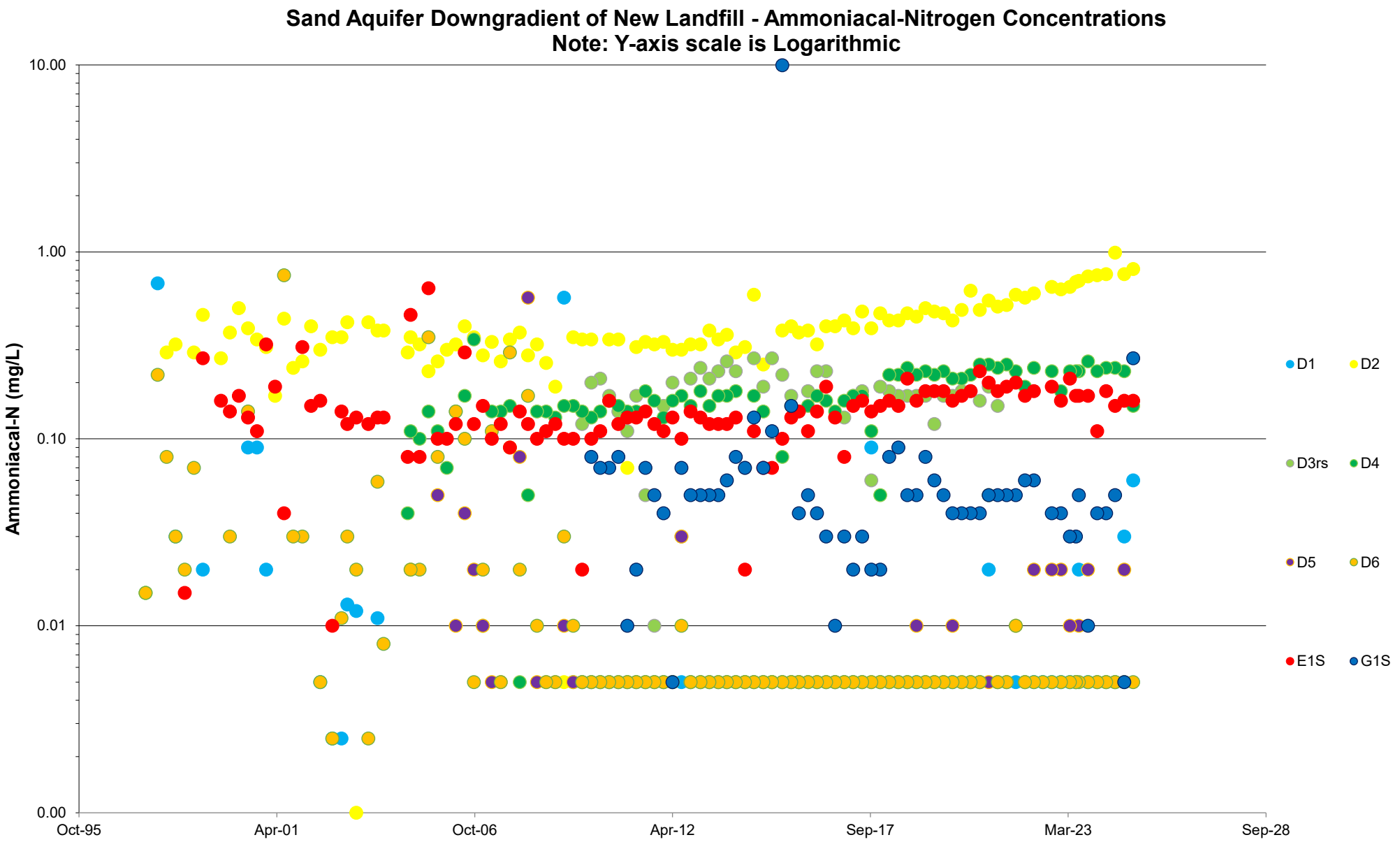
Appendix D Historical Results Graphs

Sand Aquifer Downgradient of New Landfill - Boron Concentrations

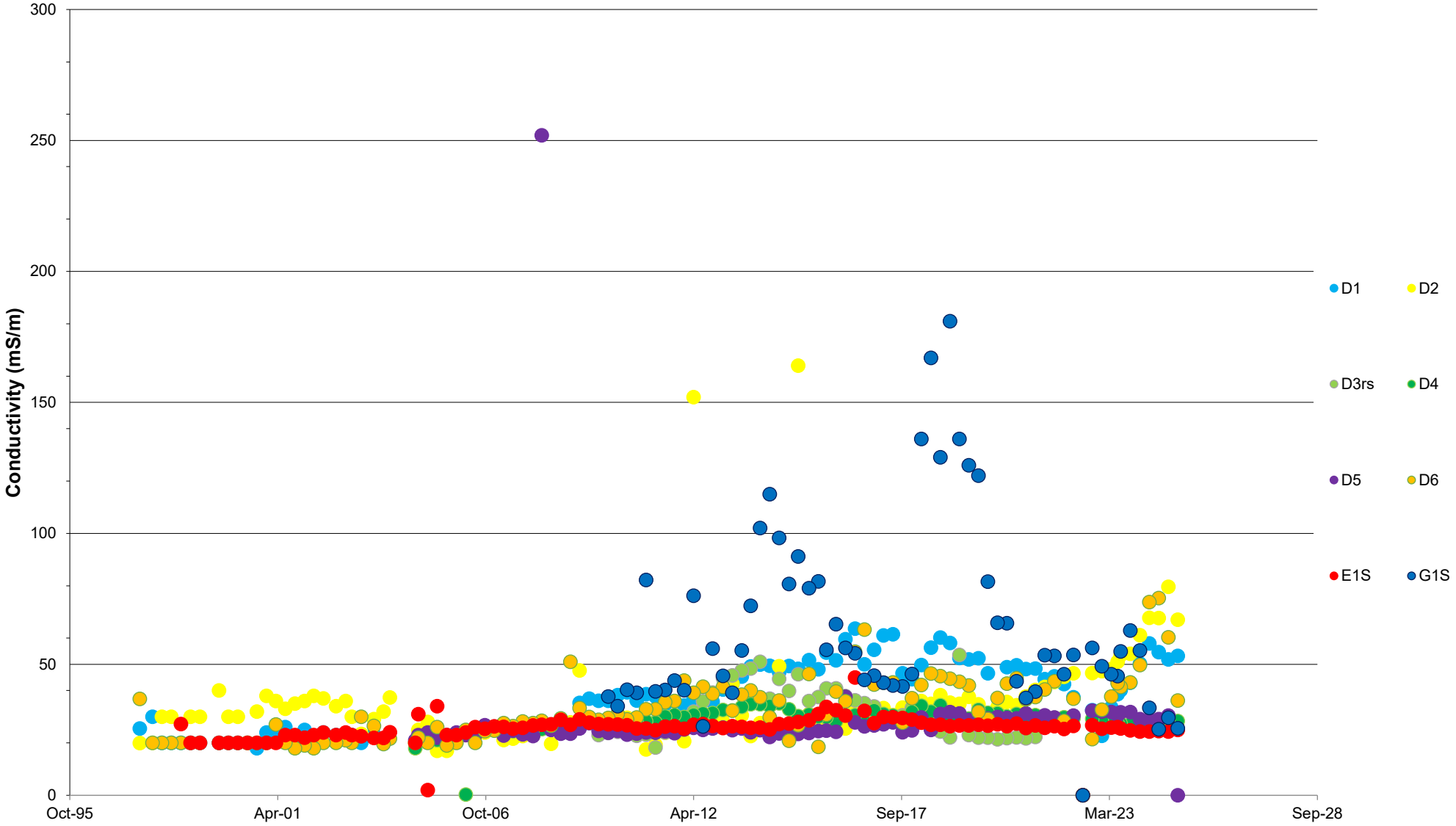


Sand Aquifer Downgradient of New Landfill - Chloride Concentrations

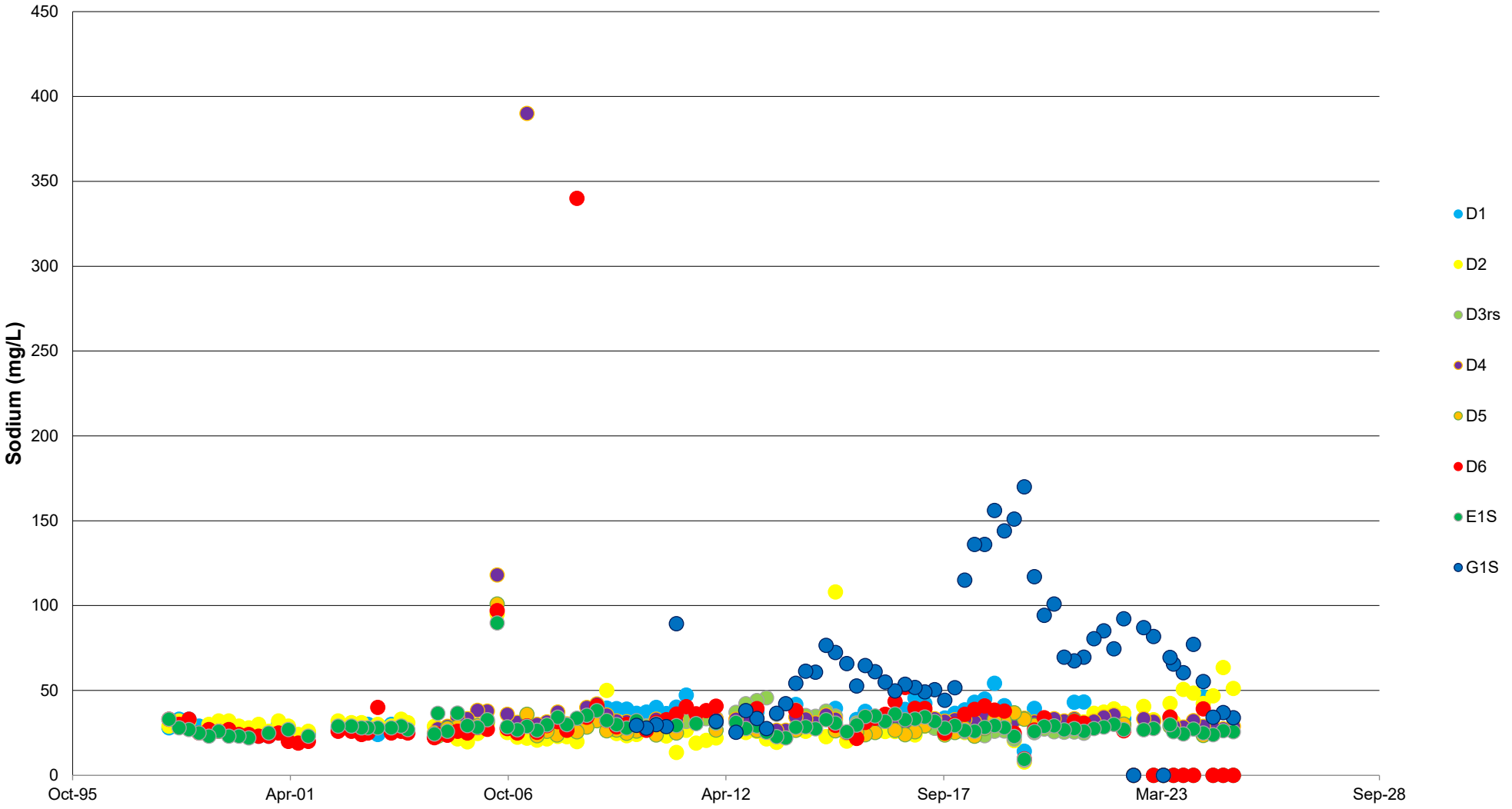



Sand Aquifer Downgradient of New Landfill - Ammoniacal-Nitrogen Concentrations
Note: Y-axis scale is Logarithmic
Ammoniacal-N (mg/L)
10.00
1.00
0.10
0.01
0.00
Oct-95
Apr-01
Oct-06
Apr-12
Sep-17
Mar-23
Sep-28
D1
D2
D3rs
D4
D5
D6
E1S
G1S

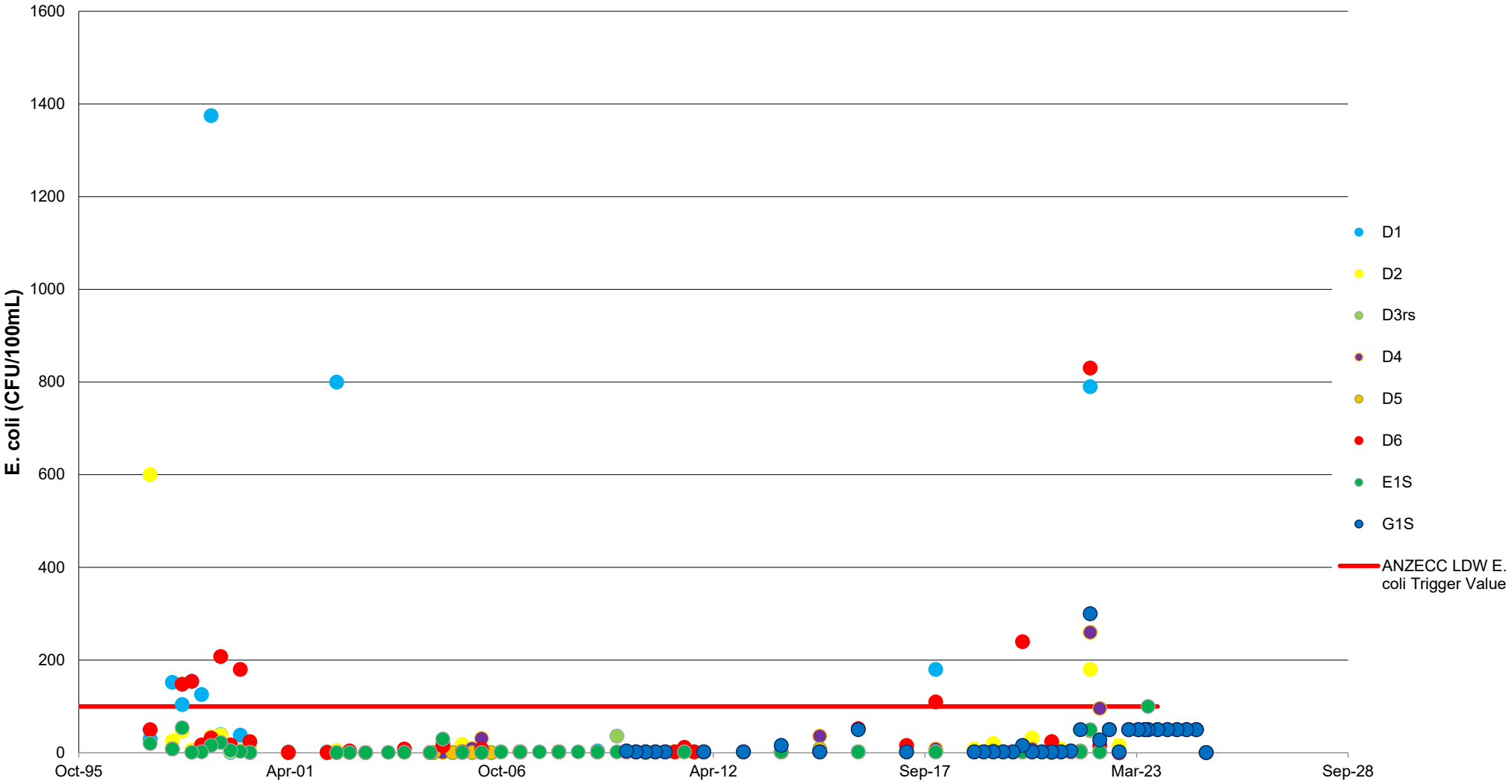
Sand Aquifer Downgradient of New Landfill - Conductivity Levels

