Levin Landfill October 2021 Quarterly Groundwater, Surface Water and Leachate Monitoring Report

PREPARED FOR Horowhenua District Council | November 2021

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Stantec

Revision Schedule

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Table of Contents

LIST OF TABLES

LIST OF APPENDICES

Abbreviations

ANZECC LDW	ANZECC 2000 Livestock Drinking Water
BDL	below the detection limit
COD	Chemical Oxygen Demand
DWSNZ GVs	Drinking Water Standards for New Zealand - Guideline Values for aesthetic determinants
DWSNZ MAVs	Drinking Water Standards for New Zealand – Maximum Acceptable Values
EC	Electrical Conductivity
HDC	Horowhenua District Council
Hg	soluble mercury
HRC	Horizons Regional Council
NH_4-N	Ammoniacal-nitrogen
NO_3-N	Nitrate nitrogen
scBOD5	soluble carbonaceous BOD5

Executive Summary

Horowhenua District Council (HDC) is required to carry out quarterly compliance monitoring of groundwater and monthly sampling of most of the surface water monitoring locations at the Levin Landfill, as part of the conditions on Resource Consents DP6009, DP6010, DP6011 and DP102259. This report summarises the findings for the monitoring events from the October 2021 sampling round and includes results for:

- Background (natural) groundwater
- Landfill leachate
- Groundwater bores within the new landfill and old irrigation area
- Shallow aquifers, down-gradient of the old landfill
- The deep aquifer
- The Tatana Drain, and
- The Hokio Stream.

Stantec has reviewed the results of this October (second quarter) monitoring round on behalf of HDC.

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

Samples were collected from 26 groundwater bores, the landfill leachate at a manhole next to the leachate pond, and at five surface water sites during October 2021 around and on the Levin Landfill. The samples were analysed for the parameters set out in Discharge Permit 6010.

Due to miscommunication between HDC and the monitoring contractor, monthly sampling of the Hokio Stream, leachate manhole and Tatana Drain was not undertaken in August and September 2021. Additionally, the new groundwater bores D3rs and D3rd should be sampled for the comprehensive suite of parameters for a period of two years following their installation. These omissions will need to be corrected in the next quarterly monitoring round.

The October 2021 samples were collected progressively over a 13-day period, which is longer than the normally accepted 7 days. Meeting the monitoring timeframe is important because it means that there can be greater confidence in comparing results from different parts of the site. It is observed that this 7-day window is consistently exceeded during the monitoring periods, and it is therefore recommended that HDC investigate why this is and put plans in place to ensure future samples are completed within 7 days.

The resource consent for the landfill (namely discharge permit 6010) 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 ANZECC 2000 Livestock Drinking Water (ANZECC LDW) trigger values respectively. Compliance limits for surface water are based on the ANZECC 2000 Aquatic Ecosystems (ANZECC AE) 95% trigger values, as required by the revised Resource Consent condition approved in December 2019.

The October 2021 monitoring results have been assessed against these limits, where they are applicable.

Sixteen non-compliances with resource consent conditions were recorded at ten individual monitoring locations, as follows:

- For E. Coli in bores B2 and C2 (with 1700 CFU/100ml and 300 CFU/100ml respectively, which exceeds the ANZECC LDW limit of 100 CFU/100ml)
- For E. Coli in bores C2DD and D3rd (being 3.9 CFU/100ml and 8 CFU/100ml respectively, which exceeds the DWSNZ limit of Nil)
- For dissolved manganese in bores C2DD, Xd1, and D3rd (being 0.604 mg/L, 0.471 mg/L, and 0.537 mg/L respectively the concentration exceeded the DWSNZ MAV of 0.4mg/L)
- The nitrate-N concentration at the Tatana Property Drain (being 0.39 mg/L, which exceeds the ANZECC AE (95%) limit of 0.16 mg/L)

- For HS1A, HS1, HS2, and HS3, the nitrate-N concentration exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- For HS1A, HS1, HS2, and HS3, the dissolved copper concentration marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.

The October 2021 results were also considered in the context of background water quality, both within the groundwater aquifers (shallow and deep bores) and the surface water receiving environment. For example, low pH at background bore G1S, and elevated iron concentrations in the same bore indicate that groundwater could be being impacted by up-gradient activities unrelated to the landfill operations.

Results from a sample of leachate taken from a manhole next to the leachate pond were within the range of data obtained from previous monitoring events at this leachate manhole and are generally well below those recorded at typical Class 1 landfills in New Zealand.

Methane was detected in three groundwater monitoring bores in the October 2021 sampling round. This is a substantial decrease compared to the last monitoring round but may be reflective of field technicians' familiarity with the use of the gas detection instruments. The highest concentration of methane was in bore D6 (0.1%) which was well below the lower explosive limit for methane (which is 5%).

Hydrogen sulphide was not detected in any of the groundwater bores during the October 2021 sampling round.

1.0 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 32 locations, as required by the resource consent conditions (namely for discharge permit 6010). These sampling locations consist of 26 boreholes penetrating the sand and gravel aquifers, four surface water sampling locations within Hokio Stream, one surface sampling location along the Tatana Drain and a 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 and active landfill. The new landfill footprint is being developed in stages. The most recent stage is Stage 3C which was developed in 2017, though landfill operations have, until the end of October 2021, occurred over the top of Stages 1A, 2 and 3C. The current landfill has reached capacity and is in the process of being capped. Council is due to decide in February 2022 whether it will continue with landfilling in a new stage that has yet to be constructed.

The Levin Landfill site is located above two identified aquifers, a shallow sand aquifer and a deeper gravel aquifer. 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. Horizons Regional Council hydrology staff advises that '*the general confined groundwater flow direction is towards the west*". 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 of the changes. Sampling since the January 2021 sampling round has been in line with what has been done previously, but different reference parameters have been applied to assess the surface water sampling results, as required by the new consent conditions.

This report presents the results for the October 2021 quarterly monitoring round.

Please note, the laboratory detection limit for E. coli is 1 cfu/100ml; however, in the results received, results were often noted as being below detection levels at <100 cfu/100ml or <4 cfu/100ml. This is assumed to be an error and has been noted in the report as being "not detected". There were also some results reported with a concentration of 0. It is assumed this means the parameter was below the laboratory detection limit.

2.0 GROUNDWATER AND SURFACE WATER MONITORING

2.1 SAMPLE ANALYSES

Samples were collected by Downer (a contractor to HDC) on 7, 11, 12, 13, 14, and 19 October 2021.Samples were received by the Eurofins ELS Ltd laboratory in Lower Hutt, Wellington on 8, 12, 13, 14, 15, and 20 October 2021.

The monitoring programme for July 2021 - April 2024 is summarised in the schedule in Appendix B. From July 2019, faecal coliform counts analyses have been included within the indicator and comprehensive analytical suites, as agreed by HDC with the Horizons Regional Council (HRC). This means that faecal coliform counts will be assessed more frequently throughout each year, as compared to the past monitoring regime.

Groundwater samples taken from the boreholes were analysed for the indicator suite of parameters which are outlined in Table 2-1. Surface water samples from Hokio Stream and samples of landfill leachate effluent were analysed for the indicator list of parameters. Surface water samples collected from the Tatana Property drain were analysed based on a specific parameter list that has been included in the reviewed resource consent conditions. From the April 2020 monitoring round onwards, sampling of the Tatana Drain has followed the comprehensive and indicator suites of parameters used for other surface water sampling.

Note that, following the revision of the resource consent conditions which were approved in December 2019, soluble carbonaceous BOD_5 ($scBOD_5$) and soluble mercury (Hg) have each been added to the indicator and comprehensive suites of parameters, and E. coli 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 has commenced from the April 2020 sampling round.

Table 2-1: Indicator Parameters

Type	Parameters
Characteristics	pH Electrical Conductivity (EC)
Oxygen demand	Chemical Oxygen Demand (COD), $scBOD_5$++
Nutrients*	Nitrate nitrogen (NO_3-N), Ammoniacal-nitrogen (NH_4-N)
Metals*	Aluminium, Manganese, Mercury++, Nickel, Lead
Other elements	Boron, Chloride
Biological+	E. coli

Note:

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

**Selected bores as per stormwater consent 102559

+Faecal coliforms added from July 2019 onwards (see Appendix B)

++Soluble carbonaceous BOD_5 ($scBOD_5$) and Soluble Mercury added as per revised consent conditions for Discharge Permit 6010, December 2019

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 that is used in the annual report. This is standard practice when dealing with chemical concentrations in water. However, the same rule cannot be applied for E. coli in the context of the Levin Landfill.

2.2 BACKGROUND GROUNDWATER QUALITY

The quality of the natural background water up-gradient from the landfill site is not subject to any consent conditions. However, for comparison purposes, both the ANZECC LDW trigger values and the DWSNZ guidelines were used to benchmark the quality of water up-gradient from the landfill site.

Groundwater samples are collected from the two background bores situated hydraulically up-gradient from both the new and old landfills to the southeast of the site (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.

The results are presented in Table 2-2.

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 C and the historical graphs are presented in Appendix D.

Table 2-2: Background Monitoring Results for October 2021

Determinant	Units	DWSNZ MAV	ANZECC LDW	G1S	G1D	F3
Water level	mBGL	-	-	13.95	14.47	5.4
pH	-	7 to 8.5*	6 to 9	7.0	7.4	7.4
Conductivity	mS/m	-	-	53.2	27.5	21.8
COD	mg/L	-	-	99.0	*7.5*	14.99
$scBOD_5$	mg/L	-	-	*3.0*	*1.5*	2.9
E. Coli	CFU/100ml	NIL	100	ND	ND	**4**

Determinant	Units	DWSNZ MAV	ANZECC LDW	G1S	G1D	F3
Chloride	mg/L	250*	-	106.0	31.0	19.5
Nitrate-N	mg/L	11.3	90.3	0.03	*0.005*	1.09
Ammoniacal-N	mg/L	1.17	-	0.05	0.09	BDL
Sodium	mg/L	200*	-	85.1	n/r	26.8
Dissolved Aluminium	mg/L	0.1*	5	**0.121**	*0.001*	0.003
Dissolved Boron	mg/L	1.4	5	*0.015*	0.04	0.02
Dissolved Iron	mg/L	0.2*	-	**3.22**	n/r	BDL
Dissolved Lead	mg/L	0.01	0.1	0.0014	*0.00025*	0.0004
Dissolved Manganese	mg/L	0.4	-	0.0737	0.0628	0.0009
Dissolved Mercury	mg/L	0.007	0.002	*0.00025*	*0.00025*	0.0004
Dissolved Nickel	mg/L	0.08	1	0.0013	*0.00025*	0.0004

Notes:

*denotes guideline values for aesthetic determinants (G.V.)