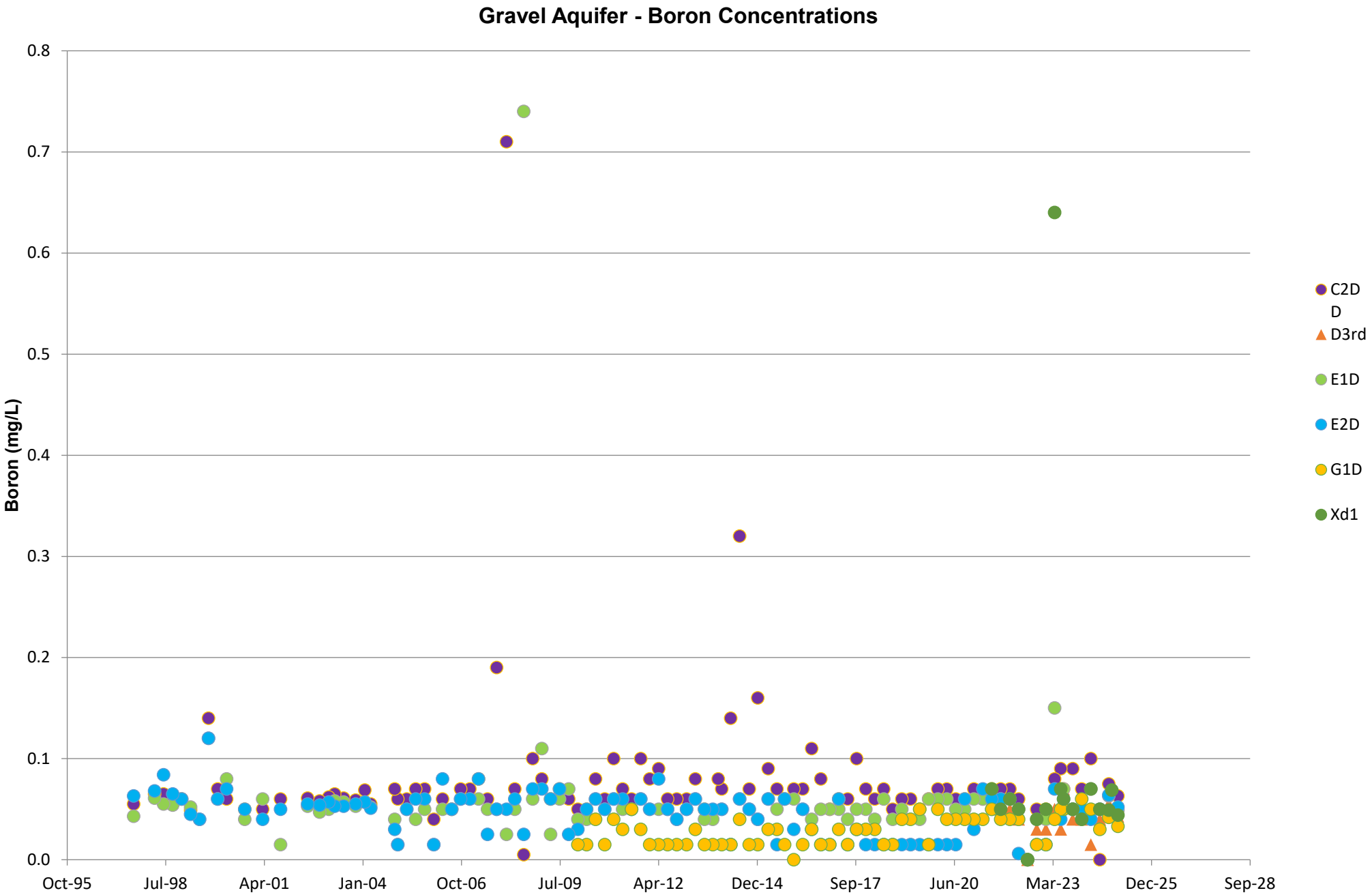


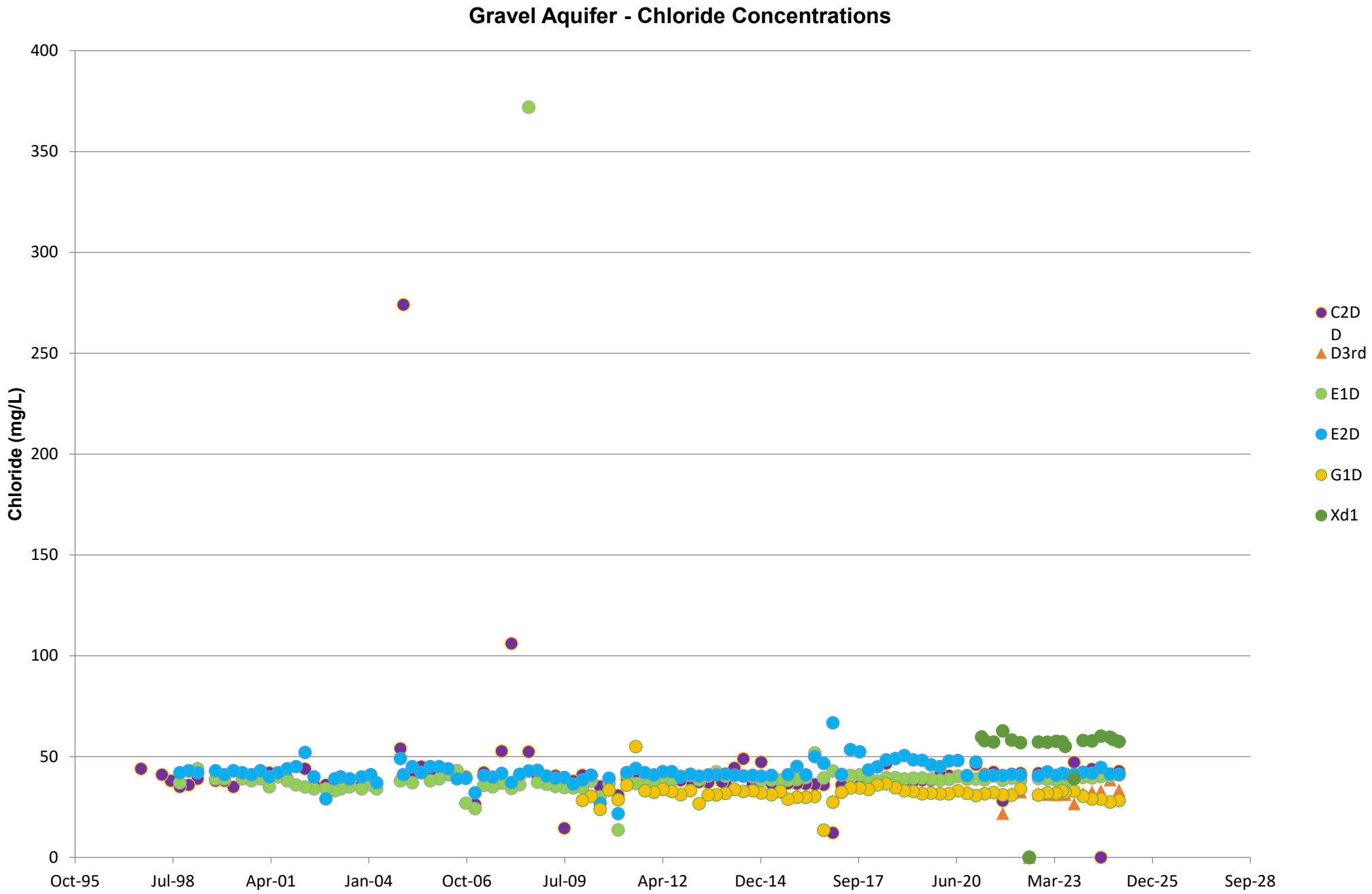
Sand Aquifer Downgradient of New Landfill - Sodium Concentrations

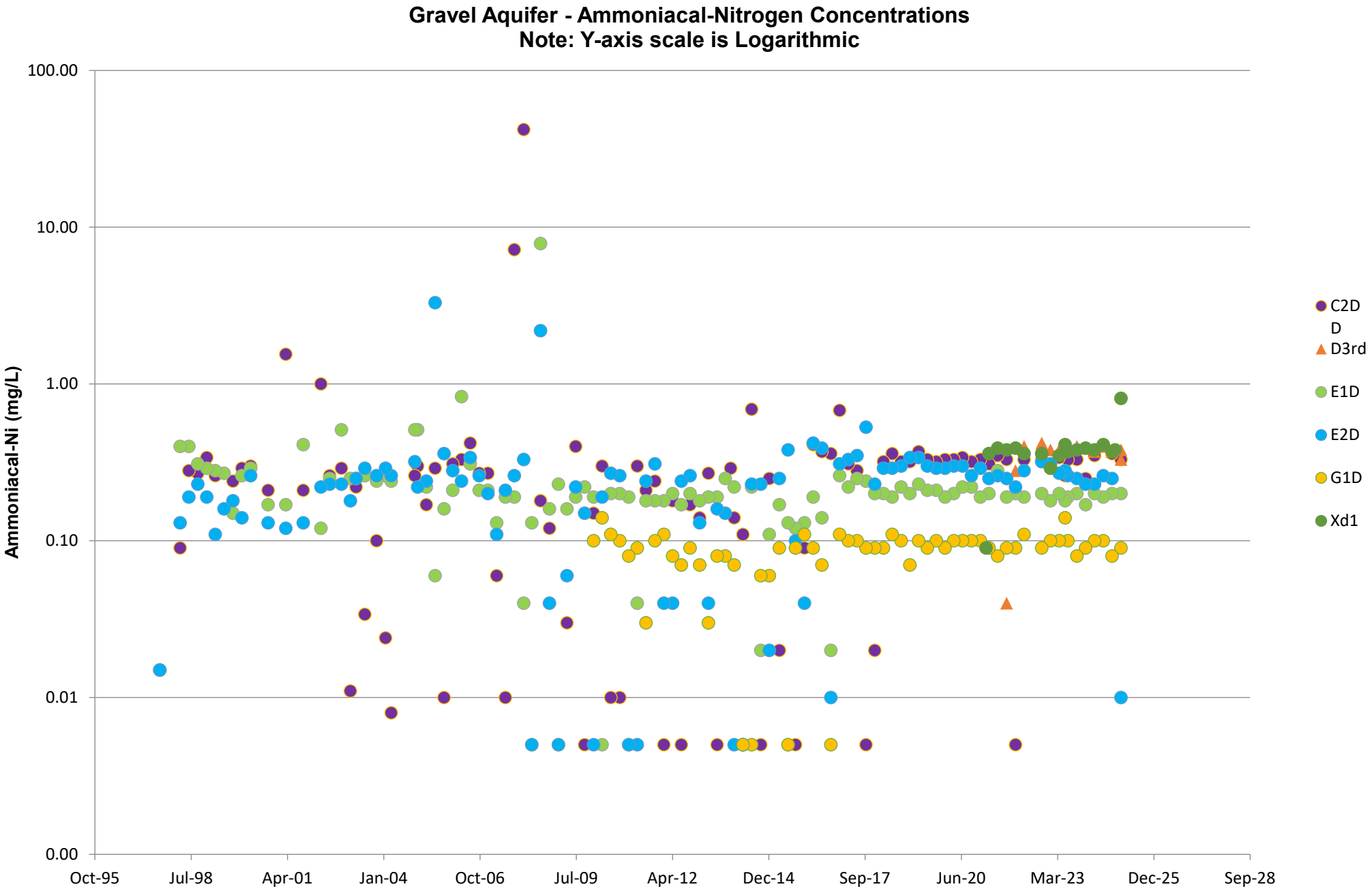


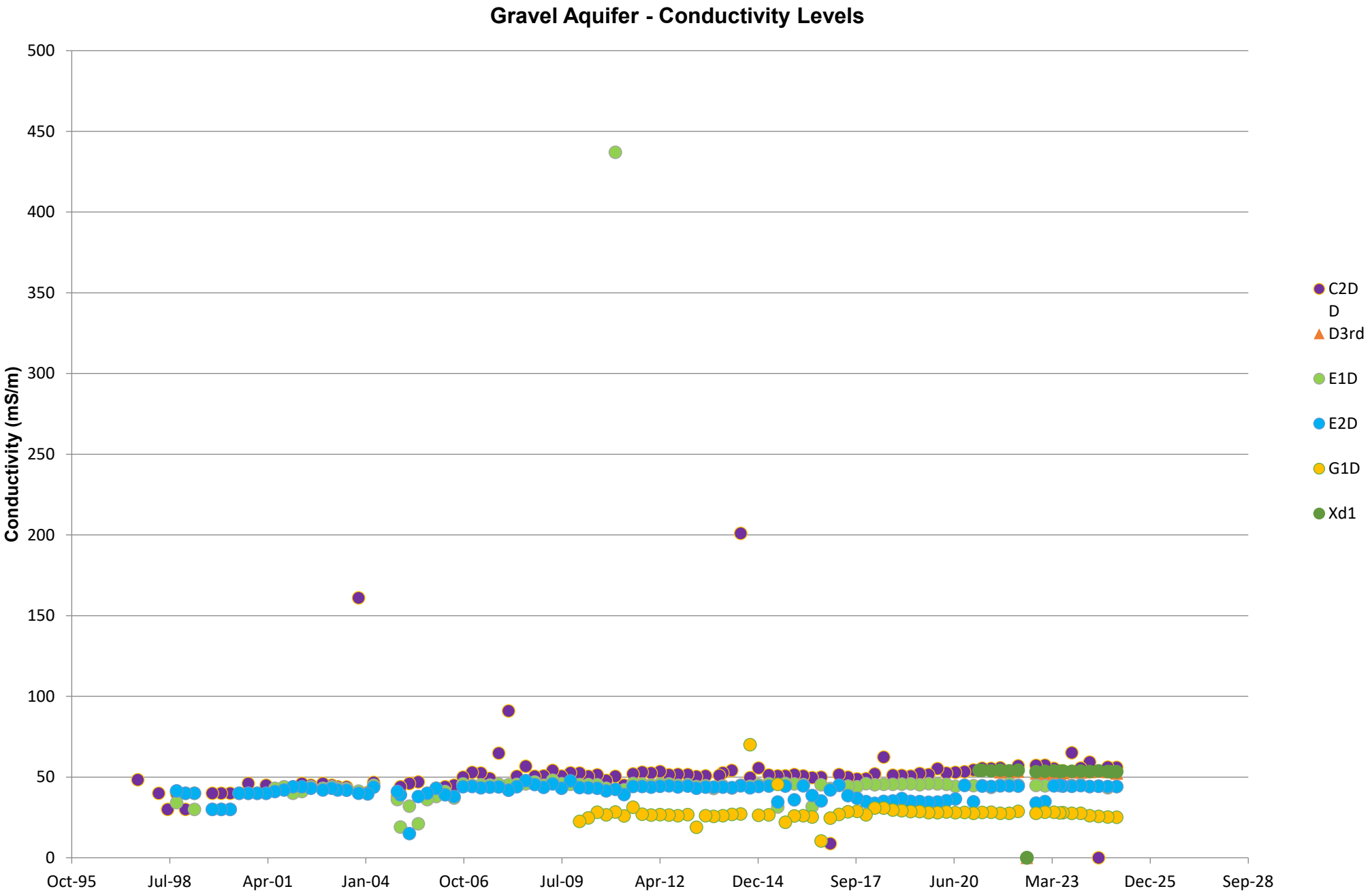
Sand Aquifer Downgradient of New Landfill - E. coli

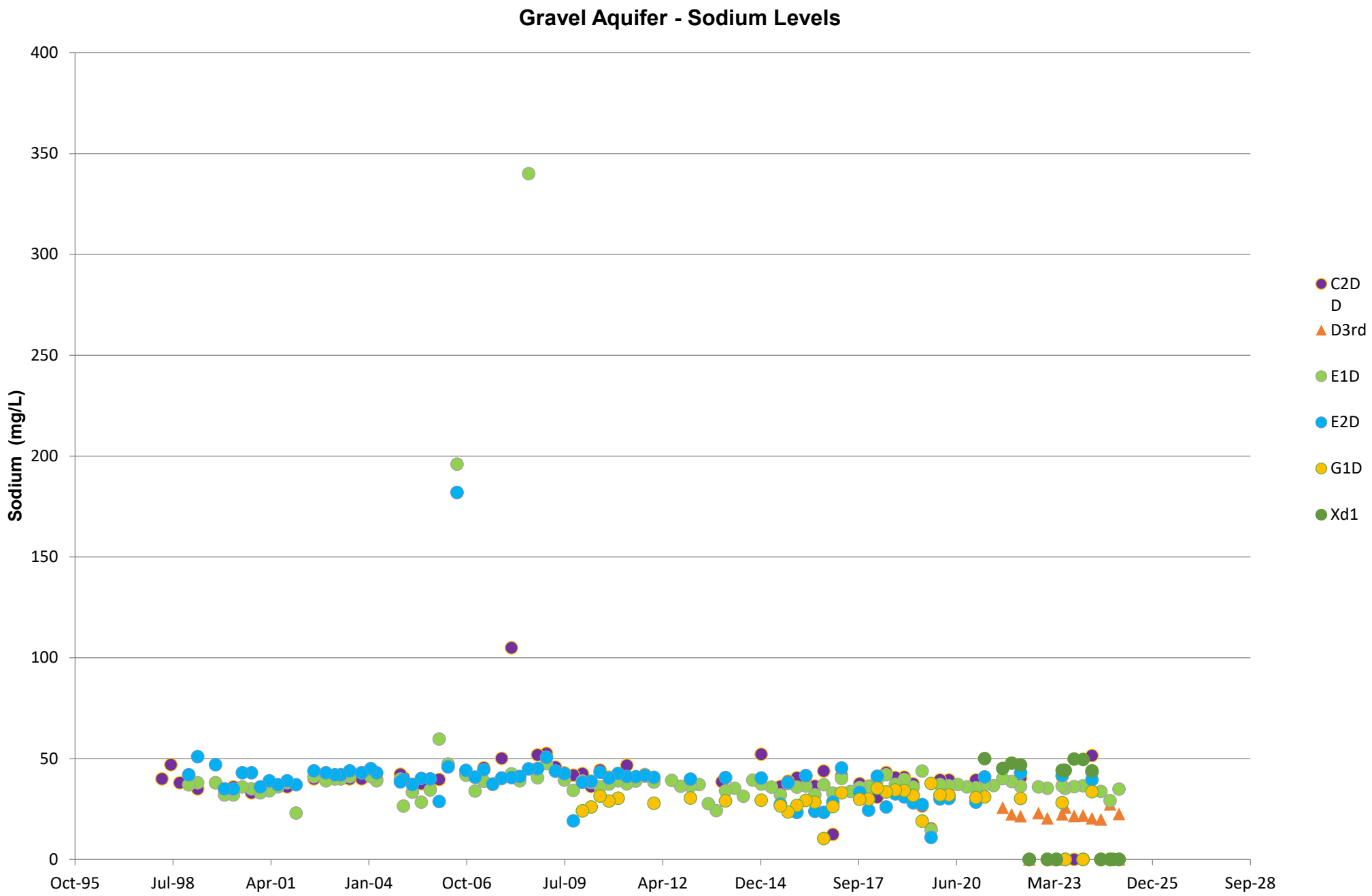


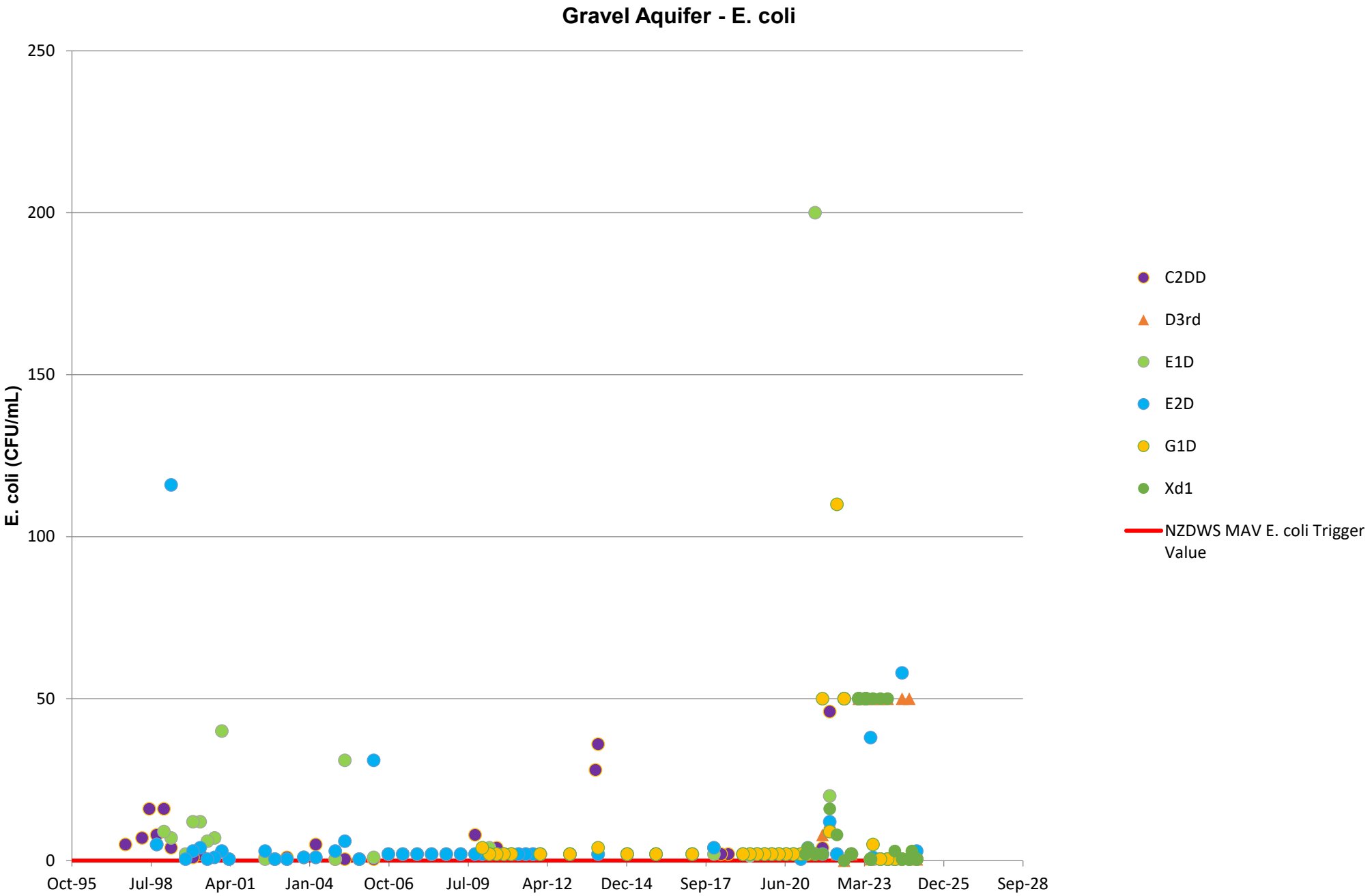

Gravel Aquifer - Boron Concentrations
Boron (mg/L)
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
C2D
D
D3rd
E1D
E2D
G1D
Xd1

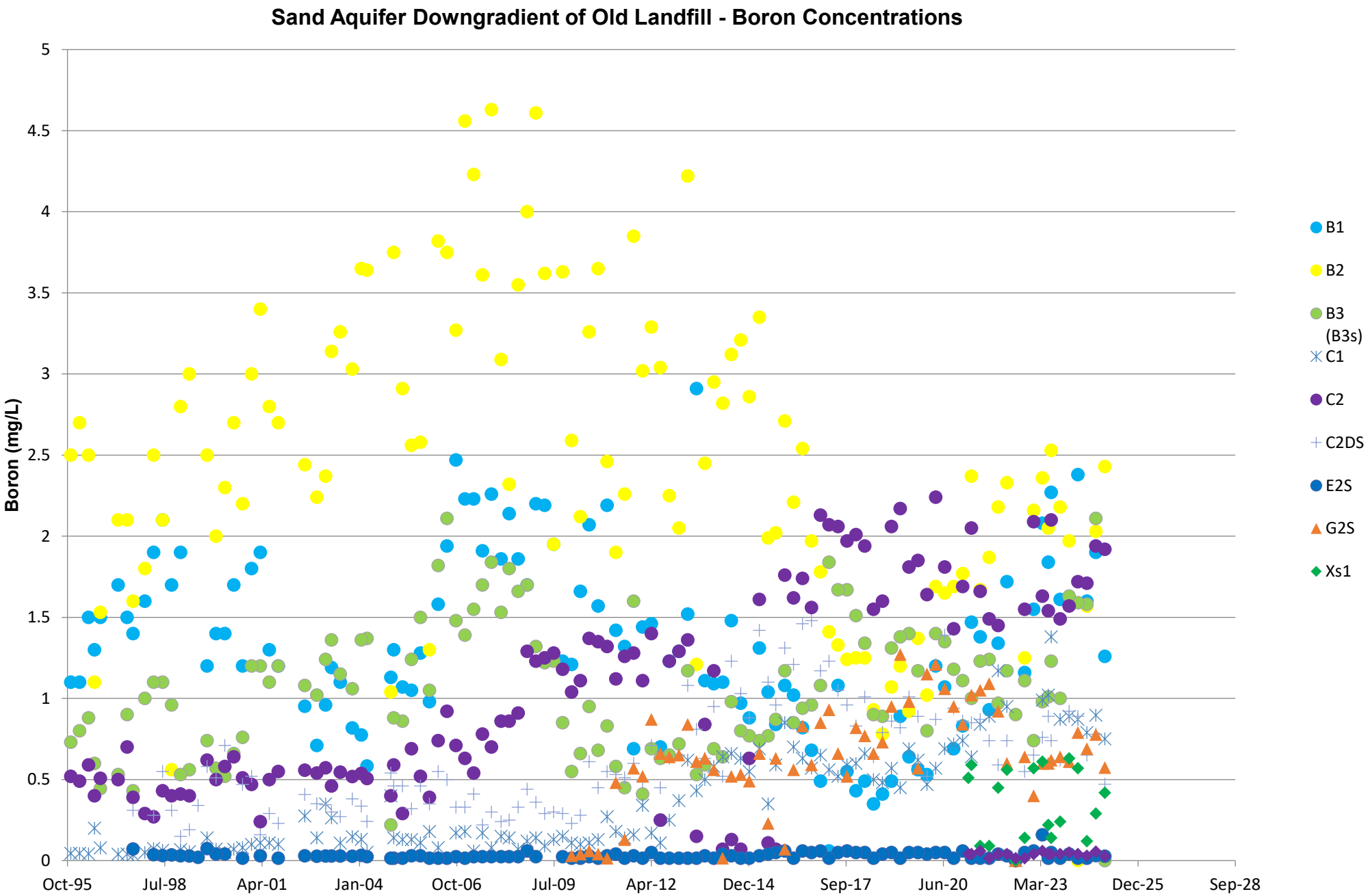

Gravel Aquifer - Chloride Concentrations
Chloride (mg/L)
400
350
300
250
200
150
100
50
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
C2D
D
D3rd
E1D
E2D
G1D
Xd1