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

'ND' indicates where E. coli were not detected

n/r – not required to be tested during this monitoring period

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

The results in Table 2-2 show that all parameters at bore G1D were within the ANZECC LDW trigger values and DWSNZ limits during the October 2021 monitoring round. Bores G1S and F3 however showed exceedances of the DWSNZ limits though no exceedances of the ANZECC LDW values. At bore G1S, dissolved aluminium (0.121 mg/L) and dissolved iron (3.22 mg/L) concentrations exceeded the DWSNZ limits of 0.1 mg/L and 0.2 mg/L respectively. At bore F3, E. coli was detected in a concentration of 4 CFU/100ml, which exceeds the DWSNZ limit of nil. However, this result is not considered to be an issue as it is within historical ranges and not considered to be the result of landfill activities.

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, D3(rs), D4, D5, 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 D4 is likely to show evidence of 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 unlikely that leachate from the new landfill will significantly affect groundwater quality due to the leachate collection system which is in place at the new landfill; however, these bores would still give early warning of any potential problems. It is noted that bore D3r has been replaced with two bores, D3rs, which is a shallow bore and D3rd, which is a deep bore. This is discussed in section 2.3.2. It is noted also that new bores D3rs and D3rd should be sampled for the comprehensive suite of parameters for the first two years following installation. This monitoring regime needs to be implemented from the time of the next sampling round.

The results from the October 2021 monitoring round for most of these bores are presented in 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 C and the historical graphs are presented in Appendix D.

There were **no exceedances of the resource consent conditions during the October 2021** monitoring round in samples from the shallow aquifer.

Table 2-3: D-Series and E1S Monitoring Bore Results for October 2021

Determinant	Units	ANZECC LDW	D1	D2	D3(rs)	D4	D5	D6	E1S
Water level	mBGL	-	16.83	21.49	Not provided	7.79	9.46	16.42	11.32
pH	-	6 to 9	6.9	6.5	6.3	7.5	7.4	7.0	7.1
Conductivity	mS/m	-	45.4	43.3	21.7	29.6	29.7	43.5	26.4
COD	mg/L	-	*7.5*	*7.5*	62.0	19.0	*7.5*	*7.5*	*7.5*
$scBOD_5$	mg/L	-	*1.5*	*3.0*	*3.0*	*1.5*	*1.5*	*1.5*	*1.5*
E-Coli	CFU/100ml	100	ND	ND	ND	ND	4	ND	ND
Chloride	mg/L	-	31.4	38.0	32.0	35.5	28.2	20.5	26.7
Nitrate-N	mg/L	90.3	7.95	0.01	*0.005*	*0.005*	1.5	16.2	0.02
Ammoniacal-N	mg/L	-	*0.005*	0.59	0.54	0.23	0.01	0.01	0.2
Dissolved Aluminium	mg/L	5	*0.001*	0.006	0.06	*0.001*	0.002	0.003	0.007
Dissolved Boron	mg/L	5	0.06	0.07	0.05	0.12	0.04	0.06	0.03
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.0007
Dissolved Manganese	mg/L	-	0.001	0.41	0.512	0.188	0.0161	0.0015	0.258
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*	*0.00025*	0.0009	*0.00025*	*0.00025*	*0.00025*	*0.00025*

Notes:

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

copper trigger values range from 0.4 mg/L for sheep, up to 5 mg/L for poultry

'ND' indicates where E. coli were not detected

2.3.2 Deep Gravel Aquifer

Bores E1D, C2DD, E2D, Xd1, and the new bore D3rd all penetrate the deeper gravel aquifer. Deep groundwater flow is assumed to be towards the northwest.

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 downstream of the old landfill.

Results for the October 2021 compliance monitoring round are presented in Table 2-4. The results have been compared with the DWSNZ as per the requirements of discharge consent 6010. The full laboratory report is included in Appendix C and the historical graphs are presented in Appendix D.

Table 2-4: Results for Monitoring Bores within the Deep Aquifer for October 2021

Determinant	Units	DWSNZ MAV	E1D	C2DD	E2D	Xd1	D3rd
Water level	mBGL	-	11.19	2.42	4.44	2.44	Not provided
pH	-	7 to 8.5*	7.8	7.6	7.6	7.5	7.5
Conductivity	mS/m	-	44.9	55.8	44.5	54.3	53.1
COD	mg/L	-	*7.5*	28	*7.5*	31.0	28
$scBOD_5$	mg/L	-	*1.5*	2.9	*1.5*	*1.5*	*1.5*
E-Coli	CFU/100ml	NIL	ND	**3.9**	ND	ND	**8**
Chloride	mg/L	250*	38.2	28.1	40.6	62.7	21.8
Nitrate-N	mg/L	11.3	*0.005*	BDL	0.01	*0.005*	0.3
Ammoniacal-N	mg/L	1.17	0.19	0.33	0.25	0.38	0.04
Sodium	mg/L	200*	40.1	n/r	n/r	45.1	25.7
Dissolved Aluminium	mg/L	0.1*	*0.001*	0.003	*0.001*	0.003	0.005
Dissolved Boron	mg/L	1.4	0.06	0.07	0.06	0.05	0.05
Dissolved Iron	mg/L	0.2*	0.03	n/r	n/r	0.048	0.028
Dissolved Lead	mg/L	0.01	*0.00025*	0.0004	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	0.4	0.236	**0.604**	0.398	**0.471**	**0.537**
Dissolved Mercury	mg/L	0.007	*0.00025*	0.0004	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.08	*0.00025*	0.0004	*0.00025*	*0.00025*	*0.00025*

Notes:

* denotes guideline values for aesthetic determinants (G.V.)

Bold – denotes an exceedance of the relevant DWSNZ (2008) standard

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

n/r – not required to be tested during this monitoring period

'ND' indicates where E. coli were not detected

There were five exceedances of the DWSNZ limits in samples from the deep gravel aquifer during the October 2021 monitoring round, as follows:

- For E.Coli bores C2DD and D3rd exceeded the DWSNZ MAV of nil. While the detection of E. coli at bore C2DD at significant levels is not common, it has occurred previously. As bore D3rd is a new bore, there is as yet no record of results over time and this should be scrutinised in future reports to determine if this result is an outlier or representative of an overall trend.

- The dissolved manganese concentrations in bores C2DD, Xd1, and D3rd exceeded the DWSNZ MAV of 0.4mg/L. The results for C2DD and Xd1 are within the historical range of concentrations observed. As bore D3rd is new any trends will not become apparent until further results have been obtained in subsequent quarterly monitoring rounds and comparisons can be made.

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 Hokio 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 Hokio Road and the entrance road to the landfill.

Bores Xs1 and Xs2 are located along Hokio Beach Road, within the road reserve. Bore Xs1 is adjacent to Tatana's property and bore Xs2 is next to the driveway leading to a Council-owned property. Bore Xs2 is considered to be hydraulically upgradient of the old landfill (See Site Plan, Appendix A).

The results from the October 2021 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 6010. The full laboratory report is included in Appendix C and the historical graphs are presented in Appendix D.

There were **two exceedances of the ANZECC LDW trigger values during the October 2021** monitoring round. These were for E. coli which has a limit of 100 CFU/100ml. This limit was exceeded at bores B2 and C2 with results of 1700 CFU/100ml and 300 CFU/100ml respectively being recorded.

Therefore, these results show non-compliance with the resource consent conditions.

Table 2-5: Monitoring Results for Shallow Boreholes Down-Gradient from the Old Landfill for October 2021

Determinant	Units	ANZECC LDW	E2S	B1	B2	B3	C1	C2	C2DS	G2S	Xs1	Xs2
Water level	mBGL	-	5.34	0.77	0.98	0.0	0.0	0.0	2.53	1.9	0.4700	2.3
pH	-	6 to 9	7.9	7.0	7.1	7.3	7.5	7.2.0	7.4	7.3	6.5	6.8
Conductivity	mS/m	-	33.2	161.0	205.0	242.0	113.0	238.0	104.0	129	86.6	16.6
COD	mg/L	-	54.0	77.0	101.0	215.0	74.0	135.0	65.0	*7.5*	68	*7.5*
$scBOD_5$	mg/L	-	*1.5*	*1.5*	*1.5*	*3.0*	*3.0*	*3.0*	*3.0*	*1.5*	*3*	*3*
E-Coli	CFU/100ml	100	4	*2*	**1700**	*50*	*2*	**300**	*50*	*2*	8	*2*
Chloride	mg/L	-	35.6	216.0	107.0	114.0	152.0	126.0	50.1	163.0	52.5	11.5
Nitrate-N	mg/L	90.3	*0.005*	21.4	54.8	*0.05*	0.04	*0.05*	*0.005*	*0.005*	*0.005*	0.65
Ammoniacal-N	mg/L	-	0.36	6.29	25.8	173.0	1.42	165.0	1.29	0.06	11.2	0.1
Sodium	mg/L	-	27.4	n/r	n/r	n/r	n/r	n/r	n/r	n/r	45.3	14.2
Dissolved Aluminium	mg/L	5	0.002	0.005	0.033	0.004	0.009	0.023	0.005	0.004	0.006	0.008
Dissolved Boron	mg/L	5	*0.015*	0.93	1.87	1.24	0.89	1.49	0.74	1.09	0.09	*0.015*
Dissolved Iron	mg/L	-	0.11	n/r	n/r	n/r	n/r	n/r	n/r	n/r	2.61	0.158
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	*0.00025*	*0.00025*	*0.00025*	0.0008	0.0006	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	-	0.22	6.97	4.33	2.62	0.244	0.0554	1.59	0.108	1.6	0.0725
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*	0.0021	0.0026	0.0085	0.0009	0.0049	0.0018	0.0031	0.0006	*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 to be tested during this monitoring period

copper trigger values range from 0.4 mg/L for sheep, up to 5 mg/L for poultry

'ND' indicates where E. coli were not detected

Bold - denotes exceedance of ANZECC LDW

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. 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 6010. The full laboratory report is included in Appendix C 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 October 2021 monitoring round.