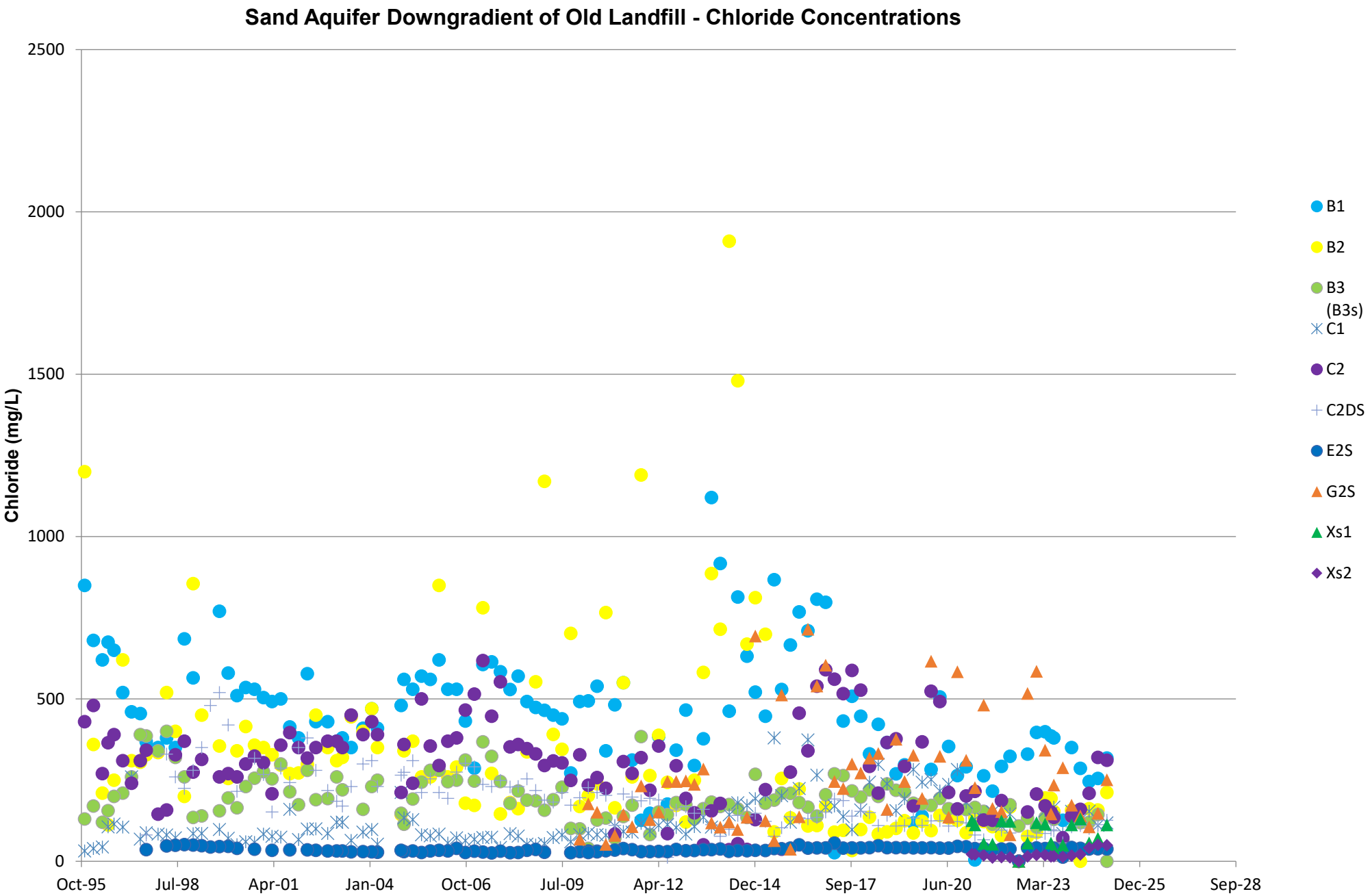

Gravel Aquifer - Ammoniacal-Nitrogen Concentrations
Note: Y-axis scale is Logarithmic
Ammoniacal-Ni (mg/L)
100.00
10.00
1.00
0.10
0.01
0.00
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
C2D
D
D3rd
E1D
E2D
G1D
Xd1

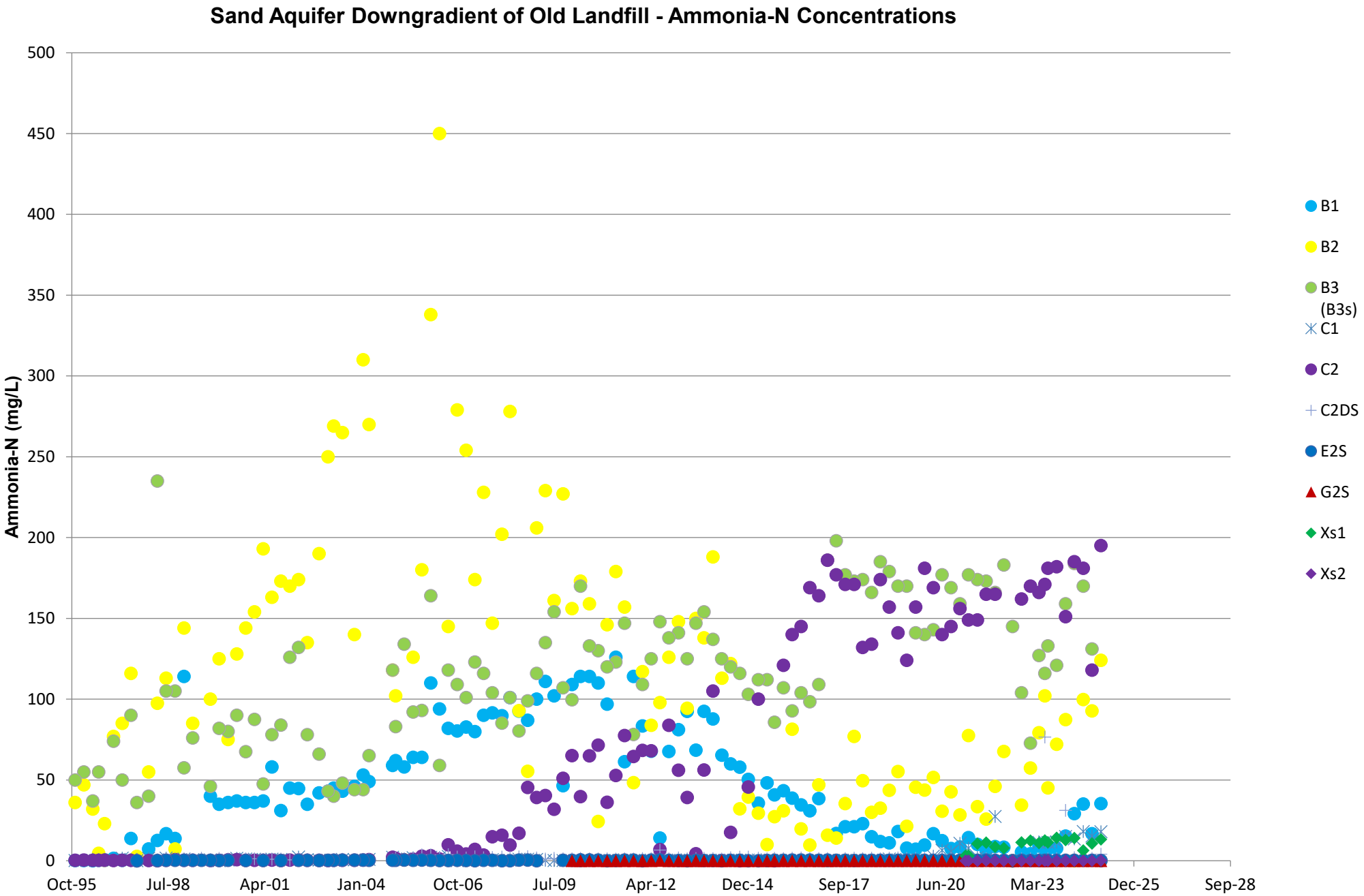

Gravel Aquifer - Conductivity Levels
Conductivity (mS/m)
500
450
400
350
300
250
200
150
100
50
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
C2D
D
D3rd
E1D
E2D
G1D
Xd1

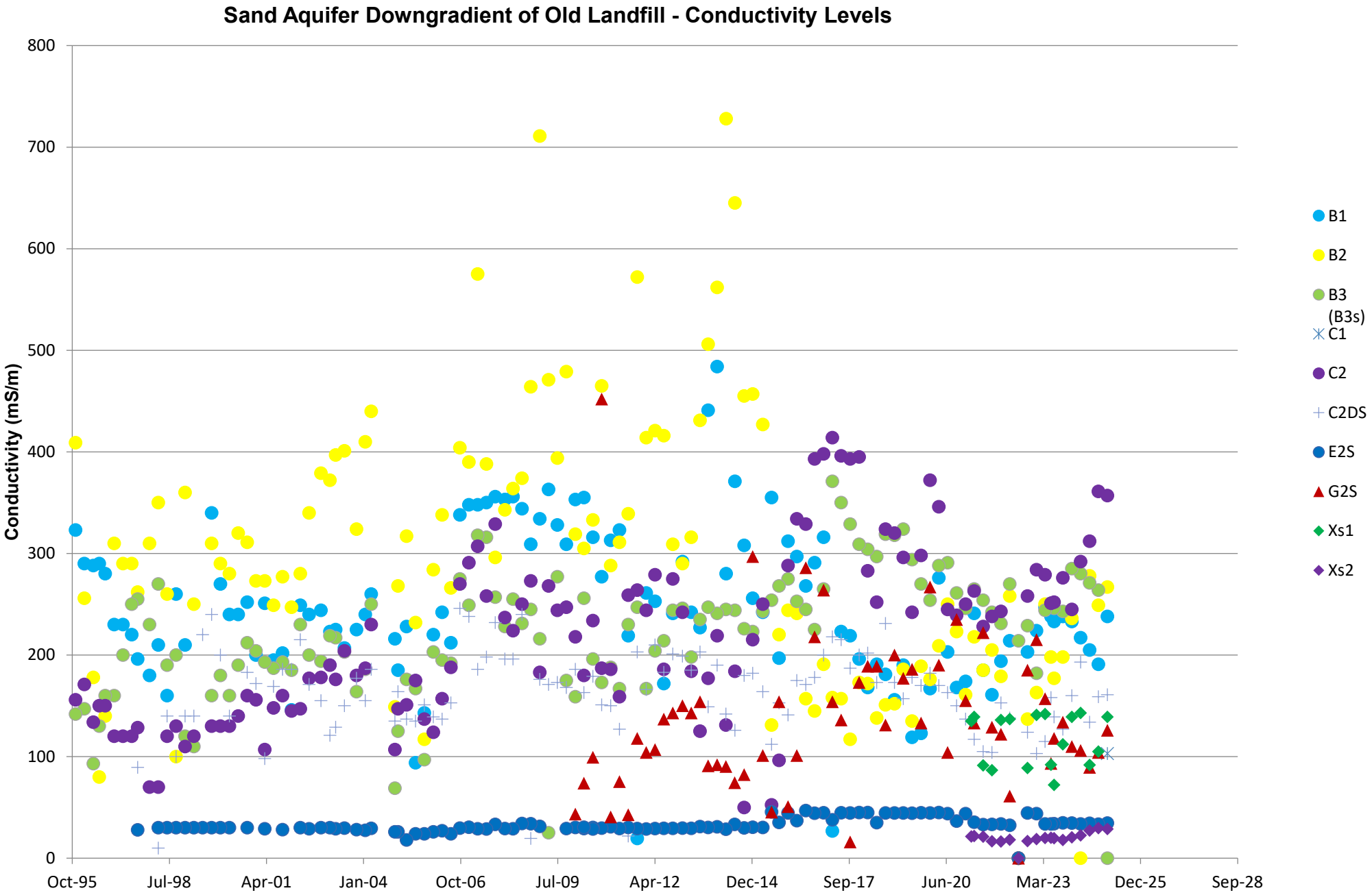

Gravel Aquifer - Sodium Levels
Sodium (mg/L)
400
350
300
250
200
150
100
50
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
C2D
D
D3rd
E1D
E2D
G1D
Xd1

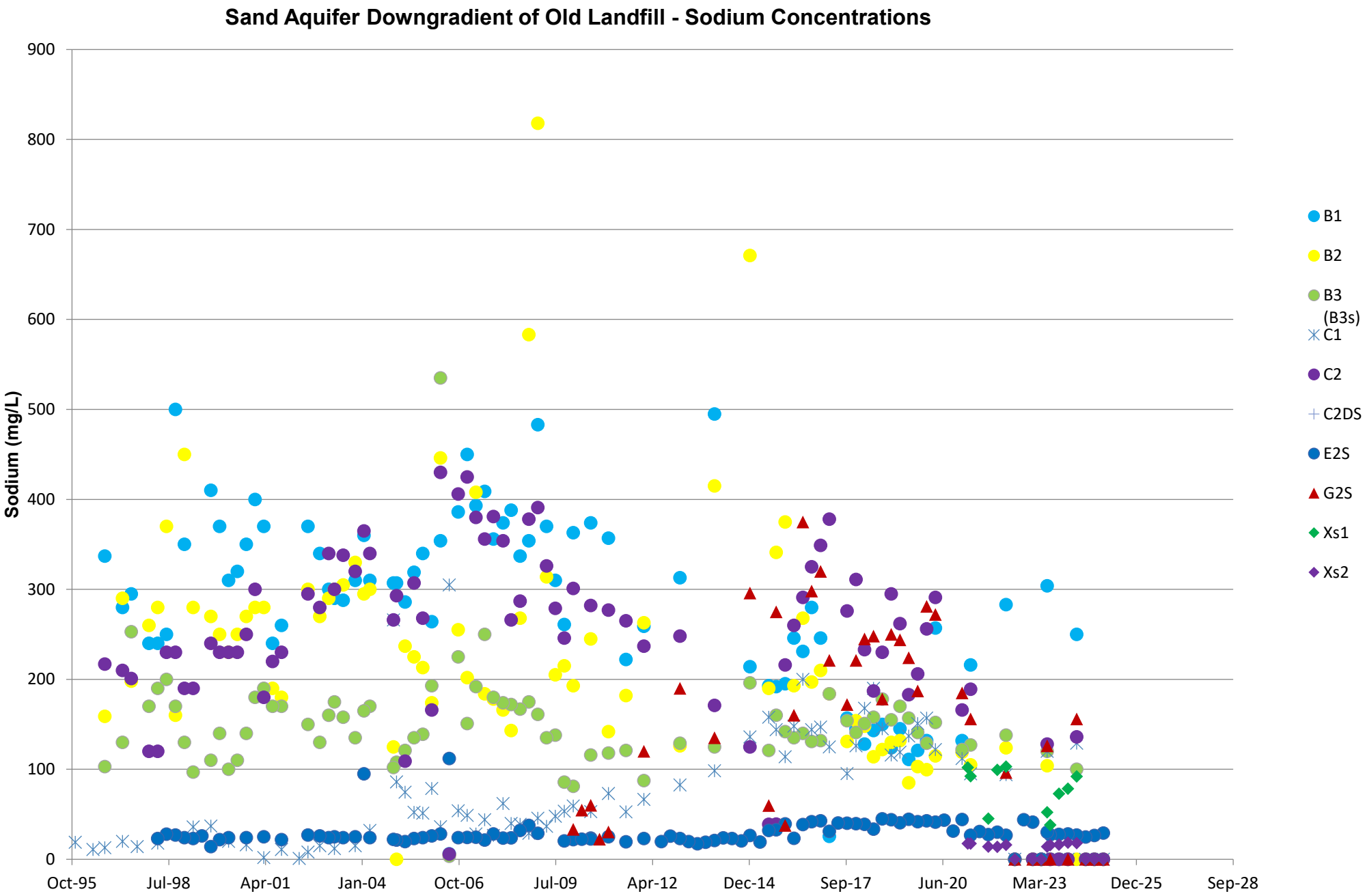

Gravel Aquifer - E. coli
E. coli (CFU/mL)
250
200
150
100
50
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
C2DD
D3rd
E1D
E2D
G1D
Xd1
NZDWS MAV E. coli Trigger Value