Table 2-6: Results from Monitoring Bores in the Irrigation Area for October 2021

Determinant	Units	ANZECC LDW	F1	F2	F3
Water level	mBGL	-	7.65	2.64	5.4
pH	-	6 to 9	7	7.4	7.4
Conductivity	mS/m	-	45.2	21.9	21.8
COD	mg/L	-	21	*7.5*	14.99
$scBOD_5$	mg/L	-	*1.5*	*1.5*	2.9
E-Coli	CFU/100ml	100	*2*	*2*	4
Chloride	mg/L	-	44.4	22.4	19.5
Nitrate-N	mg/L	90.3	0.52	0.28	1.09
Ammoniacal-N	mg/L	-	*0.005*	*0.005*	BDL
Dissolved Aluminium	mg/L	5	0.003	0.002	0.003
Dissolved Boron	mg/L	5	0.04	0.04	0.02
Dissolved Lead	mg/L	0.1	*0.00025*	*0.00025*	0.0004
Dissolved Manganese	mg/L	-	0.0241	0.0027	0.0009
Dissolved Mercury	mg/L	0.002	*0.00025*	*0.00025*	0.0004
Dissolved Nickel	mg/L	1	0.0008	*0.00025*	0.0004

Notes:

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

n/r – not required to be tested during this monitoring period

copper trigger values range from 0.4 mg/L for sheep, up to 5 mg/L for poultry

'ND' indicates where E. coli were not detected

* Value was noted as '0' in results received, however it is assumed it indicates the concentration was below the laboratory detection limit.

2.6 LEACHATE EFFLUENT RESULTS

Leachate effluent from the landfill is not subject to any water quality consent conditions. However, for comparison purposes, typical leachate characteristics for landfills, as published by the Waste Management Institute New Zealand (*Technical Guidelines for Disposal to Land*, August 2018, WasteMINZ), have been compared against the leachate quality monitoring results (Table 2-9). The full laboratory report is included in Appendix C and the historical graphs are presented in Appendix D. Table 2-9 shows that the concentrations of monitored parameters

for leachate effluent samples collected in October 2021 were mostly within the typical ranges to be expected for this type of landfill.

The August and September 2021 sampling was not completed due to a miscommunication, as noted previously. Monthly sampling will resume from November 2021 onwards.

No exceedances of the typical leachate characteristics were observed in the October 2021 monitoring results.

It is noted that the leachate effluent is sent to Levin WWTP for treatment.

Table 2-7: Results from Leachate Effluent Monitoring for October 2021

Determinant	Units	Typical Leachate Characteristics* (range)	October
pH		5.9 - 8.5	7.8
Suspended Solids	mg/l	-	30.0
Phenol	mg/L	-	0.22
VFA	mg/L	-	*25.0*
TOC	mg/L	-	602.0
Alkalinity	mg $CaCO_3$/L	-	5280.0
Conductivity	mS/m	308 – 27,900	1260.0
COD	mg/L	84 – 5,090	2720.0
$scBOD_5$	mg/L	-	95.0
E-Coli	CFU/100mL	-	640.0
Chloride	mg/L	45 – 2,584	962.0
Nitrate-N	mg/L	-	*0.5*
Sulphate	mg/L	-	69.5
Ammonia-N	mg/L	3.4 – 1,440	1070.0
Hardness	mg $CaCO_3$/L	-	440.0
Calcium	mg/L	-	99.6
Magnesium	mg/L	-	46.5
Potassium	mg/L	-	556.0
Sodium	mg/L	50 – 4,000**	818.0
D.R. Phosphorus	mg/L	-	12.3
Dissolved Aluminium	mg/L	-	0.637
Dissolved Arsenic	mg/L	-	0.318
Dissolved Boron	mg/L	0.54 – 20.1	6.55
Dissolved Cadmium	mg/L	-	*0.0001*
Dissolved Chromium	mg/L	-	0.529
Dissolved Copper	mg/L	-	0.0174
Dissolved Iron	mg/L	1.6 – 220	4.45
Dissolved Lead	mg/L	0.001 - 0.42	0.0033
Dissolved Manganese	mg/L	0.3 - 45***	1.33
Dissolved Mercury	mg/L	0.2 – 50	*0.00025*
Dissolved Nickel	mg/L	0.02 – 2.05**	0.1
Dissolved Zinc	mg/L	-	0.073

Notes:

* for Class 1-type landfills, Table 5-5, p82, Technical Guidelines for Disposal to Land, WasteMINZ August 2018 (same as Table 4.2 of the CAE Landfill Guidelines 2000, but corrections made to Table 5-5 in line with Table 4.2)

**Data taken from Table 5-4, p81 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, p81 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

2.7 TATANA PROPERTY DRAIN

A drain is located on 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).

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'.

Results from the October 2021 sampling round are presented in Table 2-8 and have been compared with the ANZECC AE[1] 95% trigger values, as per the revised resource consent conditions.

Table 2-8 Tatana Drain Monitoring Results for October 2021

Determinant	Units	ANZECC AE (95%)	TD1 (formerly SW3)
pH	-	-	7.2
Conductivity	mS/m	-	60.4
COD	mg/L	-	98.0
$scBOD_5$/	mg/L	2	***3.0***
E-Coli	CFU/100ml	-	200.0
Chloride	mg/L	-	71.8
Nitrate-N	mg/L	0.16	**0.39**
Ammoniacal-N	mg/L	2.1	0.53
Dissolved Aluminium	mg/L	0.055	0.025
Dissolved Boron	mg/L	-	0.3
Dissolved Lead	mg/L	0.0034	*0.00025*
Dissolved Manganese	mg/L	1.9	0.157
Dissolved Mercury	mg/L	0.0006	*0.00025*
Dissolved Nickel	mg/L	0.011	0.002

Notes:
Bold – denotes an exceedance of the ANZECC AE 95% protection level trigger values
All `<' values have been reported as half the detection limit for statistical purposes and are expressed in italics
n/r – not required to be tested during this monitoring period

There were exceedances of the resource consent conditions for two monitored parameters in a sample from the Tatana Drain property at the TD1 location during the October 2021 sampling round.

The nitrate-N concentration of 0.39mg/L exceeded the ANZECC AE 95% trigger value of 0.16mg/L. Historically, the nitrate-N concentration has fluctuated significantly and the October 2021 value is in fact still within this historical range.

[1]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

The concentration of $scBOD_5$ of 3mg/L also exceeded the ANZECC AE (95%) trigger value of 2 mg/L. This is not considered an issue however, as the result for $scBOD_5$ was below the detection limit of 6 mg/L; it has therefore been depicted as "3" in italics. In other words, this apparent exceedance of the trigger value is misleading.

Previously, the ammoniacal-N concentration was noted as exceeding the ANZECC AE (95%) limit and showing a sudden change compared to the historical results. It is noted that the concentrations of this parameter in the previous monitoring reports (April and July 2021) and the concentrations for October 2021 were all below the ANZECC AE (95%) limit and significantly lower than historical ranges. The cause of these significant concentration fluctuations is not known, and this matter should be kept under observation in subsequent reports.

2.8 HOKIO STREAM

Surface water grab samples are obtained from Hokio 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 Tatana Property Drain discharge, and HS3 is located approximately 50m down-stream of the landfill site property boundary and the Tatana Property Drain discharge. Samples from these monitoring locations on Hokio Stream are analysed for a comprehensive suite of parameters every month (as shown in Appendix B).

As noted above, August and September 2021 sampling was not completed because of a miscommunication and monthly sampling will resume from November 2021 onwards.

Results from the October 2021 sampling round are presented in Table 2-9 and have been compared with the ANZECC AE 95% trigger values, as per the revised resource consent conditions.

Monitoring for $scBOD_5$ and soluble mercury concentrations has now been added as per the revised Resource Consent conditions.

The revised conditions have recently been implemented and monitoring of these additional parameters, including at the new location, commenced during the April 2020 monitoring round.

Table 2-9: Hokio Stream Monitoring Results for October 2021

Determinant	Units	ANZECC AE (95%)	Consent Trigger Values (Table C1)	HS1A (new)	HS1	HS2	HS3
pH	-	-	-	7.4	7.4	7.3	7.4
Suspended Solids	mg/l	-	-	18.0	11.0	15.0	13.0
Phenol	mg/L	0.320	-	*0.025*	*0.025*	*0.025*	*0.025*
VFA	mg/L	-	-	*2.5*	*2.5*	*2.5*	*2.5*
TOC	mg/L	-	-	5.3	5.6	6.9	5.6
Alkalinity	mg CaCO3/L	-	-	47.0	47.0	50.0	50.0
Conductivity	mS/m	-	-	21.4	21.60	22.2	22.0
COD	mg/L	-	-	17.0	18.0	31.0	26.0
$scBOD_5$	mg/L	2	Monthly Ave. 2	***3.0***	***3.0***	***3.0***	***3.0***
E-Coli	CFU/100ml	-	-	170.0	92.0	180.0	68.0
Chloride	mg/L	-	-	20.4	20.8	22.2	21.4
Nitrate-N	mg/L	0.16	0.16	**1.3**	**1.28**	**1.25**	**1.27**
Sulphate	mg/L	-	-	20.6	20.6	20.0	20.5
Ammoniacal-N	mg/L	2.1	Max. 2.1 Ave. 0.400	0.1	0.08	0.11	0.12
Hardness	mg CaCO3/L	-	-	56.0	56.0	58.0	57.0

Determinant	Units	ANZECC AE (95%)	Consent Trigger Values (Table C1)	HS1A (new)	HS1	HS2	HS3
Calcium	mg/L	-	-	12.5	12.5	12.8	12.7
Magnesium	mg/L	-	-	6.0	6.02	6.24	6.06
Potassium	mg/L	-	-	3.3	3.46	3.9	3.75
Sodium	mg/L	-	-	17.1	17.0	17.9	17.3
D.R. Phosphorus	mg/L	-	-	0.016	0.016	0.021	0.023
Dissolved Aluminium	mg/L	0.055	Med. 0.055	0.021	0.02	0.014	0.016
Dissolved Arsenic	mg/L	0.024	Med. 0.024	*0.0005*	*0.0005*	*0.0005*	*0.0005*
Dissolved Boron	mg/L	0.370	-	0.1	0.06	0.07	0.06
Dissolved Cadmium	mg/L	0.0002	Med. 0.0002	*0.0001*	*0.0001*	*0.0001*	*0.0001*
Dissolved Chromium (VI)	mg/L	0.001	-	*0.0005*	*0.0005*	*0.0005*	*0.0005*
Dissolved Copper	mg/L	0.0014	Med. 0.0014	**0.0018**	**0.0015**	**0.0015**	**0.0016**
Dissolved Iron	mg/L	-	-	0.1	0.096	0.151	0.114
Dissolved Lead	mg/L	0.0034	Med. 0.0034	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Manganese	mg/L	1.9	-	0.0059	0.005	0.0116	0.0235
Dissolved Mercury	mg/L	0.0006	Med. 0.0006	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Nickel	mg/L	0.011	Med. 0.011	*0.00025*	*0.00025*	*0.00025*	*0.00025*
Dissolved Zinc	mg/L	0.008	Med. 0.008	*0.001*	*0.001*	0.003	0.002

Notes:

NR = Not reported

BDL = Below detection limit

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

Underlined – denotes exceedance of the Consent Trigger Values

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

* Value was noted as '0' in results received, however it is assumed it indicates the concentration was below the laboratory detection limit

There were **eight exceedances** of the resource consent conditions in samples from the Hokio Stream during the October 2021 sampling round. These are summarised as follows:

- For all sampling locations, the nitrate-N concentration exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- For all sampling locations, the dissolved copper concentration marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.

Please note that using the method of halving results that are recorded as being below detection limits, the $scBOD_5$ concentrations at all three sites (HS1A, HS2, and HS3) in the October 2021 monitoring round is expressed as 3 mg/L. This suggests that there are exceedances of the ANZECC AE (95%) trigger value of 2

mg/L which is incorrect. Therefore, these results for scBOD$_5$ concentrations have been represented in Table 2-9 as being below the detection limit (i.e. as "BDL").

Overall, the differences in monitoring results between the sites are marginal and there is little to no change in concentrations between upstream and downstream sites on the Hokio Stream. An exception is the nitrate-N concentration which shows an increasing trend at all the sites.

For some parameters there may be an apparent decreasing trend downstream but this is not consistent over all parameters and there may even be slight increases for some parameters. Therefore, this suggests that any influences found are likely to be as a result of upstream sources and not the old (closed) landfill.

3.0 LANDFILL GAS DETECTION IN MONITORING WELLS

Condition 4 of Discharge Permit 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…*"

In the past, landfill gas monitoring results were only reported in the Annual Report. A recommendation of the 2019-2020 Annual Report was that these results should be included in every quarterly monitoring report so that if any results are unusually high, appropriate action can be promptly undertaken, including putting safeguards in place at the monitoring bores.

Appendix E summarises the results of landfill gas monitoring undertaken on 7 October 2021.

Out of the 26 groundwater monitoring bores:

- Methane was detected in three of the bores. The highest recorded level was 0.1% in bore D6. This is well below the lower explosive limit of 5% and is therefore deemed at represent a 'safe' level. However, the detection of methane reinforces the need for the necessary precautions generally applicable at landfill sites to be taken when conducting sampling.
- Hydrogen sulphide was not detected at any bores.
- These landfill gas levels are an improvement on those levels reported in the July quarterly monitoring report and reinforce the importance of continuing to monitor these changes and map any patterns.

The possibility of encountering methane in groundwater bores endorses the need for appropriate health and safety measures to be adopted during monitoring, as is the case for the landfill gas extraction wells. No smoking should be permitted when personnel undertake groundwater sampling and also when in the vicinity of the groundwater monitoring wells, or in fact anywhere else on the Levin Landfill site.

4.0 DISCUSSION

4.1 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 a sampling period that is too long may make comparisons of results between rounds and individual monitoring locations less valid.

The October 2021 samples were collected progressively over a 13-day period, which is longer than the normally accepted 7 days (which is a consent condition requirement). Meeting the monitoring timeframe is important because it means that there can be greater confidence in comparing results from different parts of the site. It is observed that this 7-day window is consistently exceeded during the monitoring periods and it is therefore recommended that HDC investigate why this is and put plans in place to ensure future sampling is completed within 7 days.

4.2 BACKGROUND GROUNDWATER QUALITY

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

Results since 2010 for the background bores indicate that low pH values are representative of background water quality in the shallow sand aquifer (G1S). However, the pH level for the October 2021 sampling round was 7.0 which is on the lower limit of the DWSNZ MAV. This represents an increase in pH as compared to the pH level in the July 2021 monitoring round which was 6.6. As usual the deeper gravel aquifer (G1D) has a slightly higher pH of 7.4.

Dissolved iron concentrations have fluctuated considerably at both the G1S and G1D bores since monitoring began and are occasionally above the DWSNZ GV. During the October 2021 sampling round, the iron concentration at G1S (3.22 mg/L) exceeded the DWSNZ GV of 0.2 mg/L but was still within the historical results range recorded at these bores. Elevated iron concentrations in groundwater are likely to be related to hydrogeological conditions found at the site and this phenomenon is common in groundwater in this area.

During the October 2021 sampling round, the dissolved aluminium concentration at G1S (0.121 mg/L) marginally exceeded the DWSNZ MAV limit of 0.1 mg/L. The October 2021 value is within historical ranges.

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 and therefore may not be suitable to use as a yardstick of background water quality in the future.

4.3 SHALLOW AQUIFER GROUNDWATER QUALITY

4.3.1 Hydraulically up-gradient of the Old Landfill and down gradient of the new landfill

Sampling results from the October 2021 monitoring round show that water quality in the shallow monitoring bores hydraulically up-gradient from the old landfill complies with the discharge consent conditions.

4.3.2 Hydraulically down-gradient of the Old Landfill

There were **two exceedances of the ANZECC LDW trigger values during the October 2021** monitoring round. This was for E. coli which has a limit of 100 CFU/100ml. This limit was exceeded at bores B2 and C2 with 1,700 CFU/100ml and 300 CFU/100ml respectively being recorded.

Therefore, these results show non-compliance with the resource consent conditions.

4.3.3 Irrigation Area

There were **no exceedances of the resource consent conditions** during the October 2021 monitoring round in samples from the Irrigation Area.

4.4 DEEP AQUIFER GROUNDWATER QUALITY

The concentration of dissolved manganese exceeded the DWSNZ MAV at C2DD (0.604 mg/L), Xd1 (0.471 mg/L), and D3rd (0.537 mg/L) within the deep gravel aquifer in the October 2021 monitoring round. However, it is noted that these manganese concentrations at C2DD and Xd1 are consistent with historical results and appears to be representative of background groundwater quality in the area. Given that currently there is only one set of results for the new bore D3rd, it is too early to draw conclusions about any patterns and if trends are within historical ranges or not.

In the previous monitoring round (July 2021), the dissolved lead concentration in bore E1D was noted as exceeding the DWSNZ MAV limit and this was a significant increase when compared to the historical range observed. In the October 2021 monitoring round, the dissolved lead concentration had reduced significantly and

was below the laboratory detection limit. It is therefore assumed that the July 2021 result was an anomaly and does not indicate the start of an increasing trend in lead concentrations.

It was also noted in the July 2021 monitoring round that there was an unexpected exceedance of the E. coli concentration at bore E1D. The October 2021 results show that E. coli has now returned to a level below the laboratory detection limit at bore E1D and therefore, once again, the July 2021 result for this parameter is considered to be an anomaly rather than an increasing trend.

There were however exceedances of E. coli limits in the October 2021 monitoring round at bores C2DD and D3rd. The exceedance at C2DD is outside of the historical range and may represent an anomaly or an increasing trend. As D3rd is a new bore and only a single result has been obtained to date no conclusions can be drawn about this result. Both the C2DD and D3rd bores results should be closely scrutinised in the next monitoring round.

4.5 LEACHATE EFFLUENT

Monitoring results from the leachate effluent samples are not required to meet either the ANZECC LDW trigger values or DWSNZ standards. The results for the October 2021 monitoring round were within the typical composition ranges for leachate at Class 1 landfills, as published in the WasteMINZ guidelines[2].

4.6 TATANA PROPERTY DRAIN

Under the revised resource consent conditions approved in December 2019, the monitoring location 'SW3' is now re-designated as 'TD1', and sampling at locations 'SW2', 'SW3' and 'SW4' has been discontinued.

Under the revised conditions, the Tatana Property drain samples are now assessed against the ANZECC AE 95% trigger values.

There were two exceedances (for $scBOD_5$ and nitrate-N concentrations respectively) of the resource consent conditions in the October 2021 sampling round. Therefore, the conditions of the consent are not met as the ANZECC AE (95%) limits were exceeded. However, it is important to note that the result for the $scBOD_5$ concentration is below the laboratory detection limit and, as per our methodology, has been assumed to be half of the detection limit (3mg/L) for the purposes of reporting of results.