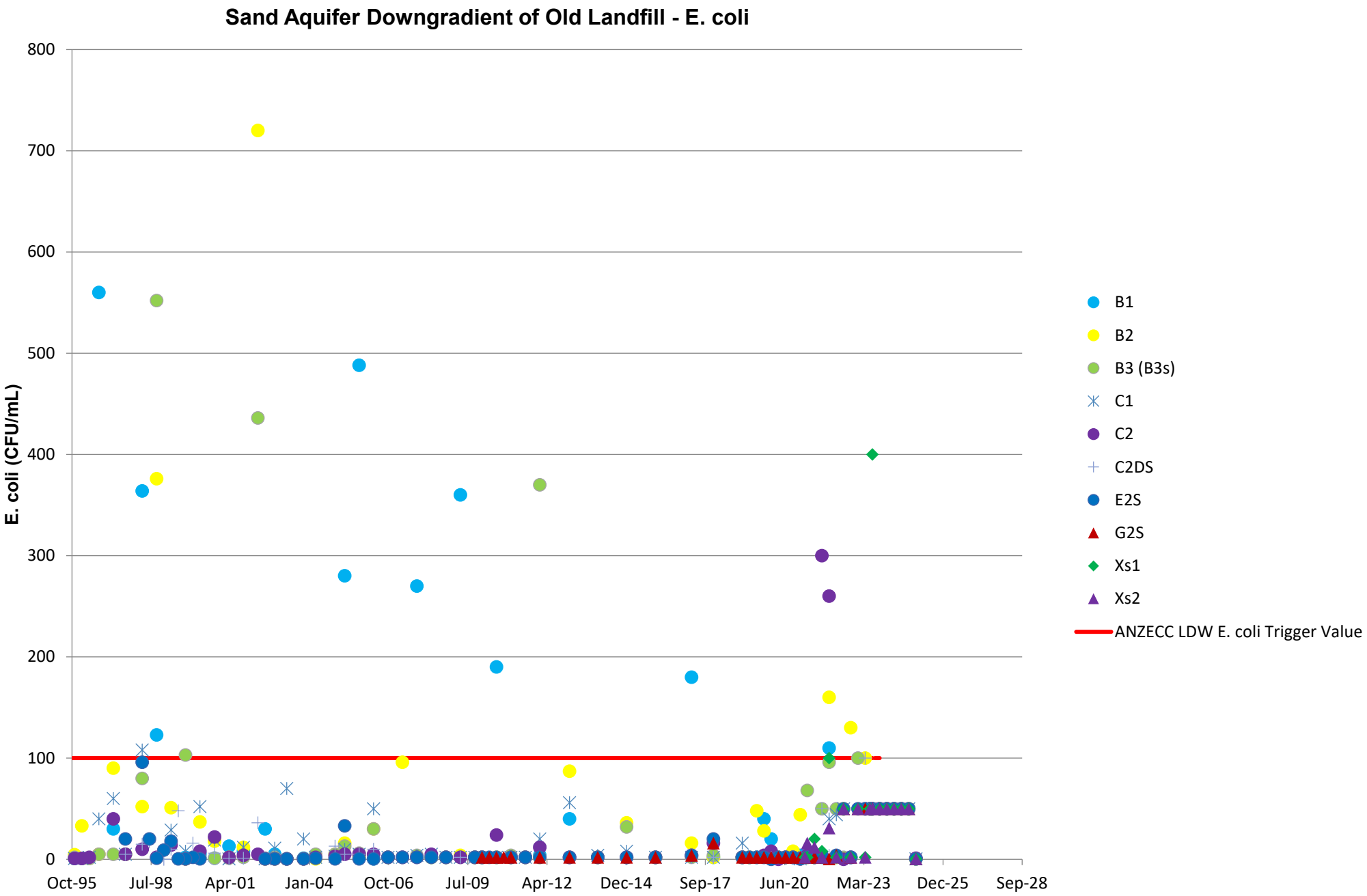

Sand Aquifer Downgradient of Old Landfill - Boron Concentrations
Boron (mg/L)
5
4.5
4
3.5
3
2.5
2
1.5
1
0.5
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
B1
B2
B3 (B3s)
C1
C2
C2DS
E2S
G2S
Xs1

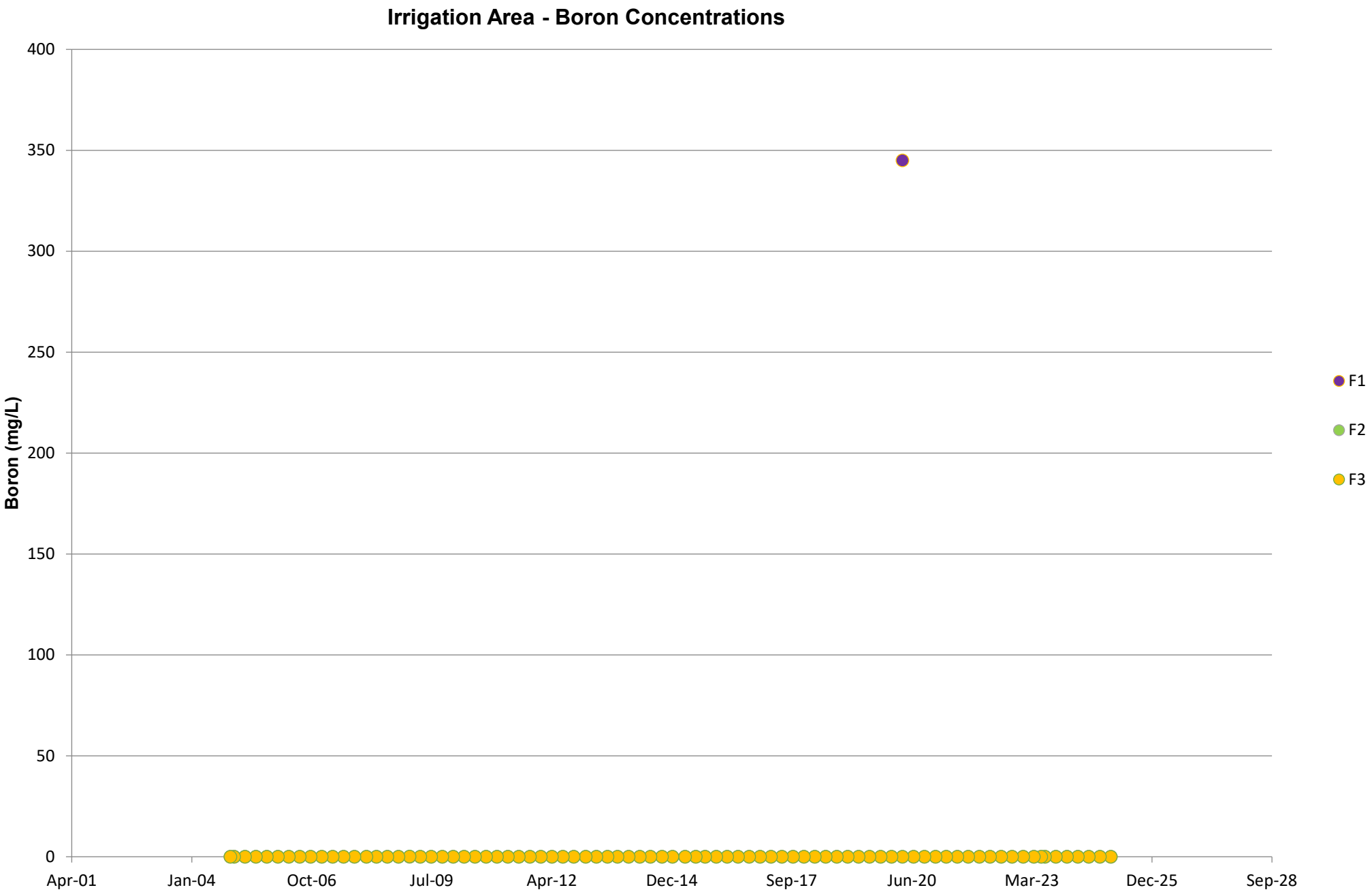

Sand Aquifer Downgradient of Old Landfill - Chloride Concentrations
Chloride (mg/L)
2500
2000
1500
1000
500
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
B1
B2
B3
(B3s)
C1
C2
C2DS
E2S
G2S
Xs1
Xs2

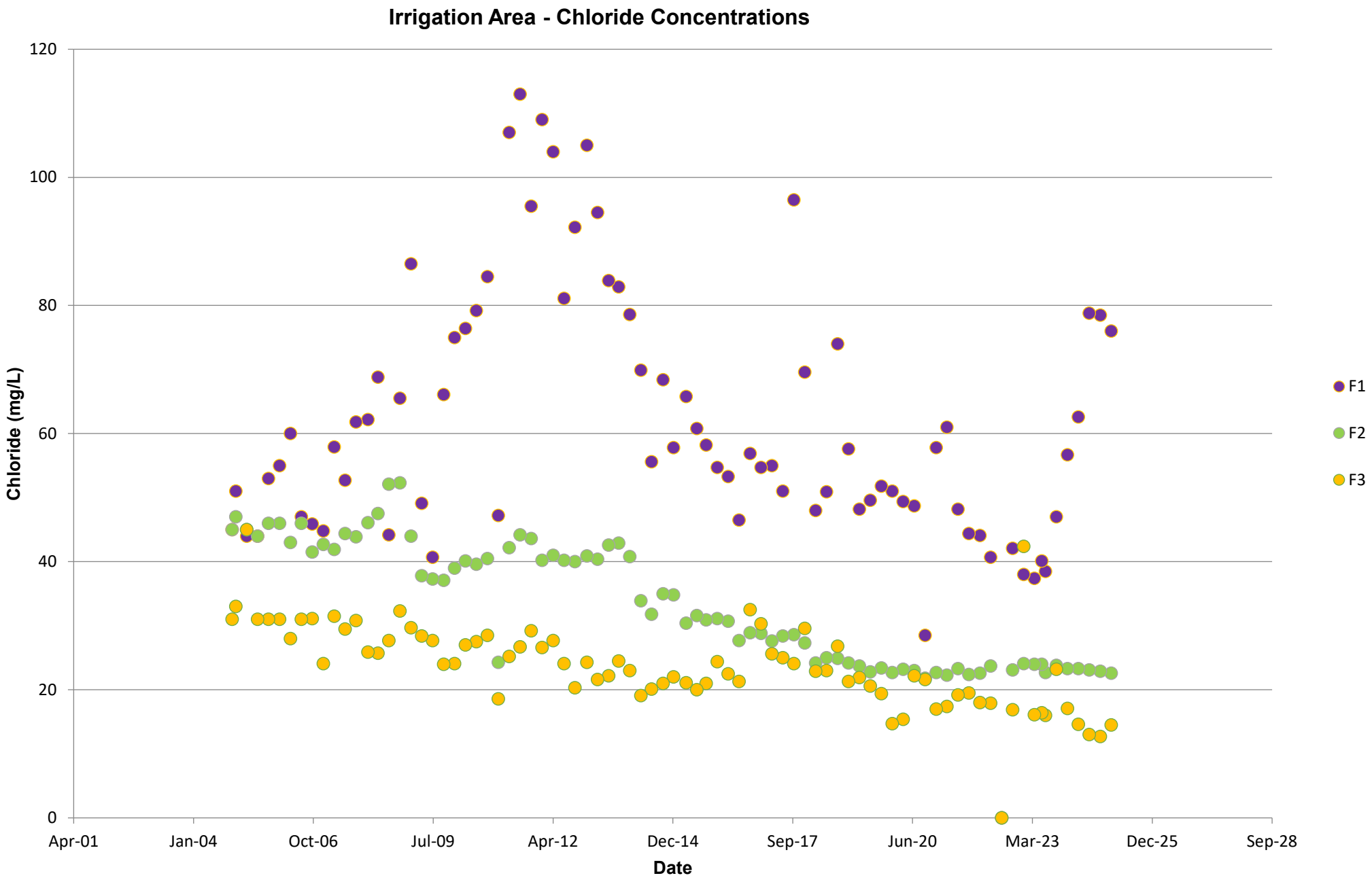

Sand Aquifer Downgradient of Old Landfill - Ammonia-N Concentrations
Ammonia-N (mg/L)
500
450
400
350
300
250
200
150
100
50
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
B1
B2
B3
(B3s)
C1
C2
C2DS
E2S
G2S
Xs1
Xs2