The results for $scBOD_5$ and nitrate-N are within historical ranges.

In previous recent monitoring results, the ammoniacal-N concentration was noted as exceeding the ANZECC AE (95%) limit and showing a sudden increase when compared to previous results. It is noted that the concentrations in the April and July 2021 sampling rounds were below the ANZECC AE (95%) limit and significantly lower than historical ranges. Due to this significant fluctuation in concentrations for this parameter the previous report (July 2021) recommended that ammoniacal-N concentrations should be kept under observation in subsequent reports. For the October 2021 sampling round, a concentration of 0.53 mg/L for ammoniacal-N was observed which is well below the ANZECC AE (95%) limit of 2.1 mg/L.

4.7 HOKIO STREAM

Under the revised resource consent conditions, a new monitoring location (HS1A), upstream of HS1, was added to the Hokio Stream monitoring sites and all monitoring results for the Hokio Stream samples are now assessed against the ANZECC AE 95% trigger values.

There were **eight exceedances** of the resource consent conditions in samples from the Hokio Stream during the October 2021 sampling round. These are summarised as follows:

- For all sampling locations, the nitrate-N concentration exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- For all sampling locations, the dissolved copper concentration marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.

[2] Technical Guidelines for Disposal to Land, WasteMINZ, 2018

4.8 CONSENT COMPLIANCE

Discharge permit 6010 states that quarterly and annual monitoring results shall comply with the ANZECC LDW trigger values in the shallow groundwater aquifer (sand aquifer) and surface water bodies. Samples from the deep groundwater (gravel aquifer) shall comply with the applicable DWSNZ values. 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.

Shallow aquifer

There were two exceedances of consent conditions hydraulically down-gradient from the old landfill. These were for E. coli at bores B2 and C2 during the October 2021 monitoring round.

Deeper gravel aquifer

There were five exceedances of the resource consent conditions in samples from the deeper gravel aquifer during the October 2021 sampling round:

- For E. Coli in bores C2DD and D3rd (being 3.9 CFU/100ml and 8 CFU/100ml respectively, which exceeds the DWSNZ limit of nil)
- For the dissolved manganese concentration in bores C2DD, Xd1, and D3rd (being 0.604 mg/L, 0.471 mg/L, and 0.537 mg/L respectively which each exceed the DWSNZ MAV of 0.4mg/L)

Irrigation area

There were no exceedances of the resource consent conditions during the October 2021 sampling round for samples obtained from the irrigation area.

Tatana Property drain

There was one exceedance of the resource consent conditions in samples from Tatana Drain during the October 2021 sampling round, as follows:

- The nitrate-N concentration exceeded the ANZECC AE (95%) limit

Hokio Stream

During the October 2021 monitoring round there were eight exceedances of the resource consent conditions in samples from the Hokio Stream, as follows:

- For all sampling locations, the nitrate-N concentration exceeded the ANZECC AE (95%) trigger value of 0.16mg/L.
- For all sampling locations, the dissolved copper concentration marginally exceeded the ANZECC AE (95%) trigger value of 0.0014 mg/L.

5.0 CONCLUSIONS

Monitoring results obtained in the October 2021 sampling rounds suggest that the groundwater at the background monitoring sites at the Levin Landfill is being impacted by local ground conditions and/or activities up-gradient of the landfill.

During the October 2021 monitoring period there were sixteen exceedances of the resource consent conditions; two exceedances were in samples from the shallow aquifer, five exceedances were in samples from the deep gravel aquifer, one exceedance occurred in the sample from Tatana Drain and eight exceedances occurred in samples from surface water monitoring at the Hokio Stream.

There were no exceedances in samples from the leachate irrigation area (which has not been used since October 2008).

Leachate quality is typical of the composition of leachate recorded generally at Class 1 landfills in New Zealand.

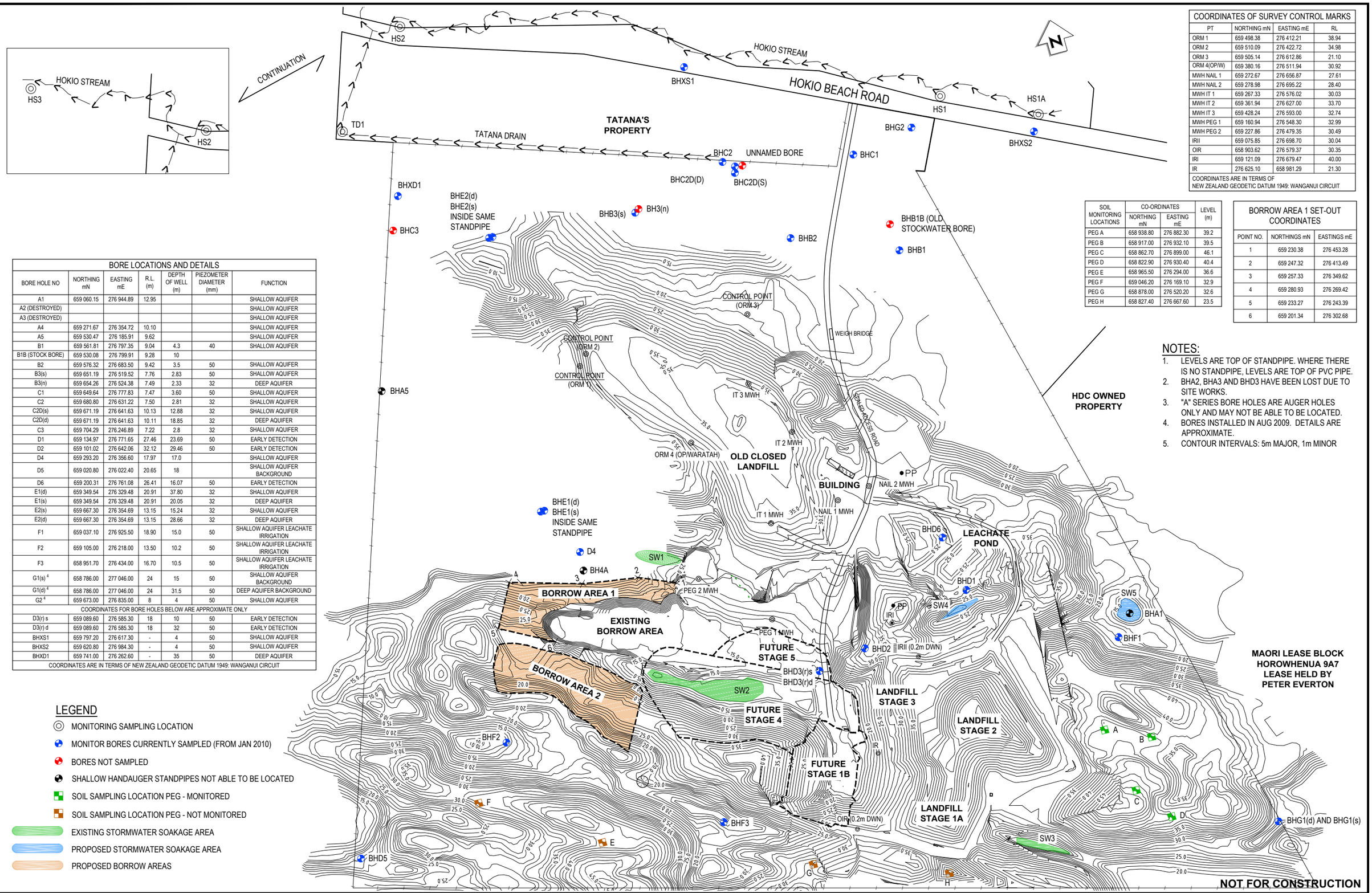
Methane was detected in three groundwater monitoring bores in the October 2021 sampling round. This is a substantial decrease compared to the last monitoring round but may be reflective of the sensitivity of the gas detection instruments being used. The highest concentration of methane was in bore D6 (0.1%) which was well below the lower explosive limit for methane (which is 5%).

Hydrogen sulphide was not detected in any of the groundwater bores during the October 2021 sampling round.

Appendices

We design with community in mind

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

NOT FOR CONSTRUCTION

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 SAMPLING SCHEDULE

LEVIN LANDFILL - SUMMARY OF SURFACE AND GROUNDWATER MONITORING REQUIREMENTS (July 2021 - April 2024).

(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, DP 6010)	Table B (Condition 3, DP 6010)																						Table C (Condition 3, DP 6010)						
			Deep Aquifer Bores	Shallow Aquifer Bores																				Irrigation Bores				Hokio Stream[4], [8]				Tatana Drain	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-21	**Aug-21**	**Jul-21**	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. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre. To 03/2022	Monthly Compre.	
	Nov-21	**Oct-21**	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							A
	Feb-22	**Jan-22**	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							
	May-22	**Apr-22**	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 + A	C	C	C	C	C + A	
Sep-22	**Aug-22**	**Jul-22**	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	Discontinue after 2 years, i.e. after March 2022	I	I	I	I	I	
	Nov-22	**Oct-22**	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-23	**Jan-23**	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-23	**Apr-23**	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 + A	C	C	C	C	C	
Sep-23	**Aug-23**	**Jul-23**	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-23	**Oct-23**	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-24	**Jan-24**	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-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 + A	C	C	C	C	C	

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 calledL D3rs and D3rd.
(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.
(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.
(8) Start measuring approximately the depth of flow in the Hokio Stream at each sampling site when sampling monthly.
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 April 2019 sampling onwards

APPENDIX C ANALYTICAL RESULTS

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30456
Issue: 1
21 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30456-01	Levin B1		13/10/2021 00:00	14/10/2021 08:28	0

Notes: 226663-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		14/10/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	161	mS/m	14/10/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	77	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	14/10/2021	Marylou Cabral KTP
0602	Chloride	216	g/m³	15/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	21.4	g/m³	15/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	6.29	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.005	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.93	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	6.97	g/m³	20/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0021	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	< 4	cfu/100mL	14/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		14/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30468
Issue: 1
21 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30468-01	Levin B2		13/10/2021 00:00	14/10/2021 08:28	0

Notes: 226664-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.1		14/10/2021	Jennifer Mont KTP
0055	Conductivity at 25°C	205	mS/m	14/10/2021	Jennifer Mont KTP
0081	Chemical Oxygen Demand	101	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	14/10/2021	Marylou Cabral KTP
0602	Chloride	107	g/m³	18/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	54.8	g/m³	18/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	25.8	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.033	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	1.87	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	4.33	g/m³	20/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0026	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	1,700	cfu/100mL	15/10/2021	Maria Norris KTP
P1859	Sample Filtration	Completed		14/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.
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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30467
Issue: 1
21 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30467-01	Levin B3s		14/10/2021 00:00	15/10/2021 09:52	0

Notes: 226665-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.3		15/10/2021	Marylou Cabral KTP
0055	Conductivity at 25°C	242	mS/m	15/10/2021	Marylou Cabral KTP
0081	Chemical Oxygen Demand	215	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	114	g/m³	19/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	< 0.10	g/m³	19/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	173	g/m³	18/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.004	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	1.24	g/m³	20/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	2.62	g/m³	20/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0085	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	< 100	cfu/100mL	15/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		15/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30472
Issue: 1
20 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30472-01	Levin C1		13/10/2021 00:00	14/10/2021 08:28	0

Notes: 226659-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.5		15/10/2021	Marylou Cabral KTP
0055	Conductivity at 25°C	113	mS/m	15/10/2021	Marylou Cabral KTP
0081	Chemical Oxygen Demand	74	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	152	g/m³	18/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.04	g/m³	18/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	1.42	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.009	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.89	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.244	g/m³	16/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0009	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	< 4	cfu/100mL	14/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		14/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30471
Issue: 1
21 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30471-01	Levin C2		14/10/2021 00:00	15/10/2021 09:52	0

Notes: 226660-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.2		15/10/2021	Marylou Cabral KTP
0055	Conductivity at 25°C	238	mS/m	15/10/2021	Marylou Cabral KTP
0081	Chemical Oxygen Demand	135	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	126	g/m³	19/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	< 0.10	g/m³	19/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	165	g/m³	18/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.023	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	1.49	g/m³	20/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	0.0008	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0554	g/m³	16/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0049	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	300	cfu/100mL	15/10/2021	Maria Norris KTP
P1859	Sample Filtration	Completed		15/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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			C2DD	
Sample:	Unit:	Date		14/10/2021 17:08
		Status	Processed	
		Lab Reference	21/30479-01	
Levin Landfill	g/mÂ³	Aluminium - Dissolved		0.003
Levin Landfill	g/mÂ³	Ammonia Nitrogen - Add P1859 Filtration		0.33
Levin Landfill	g/mÂ³	BOD - Soluble Carbonaceous		2.9
Levin Landfill	g/mÂ³	Boron - Dissolved		0.07
Levin Landfill	g/mÂ³	Chemical Oxygen Demand		28
Levin Landfill	g/mÂ³	Chloride - Add P1859 Filtration		28.1
Levin Landfill	mS/m	Conductivity at 25Â°C - mS/m unit		55.8
Levin Landfill	cfu/100mL	E. coli by MF - Environmental Water		3.9
Levin Landfill		IC - 2 Elements	Completed	
Levin Landfill		ICP-MS - 7 Elements	Completed	
Levin Landfill	g/mÂ³	Lead - Dissolved		0.0004
Levin Landfill	g/mÂ³	Manganese - Dissolved		0.604
Levin Landfill	g/mÂ³	Mercury - Dissolved		0.0004
Levin Landfill	g/mÂ³	Nickel - Dissolved		0.0004
Levin Landfill	g/mÂ³	Nitrate - Nitrogen - Add P1859 Filtration		0
Levin Landfill		pH		7.6
Levin Landfill		Sample Filtration	Completed	
		Unscheduled tests (if present)		

			F3
Sample:	Unit:	Date	11/10/2021 16:37
		Status	Processed
		Lab Reference	21/29718-01
Levin Landfill	g/mÂ³	Aluminium - Dissolved	0.003
Levin Landfill	g/mÂ³	Ammonia Nitrogen - Add P1859 Filtration	0
Levin Landfill	g/mÂ³	BOD - Soluble Carbonaceous	2.9
Levin Landfill	g/mÂ³	Boron - Dissolved	0.02
Levin Landfill	g/mÂ³	Chemical Oxygen Demand	14.99
Levin Landfill	g/mÂ³	Chloride - Add P1859 Filtration	19.5
Levin Landfill	mS/m	Conductivity at 25Â°C - mS/m unit	21.8
Levin Landfill	cfu/100mL	E. coli by MF - Environmental Water	4
Levin Landfill		IC - 2 Elements	Completed
Levin Landfill		ICP-MS - 7 Elements	Completed
Levin Landfill	g/mÂ³	Iron - Dissolved	0
Levin Landfill	g/mÂ³	Lead - Dissolved	0.0004
Levin Landfill	g/mÂ³	Manganese - Dissolved	0.0009
Levin Landfill	g/mÂ³	Mercury - Dissolved	0.0004
Levin Landfill	g/mÂ³	Nickel - Dissolved	0.0004
Levin Landfill	g/mÂ³	Nitrate - Nitrogen - Add P1859 Filtration	1.09
Levin Landfill		pH	7.4
Levin Landfill		Sample Filtration	Completed
Levin Landfill	g/mÂ³	Sodium - Dissolved	26.8
		Unscheduled tests (if present)	

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30470
Issue: 1
21 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30470-01	Levin C2ds		14/10/2021 00:00	15/10/2021 09:52	0

Notes: 226661-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		15/10/2021	Marylou Cabral KTP
0055	Conductivity at 25°C	104	mS/m	15/10/2021	Marylou Cabral KTP
0081	Chemical Oxygen Demand	65	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	50.1	g/m³	19/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	19/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	1.29	g/m³	18/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.005	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.74	g/m³	20/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	0.0006	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	1.59	g/m³	20/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0018	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	< 100	cfu/100mL	15/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		15/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30455
Issue: 1
19 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30455-01	Levin D1		12/10/2021 00:00	13/10/2021 08:55	0

Notes: 226668-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.9		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	45.4	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	31.4	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	7.95	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0010	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	13/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30454
Issue: 1
19 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30454-01	Levin D2		12/10/2021 00:00	13/10/2021 08:55	0

Notes: 226669-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	6.5		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	43.3	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	38.0	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	0.01	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.59	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.006	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.07	g/m³	13/10/2021	Amit Kumar KTP
6717	Iron - Dissolved	10.0	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.411	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6731	Sodium - Dissolved	37.2	g/m³	15/10/2021	Amit Kumar KTP
M0104	E. coli	< 100	cfu/100mL	13/10/2021	Maria Norris KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36543
Issue: 1
04 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36543-01	Levin D3rd		13/10/2021 00:00	13/10/2021 14:23	0

Notes: 231827-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.5		14/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	206	g/m³	14/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	5.9	g/m³	14/10/2021	Amit Kumar KTP
0052	Alkalinity - Total	224	g CaCO3/m³	14/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	53.1	mS/m	14/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	28	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	14/10/2021	Marylou Cabral KTP
0602	Chloride	21.8	g/m³	15/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.30	g/m³	15/10/2021	Divina Lagazon KTP
0607	Sulphate	30.1	g/m³	15/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.04	g/m³	15/10/2021	Divina Lagazon KTP
1642	Total Hardness	220	g CaCO3/m³	14/10/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	64.3	g/m³	14/10/2021	Edwin Lowe KTP
1819	Iron - Dissolved	0.028	g/m³	14/10/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	14.5	g/m³	14/10/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	25.7	g/m³	16/10/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.011	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.005	g/m³	14/10/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	0.017	g/m³	14/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	14/10/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	14/10/2021	Amit Kumar KTP
6711	Chromium - Dissolved	< 0.001	g/m³	14/10/2021	Amit Kumar KTP
6713	Copper - Dissolved	< 0.0005	g/m³	14/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	14/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.537	g/m³	14/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	14/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	14/10/2021	Amit Kumar KTP
6726	Potassium - Dissolved	7.76	g/m³	14/10/2021	Amit Kumar KTP
6738	Zinc - Dissolved	< 0.002	g/m³	14/10/2021	Amit Kumar KTP
M0104	E. coli	8	cfu/100mL	13/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		14/10/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36550
Issue: 1
04 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36550-01	Levin D3rs		13/10/2021 00:00	13/10/2021 14:23	0

Notes: 231828-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	6.3		14/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	12	g/m³	14/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	23.9	g/m³	14/10/2021	Amit Kumar KTP
0052	Alkalinity - Total	70	g CaCO3/m³	14/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	21.7	mS/m	14/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	62	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	14/10/2021	Marylou Cabral KTP
0602	Chloride	32.0	g/m³	15/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	15/10/2021	Divina Lagazon KTP
0607	Sulphate	0.03	g/m³	15/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.54	g/m³	15/10/2021	Divina Lagazon KTP
1642	Total Hardness	51	g CaCO3/m³	14/10/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	13.4	g/m³	14/10/2021	Edwin Lowe KTP
1819	Iron - Dissolved	17.0	g/m³	14/10/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	4.20	g/m³	14/10/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	26.0	g/m³	19/10/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.058	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.060	g/m³	14/10/2021	Amit Kumar KTP
6703	Arsenic - Dissolved	0.001	g/m³	14/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.05	g/m³	14/10/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	14/10/2021	Amit Kumar KTP
6711	Chromium - Dissolved	0.004	g/m³	14/10/2021	Amit Kumar KTP
6713	Copper - Dissolved	< 0.0005	g/m³	14/10/2021	Amit Kumar KTP
6717	Iron - Dissolved	17.4	g/m³	14/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	14/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.512	g/m³	14/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	14/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	0.0009	g/m³	14/10/2021	Amit Kumar KTP
6726	Potassium - Dissolved	5.80	g/m³	14/10/2021	Amit Kumar KTP
6731	Sodium - Dissolved	24.3	g/m³	14/10/2021	Amit Kumar KTP
6738	Zinc - Dissolved	0.002	g/m³	14/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	15/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		14/10/2021	Emily Couper .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification	1 g/m³