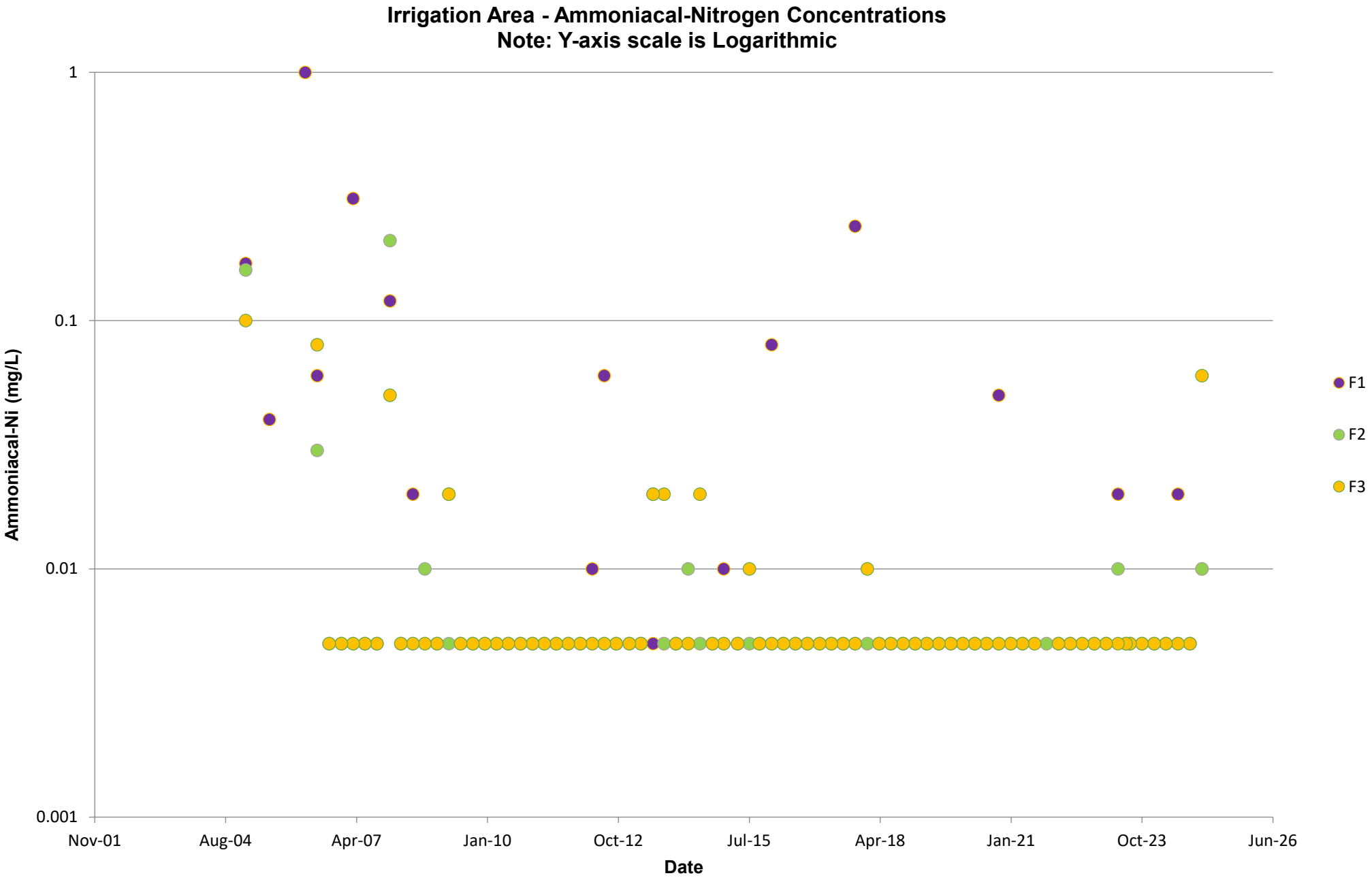

Sand Aquifer Downgradient of Old Landfill - Conductivity Levels
Conductivity (mS/m)
800
700
600
500
400
300
200
100
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
B1
B2
B3
(B3s)
C1
C2
C2DS
E2S
G2S
Xs1
Xs2

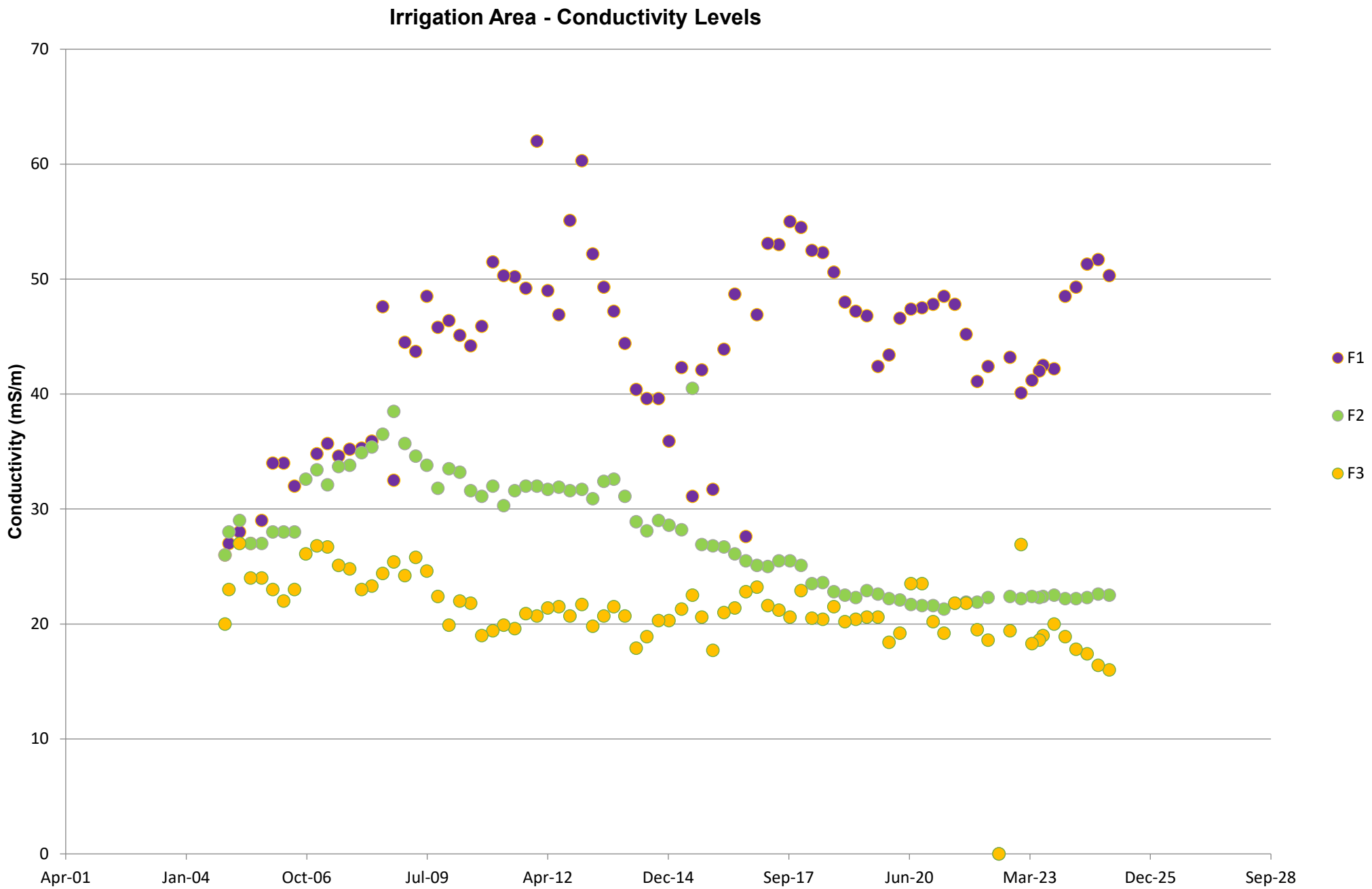

Sand Aquifer Downgradient of Old Landfill - Sodium Concentrations
Sodium (mg/L)
900
800
700
600
500
400
300
200
100
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
B1
B2
B3
(B3s)
C1
C2
C2DS
E2S
G2S
Xs1
Xs2

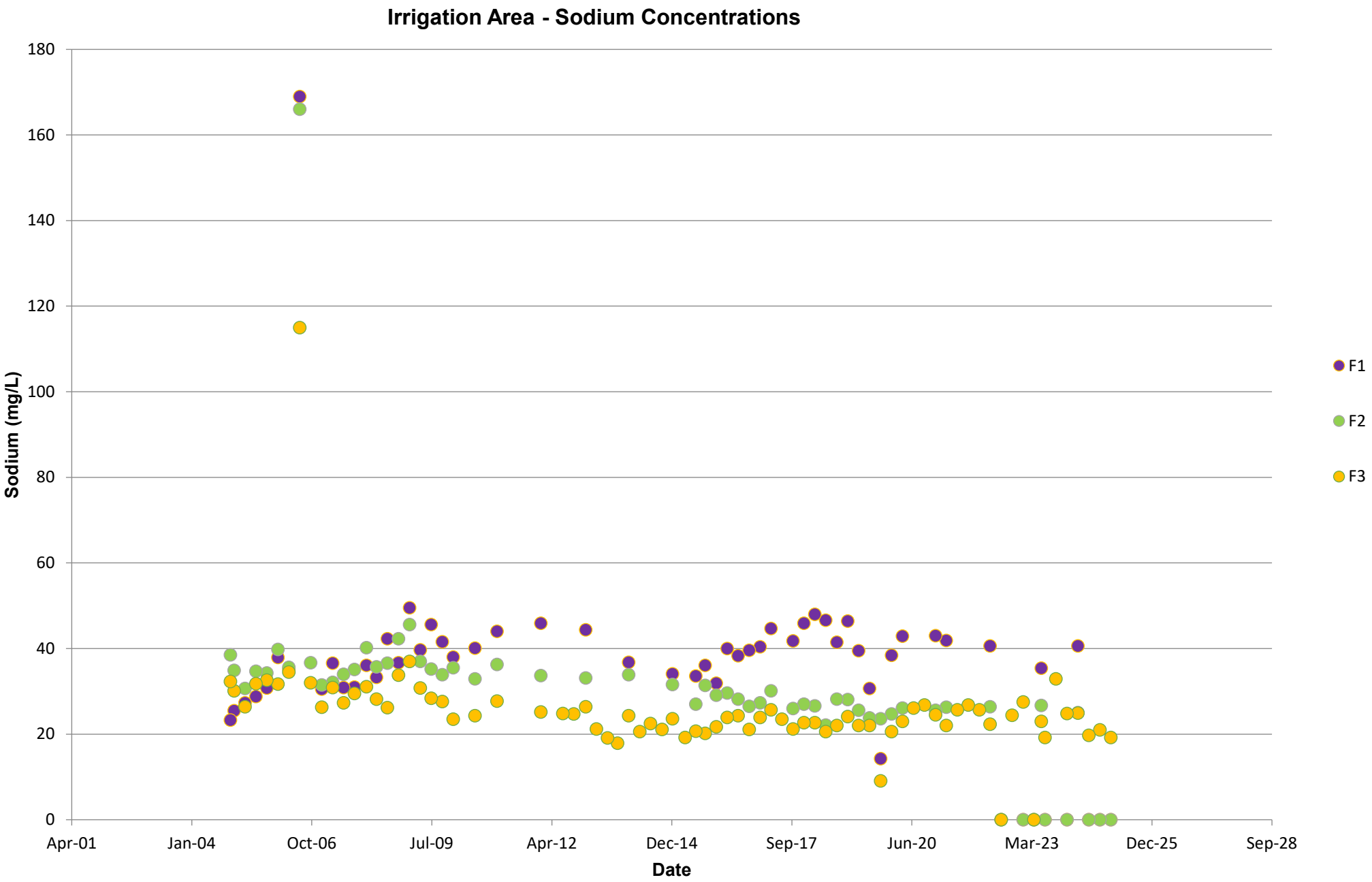

Sand Aquifer Downgradient of Old Landfill - E. coli
E. coli (CFU/mL)
800
700
600
500
400
300
200
100
0
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
B1
B2
B3 (B3s)
C1
C2
C2DS
E2S
G2S
Xs1
Xs2
ANZECC LDW E. coli Trigger Value

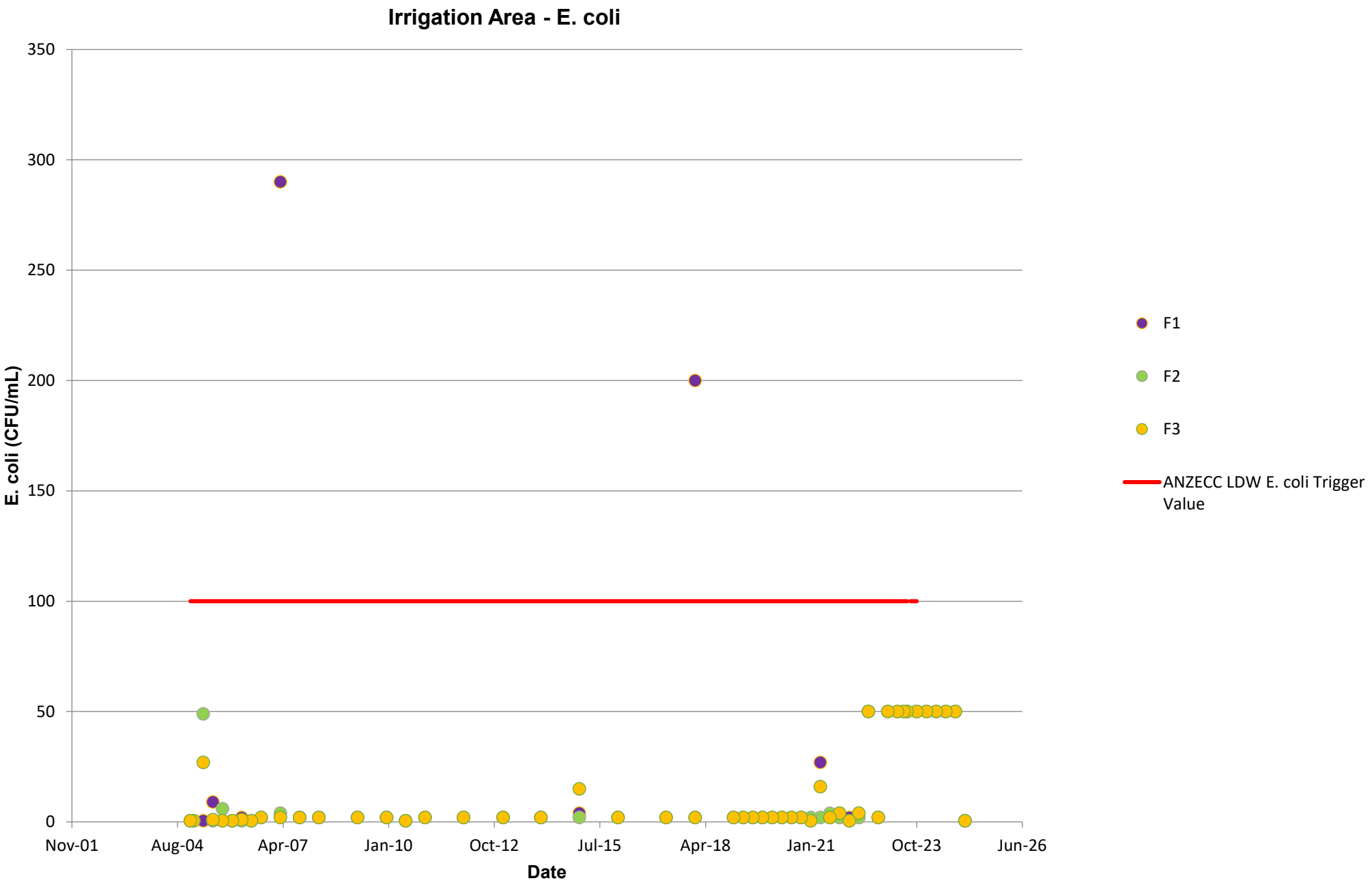

Irrigation Area - Boron Concentrations
Boron (mg/L)
400
350
300
250
200
150
100
50
0
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
F1
F2
F3