Test	Methodology	Detection Limit
	inhibitor.	
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30469
Issue: 1
21 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30469-01	Levin D4		13/10/2021 00:00	14/10/2021 08:28	0

Notes: 226662-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.5		15/10/2021	Marylou Cabral KTP
0055	Conductivity at 25°C	29.6	mS/m	15/10/2021	Marylou Cabral KTP
0081	Chemical Oxygen Demand	19	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	35.5	g/m³	15/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	15/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.23	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.12	g/m³	16/10/2021	Sharon van Soest KTP
6717	Iron - Dissolved	0.40	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.188	g/m³	16/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6731	Sodium - Dissolved	34.4	g/m³	20/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	14/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		14/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30449
Issue: 1
18 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30449-01	Levin D5		11/10/2021 00:00	12/10/2021 08:14	0

Notes: 226674-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	29.7	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	12/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	28.2	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	1.50	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.01	g/m³	12/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.002	g/m³	12/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	12/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0161	g/m³	12/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
M0104	E. coli	4	cfu/100mL	12/10/2021	Maria Norris KTP
P1859	Sample Filtration	Completed		12/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30452
Issue: 1
19 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30452-01	Levin D6		12/10/2021 00:00	12/10/2021 14:31	0

Notes: 226671-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	43.5	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	20.5	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	16.2	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.01	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.003	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0015	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	12/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30478
Issue: 1
19 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30478-01	Levin E1d		12/10/2021 00:00	13/10/2021 08:55	0

Notes: 226655-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	44.9	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	38.2	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.19	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	13/10/2021	Amit Kumar KTP
6717	Iron - Dissolved	0.03	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.236	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6731	Sodium - Dissolved	40.1	g/m³	15/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	13/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30463
Issue: 1
04 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30463-01	Levin E1s		12/10/2021 00:00	13/10/2021 08:55	0

Notes: 226666-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.1		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	26.4	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	26.7	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	0.02	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.20	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.007	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.03	g/m³	13/10/2021	Amit Kumar KTP
6717	Iron - Dissolved	5.36	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	0.0007	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.258	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6731	Sodium - Dissolved	28.4	g/m³	15/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	13/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30477
Issue: 1
19 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30477-01	Levin E2d		12/10/2021 00:00	13/10/2021 08:55	0

Notes: 226656-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.6		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	44.5	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	40.6	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	0.01	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.25	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.06	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.398	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	13/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30460
Issue: 1
09 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30460-01	Levin E2s		19/10/2021 00:00	20/10/2021 08:48	0

Notes: 226667-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.9		20/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	33.2	mS/m	20/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	54	g/m³	22/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	21/10/2021	Gordon McArthur KTP
0602	Chloride	35.6	g/m³	22/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	22/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.36	g/m³	21/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.002	g/m³	21/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	< 0.03	g/m³	21/10/2021	Amit Kumar KTP
6717	Iron - Dissolved	0.11	g/m³	21/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	21/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.220	g/m³	21/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	21/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	21/10/2021	Amit Kumar KTP
6731	Sodium - Dissolved	27.4	g/m³	21/10/2021	Amit Kumar KTP
M0104	E. coli	4	cfu/100mL	20/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		20/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30448
Issue: 1
19 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30448-01	Levin F1		12/10/2021 00:00	12/10/2021 14:31	0

Notes: 226675-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	45.2	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	21	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	44.4	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	0.52	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.003	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0241	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	0.0008	g/m³	13/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	12/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/29717
Issue: 1
18 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/29717-01	Levin F2		11/10/2021 00:00	12/10/2021 08:13	0

Notes: 226676-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	21.9	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	12/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	22.4	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	0.28	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	< 0.01	g/m³	12/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.002	g/m³	12/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	12/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0027	g/m³	12/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	12/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		12/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30474
Issue: 1
18 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30474-01	Levin G1D		11/10/2021 00:00	12/10/2021 08:14	0

Notes: 226657-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	27.5	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	12/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	31.0	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.09	g/m³	12/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	< 0.002	g/m³	12/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	0.04	g/m³	12/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0628	g/m³	12/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
M0104	E. coli	< 100	cfu/100mL	12/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		12/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30451
Issue: 1
18 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30451-01	Levin G1S		11/10/2021 00:00	12/10/2021 08:14	0

Notes: 226672-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.0		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	53.2	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	99	g/m³	12/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	106	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	0.03	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.05	g/m³	12/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.121	g/m³	12/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	< 0.03	g/m³	12/10/2021	Amit Kumar KTP
6717	Iron - Dissolved	3.22	g/m³	12/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	0.0014	g/m³	12/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.0737	g/m³	12/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	12/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	0.0013	g/m³	12/10/2021	Amit Kumar KTP
6731	Sodium - Dissolved	85.1	g/m³	13/10/2021	Amit Kumar KTP
M0104	E. coli	< 100	cfu/100mL	12/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		12/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Iron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.01 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Sodium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/30450
Issue: 1
19 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/30450-01	Levin G2s		12/10/2021 00:00	12/10/2021 14:31	0

Notes: 226673-0 Levin Landfill

	Test	Result	Units	Test Date	Signatory
0001	pH	7.3		13/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	129	mS/m	13/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	13/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	13/10/2021	Gordon McArthur KTP
0602	Chloride	163	g/m³	14/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	14/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.06	g/m³	14/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.004	g/m³	13/10/2021	Amit Kumar KTP
6707	Boron - Dissolved	1.09	g/m³	13/10/2021	Amit Kumar KTP
6718	Lead - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6721	Manganese - Dissolved	0.108	g/m³	13/10/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	13/10/2021	Amit Kumar KTP
6724	Nickel - Dissolved	0.0031	g/m³	13/10/2021	Amit Kumar KTP
M0104	E. coli	< 4	cfu/100mL	12/10/2021	Sunita Raju KTP
P1859	Sample Filtration	Completed		13/10/2021	Emily Couper .

Comments:

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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Report Released By
Rob Deacon

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Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36568
Issue: 1
27 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36568-01	Levin HS1		07/10/2021 00:00	08/10/2021 09:33	0

Notes: 231829-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		08/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	11	g/m³	08/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	5.6	g/m³	11/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	47	g CaCO3/m³	08/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	21.6	mS/m	08/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	18	g/m³	08/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	08/10/2021	Gordon McArthur KTP
0602	Chloride	20.8	g/m³	11/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	1.28	g/m³	11/10/2021	Divina Lagazon KTP
0607	Sulphate	20.6	g/m³	11/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.08	g/m³	09/10/2021	Divina Lagazon KTP
1642	Total Hardness	56	g CaCO3/m³	11/10/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	12.5	g/m³	11/10/2021	Edwin Lowe KTP
1819	Iron - Dissolved	0.096	g/m³	11/10/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	6.02	g/m³	11/10/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	17.0	g/m³	11/10/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.016	g/m³	09/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.020	g/m³	08/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.06	g/m³	08/10/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	08/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0015	g/m³	08/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0050	g/m³	08/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	3.46	g/m³	08/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	< 0.002	g/m³	08/10/2021	Sharon van Soest KTP
M0104	E. coli	92	cfu/100mL	08/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		08/10/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36571
Issue: 1
27 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36571-01	Levin HS1A		07/10/2021 00:00	08/10/2021 09:33	0

Notes: 231832-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		08/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	18	g/m³	08/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	5.3	g/m³	11/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	47	g CaCO3/m³	08/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	21.4	mS/m	08/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	17	g/m³	08/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	08/10/2021	Gordon McArthur KTP
0602	Chloride	20.4	g/m³	11/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	1.28	g/m³	11/10/2021	Divina Lagazon KTP
0607	Sulphate	20.6	g/m³	11/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.07	g/m³	09/10/2021	Divina Lagazon KTP
1642	Total Hardness	56	g CaCO3/m³	11/10/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	12.5	g/m³	11/10/2021	Edwin Lowe KTP
1819	Iron - Dissolved	0.091	g/m³	11/10/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	6.02	g/m³	11/10/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	17.1	g/m³	11/10/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.016	g/m³	09/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.021	g/m³	08/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.06	g/m³	08/10/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	08/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0018	g/m³	08/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0059	g/m³	08/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	3.34	g/m³	08/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	< 0.002	g/m³	08/10/2021	Sharon van Soest KTP
M0104	E. coli	170	cfu/100mL	08/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		08/10/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36574
Issue: 1
27 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36574-01	Levin HS2		07/10/2021 00:00	08/10/2021 09:33	0

Notes: 231835-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.3		08/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	15	g/m³	08/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	6.9	g/m³	11/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	50	g CaCO3/m³	08/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	22.2	mS/m	08/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	31	g/m³	08/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	08/10/2021	Gordon McArthur KTP
0602	Chloride	22.2	g/m³	11/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	1.25	g/m³	11/10/2021	Divina Lagazon KTP
0607	Sulphate	20.0	g/m³	11/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.11	g/m³	09/10/2021	Divina Lagazon KTP
1642	Total Hardness	58	g CaCO3/m³	11/10/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	12.8	g/m³	11/10/2021	Edwin Lowe KTP
1819	Iron - Dissolved	0.151	g/m³	11/10/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	6.24	g/m³	11/10/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	17.9	g/m³	11/10/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.021	g/m³	09/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.014	g/m³	08/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.07	g/m³	08/10/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	08/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0015	g/m³	08/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0116	g/m³	08/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	3.90	g/m³	08/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.003	g/m³	08/10/2021	Sharon van Soest KTP
M0104	E. coli	180	cfu/100mL	08/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		08/10/2021	Emily Couper .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36577
Issue: 1
27 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36577-01	Levin HS3		07/10/2021 00:00	08/10/2021 09:33	0