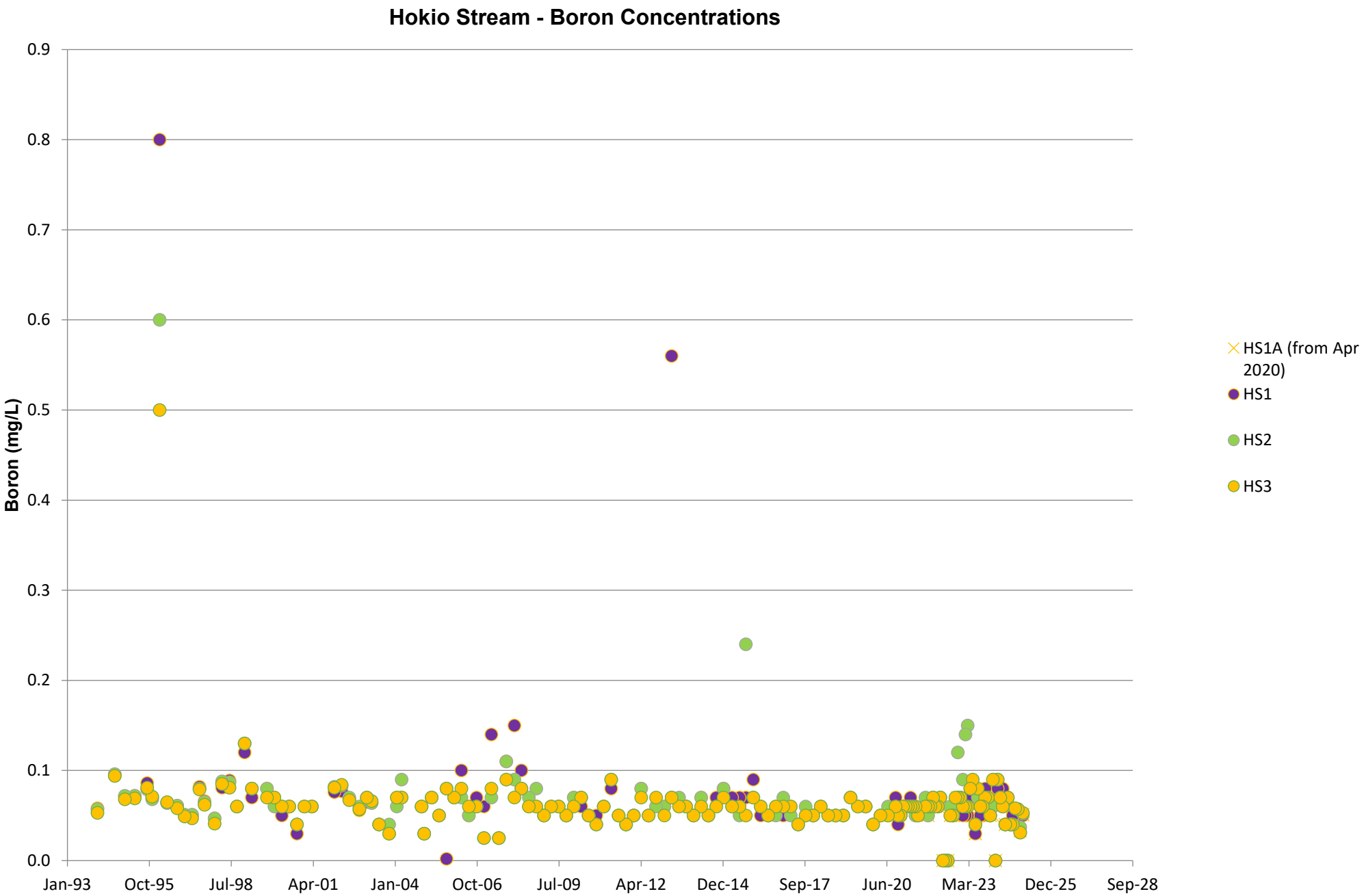

Irrigation Area - Chloride Concentrations
120
100
80
60
40
20
0
Chloride (mg/L)
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
Date
F1
F2
F3

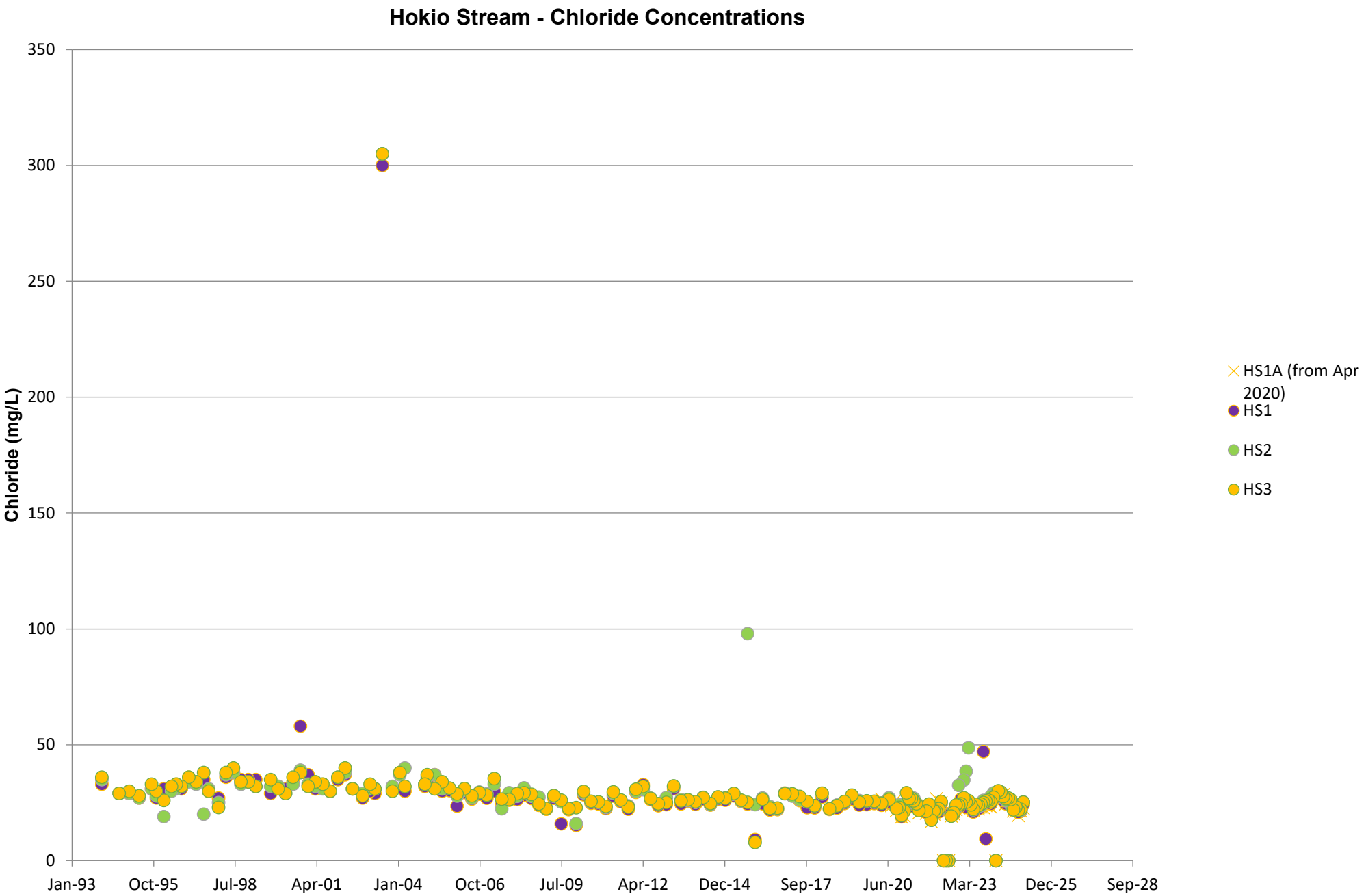

Irrigation Area - Ammoniacal-Nitrogen Concentrations
Note: Y-axis scale is Logarithmic
Ammoniacal-Ni (mg/L)
1
0.1
0.01
0.001
Nov-01
Aug-04
Apr-07
Jan-10
Oct-12
Jul-15
Apr-18
Jan-21
Oct-23
Jun-26
Date
F1
F2
F3

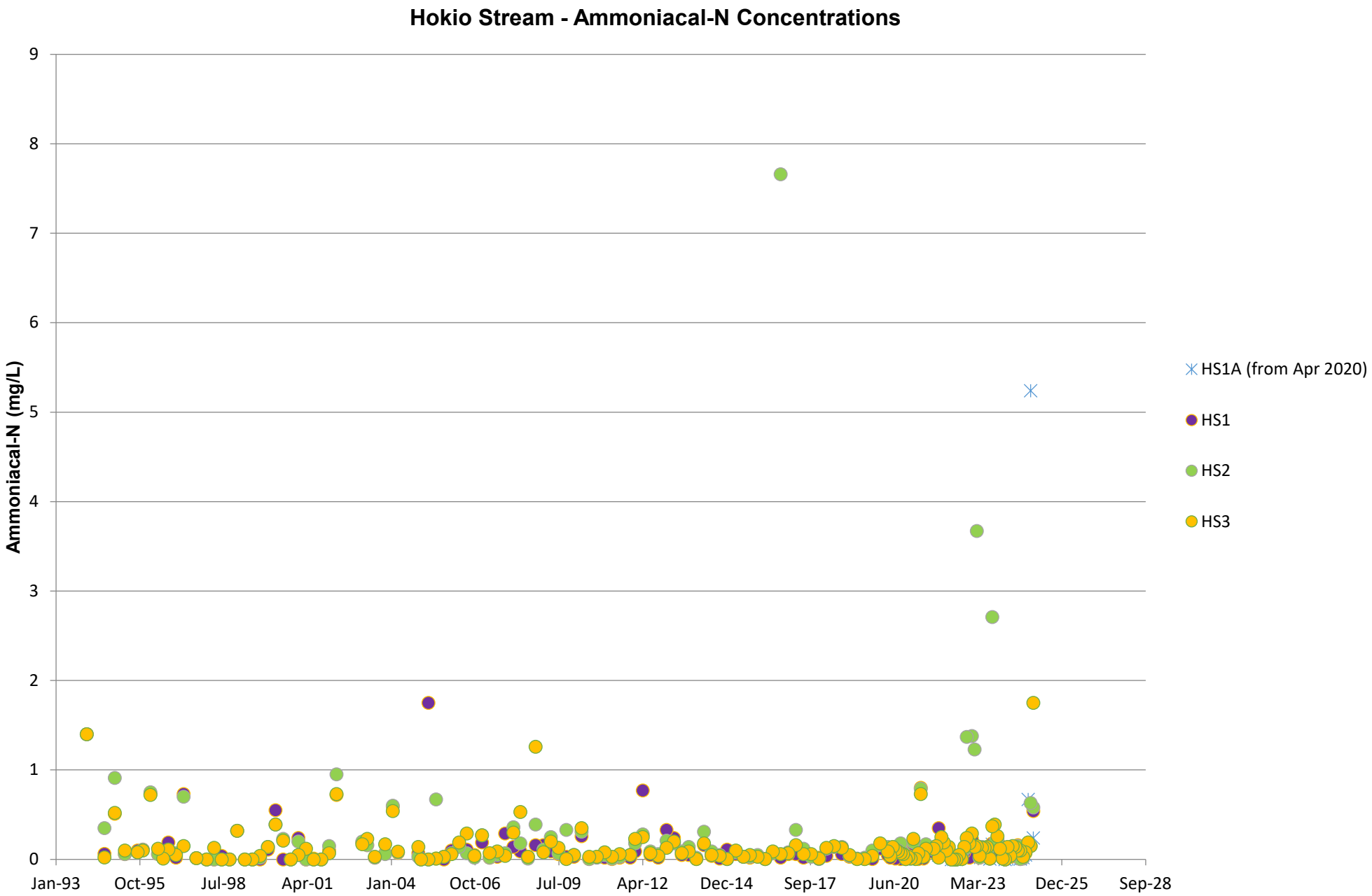

Irrigation Area - Conductivity Levels
Conductivity (mS/m)
70
60
50
40
30
20
10
0
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
F1
F2
F3

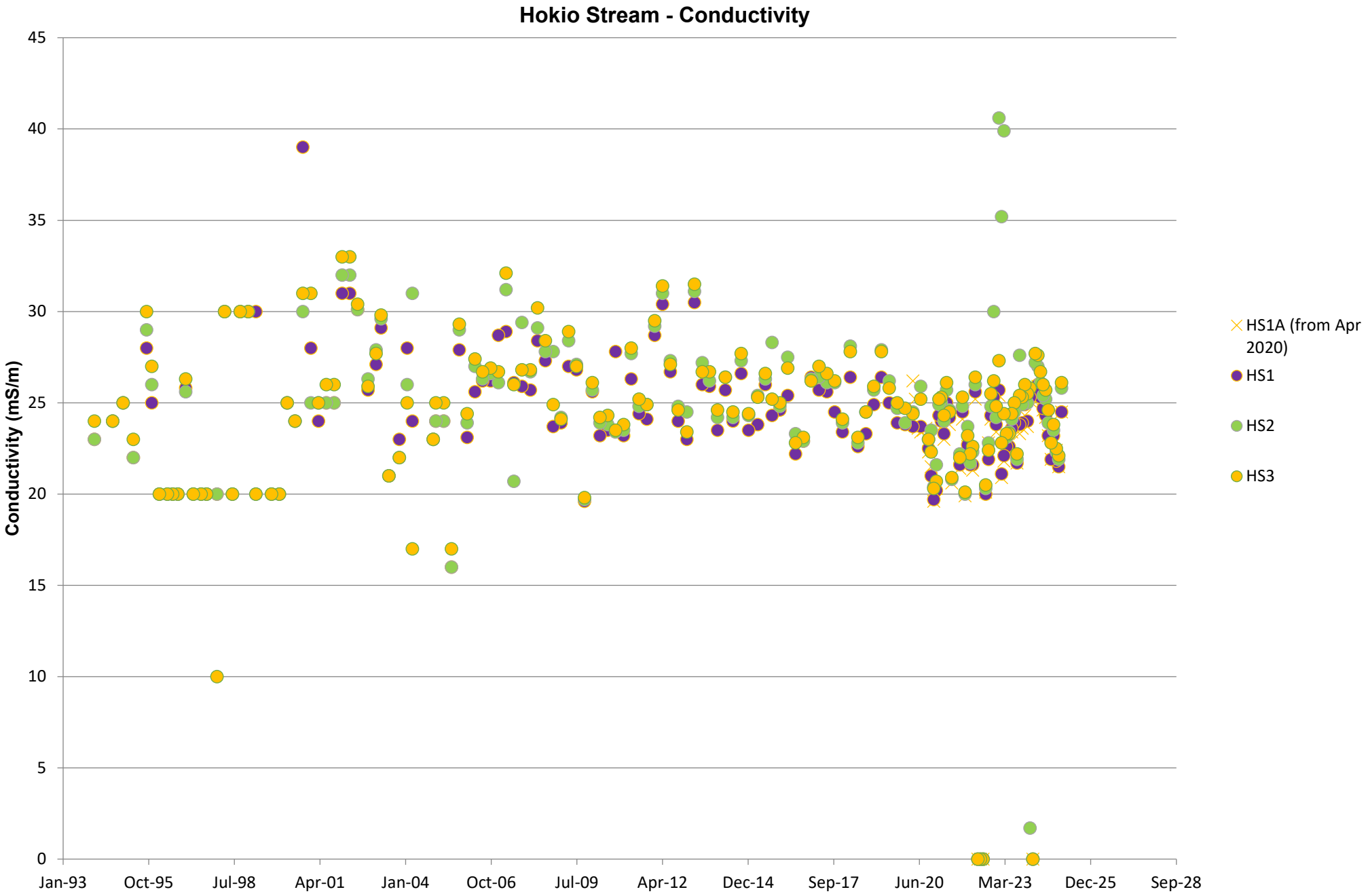

Irrigation Area - Sodium Concentrations
Sodium (mg/L)
180
160
140
120
100
80
60
40
20
0
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
Date
F1
F2
F3

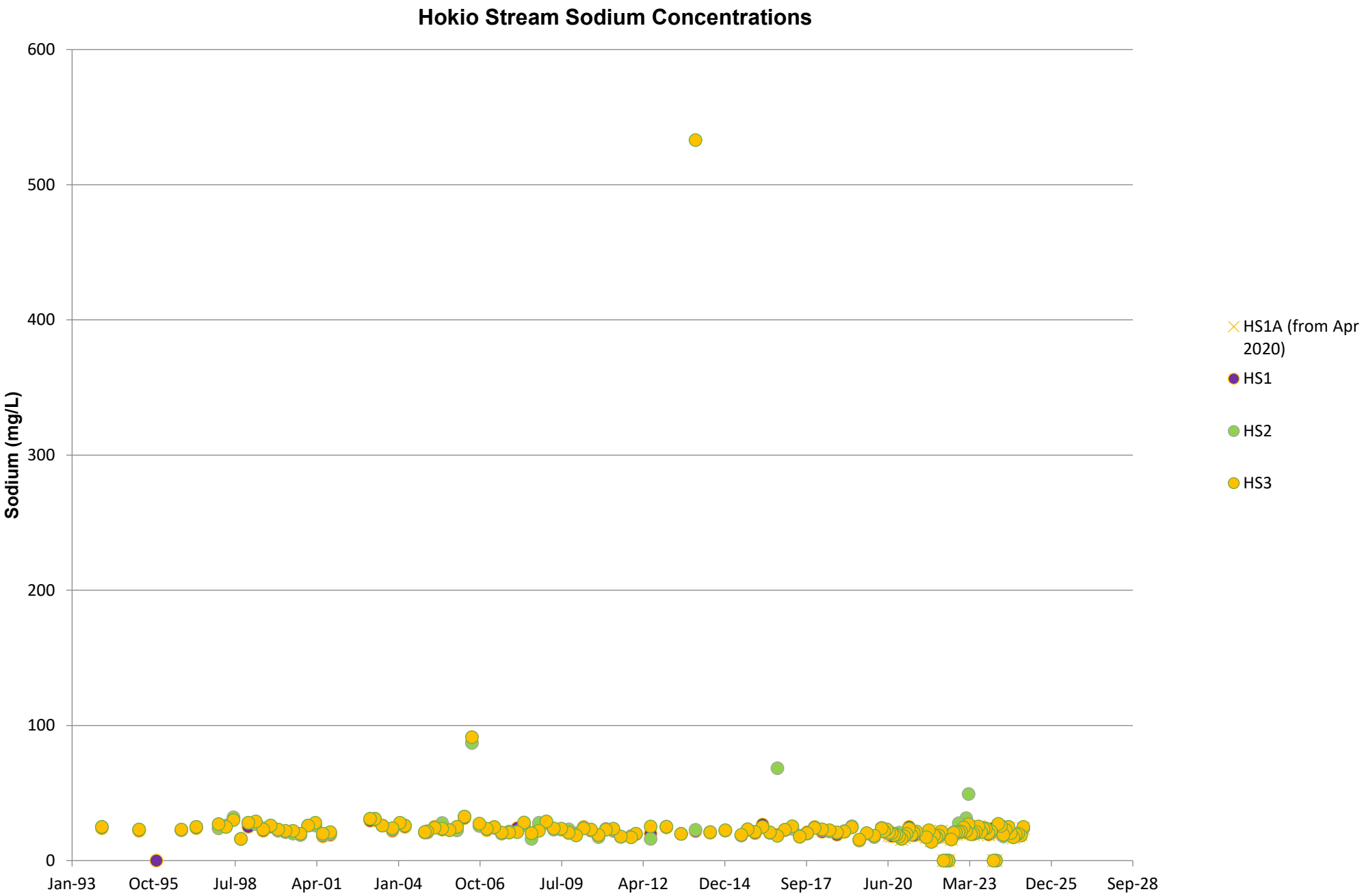

Irrigation Area - E. coli
E. coli (CFU/mL)
350
300
250
200
150
100
50
0
Nov-01
Aug-04
Apr-07
Jan-10
Oct-12
Jul-15
Apr-18
Jan-21
Oct-23
Jun-26
Date
F1
F2
F3
ANZECC LDW E. coli Trigger Value

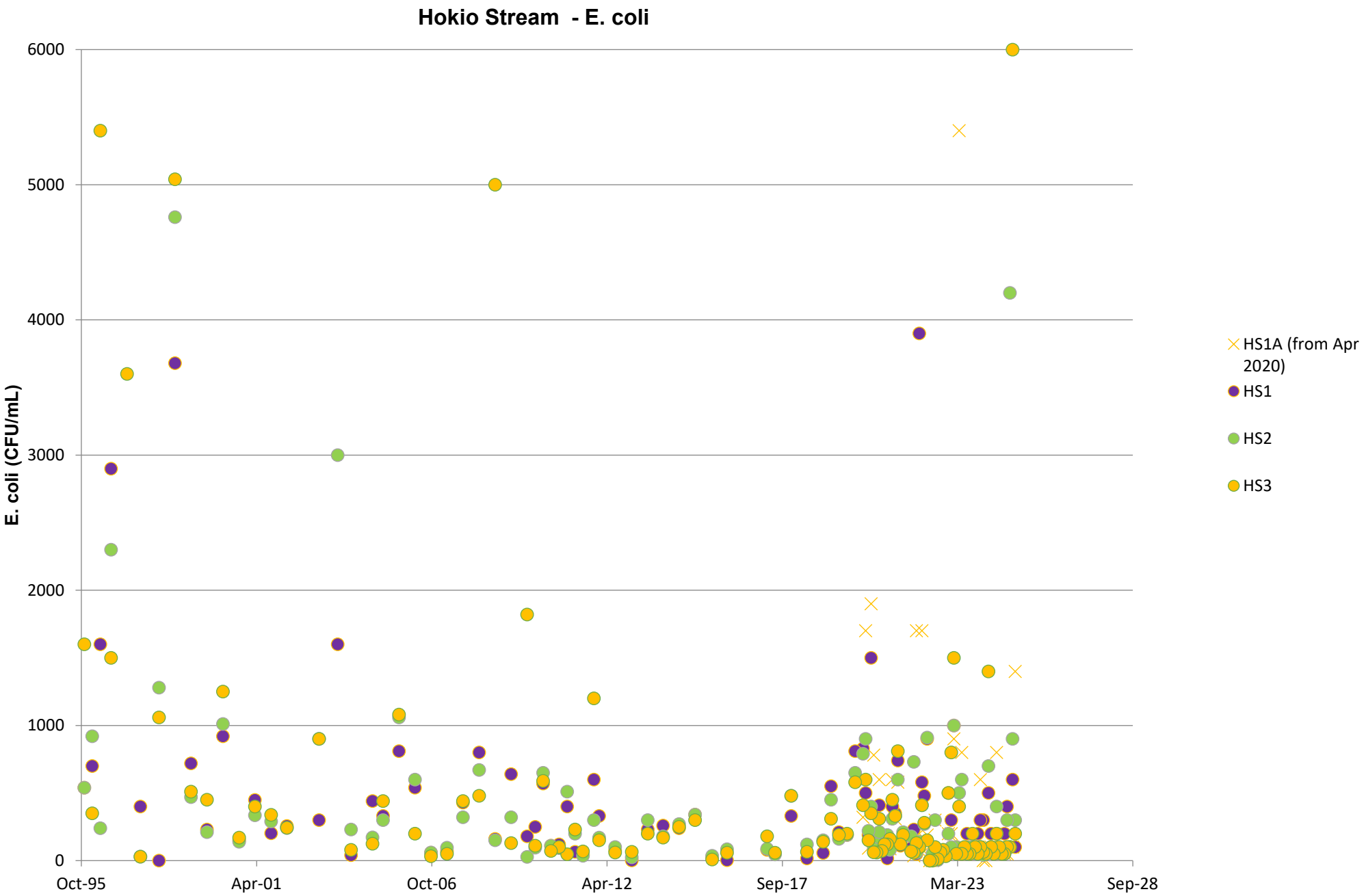

Hokio Stream - Boron Concentrations
Boron (mg/L)
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
HS1A (from Apr 2020)
HS1
HS2
HS3


Hokio Stream - Chloride Concentrations
Chloride (mg/L)
350
300
250
200
150
100
50
0
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
HS1A (from Apr 2020)
HS1
HS2
HS3


Hokio Stream - Ammoniacal-N Concentrations
Ammoniacal-N (mg/L)
9
8
7
6
5
4
3
2
1
0
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
HS1A (from Apr 2020)
HS1
HS2
HS3


Hokio Stream - Conductivity
Conductivity (mS/m)
45
40
35
30
25
20
15
10
5
0
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
HS1A (from Apr 2020)
HS1
HS2
HS3


Hokio Stream Sodium Concentrations
Sodium (mg/L)
600
500
400
300
200
100
0
Jan-93
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Dec-25
Sep-28
HS1A (from Apr 2020)
HS1
HS2
HS3


Hokio Stream - E. coli
E. coli (CFU/mL)
6000
5000
4000
3000
2000
1000
0
Oct-95
Apr-01
Oct-06
Apr-12
Sep-17
Mar-23
Sep-28
HS1A (from Apr 2020)
HS1
HS2
HS3

Appendix E Landfill Gas Monitoring Results at GW Bores for January 2025

Entry Date	Borehole	Methane (CH_4) %	Carbon Dioxide (CO_2) %	Hydrogen Sulphide (H_2S) ppm	Oxygen (O_2) %
14/01/2025	Levin Landfill: Levin G1d	0	0.09	0	20.7
14/01/2025	Levin Landfill: Levin D4	0	0.13	1	20.7
14/01/2025	Levin Landfill: Levin E1s	0	0.07	0	20.3
14/01/2025	Levin Landfill: Levin E1d	0.07	0.07	0	20.3
14/01/2025	Levin Landfill: Levin D3rd	0	0.08	1	20.4
14/01/2025	Levin Landfill: Levin D3rs	0	0.11	0	20.3
14/01/2025	Levin Landfill: Levin D5	0.07	0.06	0	20.9
14/01/2025	Levin Landfill: Levin F1	0	0.08	1	19.5
15/01/2025	Levin Landfill: Levin F2	0	0.15	0	20.8
15/01/2025	Levin Landfill: Levin F3	0	0.06	0	20.7
15/01/2025	Levin Landfill: Levin D2	0	0.15	1	20.6
15/01/2025	Levin Landfill: Levin D1	0	0.11	0	20.2
15/01/2025	Levin Landfill: Levin D6	0.07	0.07	1	20
15/01/2025	Levin Landfill: Levin E2d	0	0.13	0	20.8
15/01/2025	Levin Landfill: Levin E2s	0.01	0.12	0	20.8
15/01/2025	Levin Landfill: Levin Xd1	0	0.1	1	20.8
15/01/2025	Levin Landfill: Levin B3s	0	0.3	1	20.5
15/01/2025	Levin Landfill: Levin C1	0	0.2	0	20.6
15/01/2025	Levin Landfill: BH102	0	0.09	1	20.5
15/01/2025	Levin Landfill: Levin C2ds	0.05	0.23	1	19.4
15/01/2025	Levin Landfill: Levin C2ds	0	0.1	1	19.8
15/01/2025	Levin Landfill: Levin C2dd	0.07	0.12	1	19.6
15/01/2025	Levin Landfill: Levin B2	0.06	3.07	0	19
15/01/2025	Levin Landfill: BH103	0.05	0.12	1	20.1
15/01/2025	Levin Landfill: Levin B1	0	0.2	0	21.1
16/01/2025	Levin Landfill: Levin Xs2	0.06	0.09	0	20.7
16/01/2025	Levin Landfill: BH101B	0	0.3	0	20.3
16/01/2025	Levin Landfill: BH101A	0	0.05	0	20.2
16/01/2025	Levin Landfill: Levin Xs1	0	0.27	0	19.8
16/01/2025	Levin Landfill: BH104	0	0.16	0	19.9
22/01/2025	Levin Landfill: Levin G1s	0	0.18	0	20.5
22/01/2025	Levin Landfill: Levin G2s	0	0.11	0	21.1

Stantec

Stantec is a global leader in sustainable engineering, architecture, and environmental consulting. The diverse perspectives of our partners and interested parties drive us to think beyond what's previously been done on critical issues like climate change, digital transformation, and future-proofing our cities and infrastructure. We innovate at the intersection of community, creativity, and client relationships to advance communities everywhere, so that together we can redefine what's possible.