Notes: 231838-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.4		08/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	13	g/m³	08/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	5.6	g/m³	11/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	50	g CaCO3/m³	08/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	22.0	mS/m	08/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	26	g/m³	08/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	08/10/2021	Gordon McArthur KTP
0602	Chloride	21.4	g/m³	11/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	1.27	g/m³	11/10/2021	Divina Lagazon KTP
0607	Sulphate	20.5	g/m³	11/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.12	g/m³	09/10/2021	Divina Lagazon KTP
1642	Total Hardness	57	g CaCO3/m³	11/10/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	12.7	g/m³	11/10/2021	Edwin Lowe KTP
1819	Iron - Dissolved	0.114	g/m³	11/10/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	6.06	g/m³	11/10/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	17.3	g/m³	11/10/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.023	g/m³	09/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.016	g/m³	08/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.06	g/m³	08/10/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	08/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0016	g/m³	08/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0235	g/m³	08/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	3.75	g/m³	08/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.002	g/m³	08/10/2021	Sharon van Soest KTP
M0104	E. coli	68	cfu/100mL	08/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		08/10/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36593
Issue: 1
04 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36593-01	Levin Leachate Pond		13/10/2021 00:00	13/10/2021 14:23	0

Notes: 231844-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.8		14/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	30	g/m³	14/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	602	g/m³	14/10/2021	Amit Kumar KTP
0052	Alkalinity - Total	5,280	g CaCO3/m³	14/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	1,260	mS/m	14/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	2,720	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	95	g/m³	14/10/2021	Marylou Cabral KTP
0602	Chloride	962	g/m³	15/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 1.00	g/m³	15/10/2021	Divina Lagazon KTP
0607	Sulphate	69.5	g/m³	15/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	1,070	g/m³	15/10/2021	Divina Lagazon KTP
1642	Total Hardness	440	g CaCO3/m³	16/10/2021	Amit Kumar KTP
1810	Calcium - Dissolved	99.6	g/m³	16/10/2021	Amit Kumar KTP
1819	Iron - Dissolved	4.45	g/m³	16/10/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	46.5	g/m³	16/10/2021	Amit Kumar KTP
1834	Sodium - Dissolved	818	g/m³	16/10/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	12.3	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.637	g/m³	16/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.318	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	6.55	g/m³	16/10/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	16/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	0.529	g/m³	16/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0174	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	0.0033	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	1.33	g/m³	16/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.100	g/m³	16/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	556	g/m³	16/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.073	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	640	cfu/100mL	13/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 50 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	0.22	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		14/10/2021	Emily Couper .
SVOC-002	a-BHC	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-003	a-chlordane	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-005	b-BHC	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-006	cis-Permethrin	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-007	Dieldrin	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-008	Endosulfan II	<0.005	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-009	Endosulfan Sulfate	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-010	Endrin	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-011	Endrin Aldehyde	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-012	Endrin Ketone	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-013	Gamma-Chlordane	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-014	Heptachlor	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-015	Heptachlor Epoxide	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-016	Hexachlorobenzene	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-017	Lindane (g-BHC)	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-018	Methoxychlor	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-019	p,p'-DDD	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-020	p,p'DDE	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-021	p,p'-DDT	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36593-01	Levin Leachate Pond		13/10/2021 00:00	13/10/2021 14:23	0

Notes: 231844-0 Levin Landfill Sample

Test	Result	Units	Test Date	Signatory
SVOC-022 Procymidone	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-023 Propanil	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-024 Endosulfan I	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-025 Alachlor	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-026 Aldicarb	<0.1	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-027 Atrazine	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-028 Bromacil	<0.005	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-030 Cyanazine	<0.005	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-031 d-BHC	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-032 Metalaxyl-M	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-033 Metolachlor	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-034 Metribuzin	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-035 Molinate	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-037 Oxadiazon	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-038 Pendimethalin	<0.002	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-039 Propazine	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-040 Pyriproxyfen	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-041 Simazine	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-042 Terbuthylazine	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-043 Trifluralin	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-044 Hexazinone	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-045 Chlorpyrifos	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-046 Diazinon	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-047 Dimethoate	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-048 Pirimiphos methyl	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-049 Acenapthene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-050 Acenaphthylene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-051 Anthracene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-052 benz(a)anthracene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-053 Benzo(a)pyrene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-054 Total Benzo(b) and Benzo(k) fluoranthrene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-055 Benzo(g,h,i)perylene	< 0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-057 Chrysene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-058 Dibenz(a,h)anthracene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-059 Fluoranthene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-060 Fluorene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-061 Indeno(1,2,3-cd)pyrene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-062 Naphthalene	0.0025	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-063 Phenanthrene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-064 Pyrene	< 0.0010	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-066 2,2',3,4,4',5'-Hexachlorobiphenyl	<0.001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-067 2,2',4,5,5'-Pentachlorobiphenyl	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-068 2,4,4'-Trichlorobiphenyl	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-069 2,4-Dichlorobiphenyl	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-070 2,2',3,4,4',5',6-Heptachlorobiphenyl	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
SVOC-072 Bis(2-ethylhexyl)adipate	<0.0001	mg/L	19/10/2021	Ganesh Ilancko KTP
VOC-001 1,2,4-Trimethylbenzene	0.0062	mg/L	14/10/2021	Joanna Yang KTP
VOC-002 1,3,5-Trimethylbenzene	0.0026	mg/L	14/10/2021	Joanna Yang KTP
VOC-003 Benzene	0.0027	mg/L	14/10/2021	Joanna Yang KTP
VOC-005 Isopropylbenzene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-007 Naphthalene	0.0019	mg/L	14/10/2021	Joanna Yang KTP
VOC-008 n-Butylbenezene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-009 n-Propylbenzene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-010 o-Xylene	0.0150	mg/L	14/10/2021	Joanna Yang KTP
VOC-011 p-Isopropyltoluene	0.0038	mg/L	14/10/2021	Joanna Yang KTP
VOC-013 sec-Butylbenzene	0.0160	mg/L	14/10/2021	Joanna Yang KTP
VOC-014 Styrene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-015 tert-Butylbenzene	0.0011	mg/L	14/10/2021	Joanna Yang KTP
VOC-016 Toluene	0.0053	mg/L	14/10/2021	Joanna Yang KTP
VOC-017 Total p,m Xylene, Ethylbenzene	0.0262	mg/L	14/10/2021	Joanna Yang KTP

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36593-01	Levin Leachate Pond		13/10/2021 00:00	13/10/2021 14:23	0

Notes: 231844-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
VOC-018	1,1,1,2-Tetrachloroethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-019	1,1,1-Trichloroethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-020	1,1,2,2-Tetrachloroethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-021	1,1,2-Trichloroethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-022	1,1-Dichloroethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-023	1,1-Dichloroethene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-024	1,1-Dichloropropene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-025	1,2,3-Trichloropropane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-026	1,2-Dibromo-3-chloropropane	<0.001	mg/L	14/10/2021	Joanna Yang KTP
VOC-027	1,2-Dibromoethane	<0.0002	mg/L	14/10/2021	Joanna Yang KTP
VOC-028	1,2-Dichloroethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-029	1,2-Dichloropropane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-030	1,3-Dichloropropane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-031	2,2-Dichloropropane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-033	Bromochloromethane	<0.0012	mg/L	14/10/2021	Joanna Yang KTP
VOC-034	Bromomethane	<0.001	mg/L	14/10/2021	Joanna Yang KTP
VOC-035	Carbon tetrachloride	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-036	Chloroethane	<0.001	mg/L	14/10/2021	Joanna Yang KTP
VOC-037	Chloromethane	<0.006	mg/L	14/10/2021	Joanna Yang KTP
VOC-038	cis-1,2-Dichloroethene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-039	cis-1,3-Dichloropropene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-040	Dibromomethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-042	Dichloromethane	<0.005	mg/L	14/10/2021	Joanna Yang KTP
VOC-043	Hexachlorobutadiene	<0.0002	mg/L	14/10/2021	Joanna Yang KTP
VOC-044	Tetrachloroethene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-045	trans-1,2-Dichloroethene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-046	trans-1,3-Dichloropropene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-047	Trichloroethene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-048	Trichlorofluoromethane	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-049	Vinyl Chloride	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-050	1,2,3-Trichlorobenzene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-051	1,2,4-Trichlorobenzene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-052	1,2-Dichlorobenzene	< 0.0010	mg/L	14/10/2021	Joanna Yang KTP
VOC-053	1,3-Dichlorobenzene	< 0.0010	mg/L	14/10/2021	Joanna Yang KTP
VOC-054	1,4-Dichlorobenzene	< 0.0010	mg/L	14/10/2021	Joanna Yang KTP
VOC-055	2-Chlorotoluene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-056	4-Chlorotoluene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-057	Bromobenzene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-058	Chlorobenzene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-059	1,3,5-Trichlorobenzene	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-061	Carbon disulphide	<0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-062	Bromodichloromethane	< 0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-063	Bromoform	< 0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-064	Chloroform	< 0.0005	mg/L	14/10/2021	Joanna Yang KTP
VOC-065	Dibromochloromethane	< 0.0005	mg/L	14/10/2021	Joanna Yang KTP

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m

Test	Methodology	Detection Limit
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a
2,3-Diuron	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
a-BHC	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
a-chlordane	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Aldrin	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
b-BHC	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
cis-Permethrin	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Dieldrin	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Endosulfan II	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.005 mg/L
Endosulfan Sulfate	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Endrin	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Endrin Aldehyde	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Endrin Ketone	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Gamma-Chlordane	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Heptachlor	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Heptachlor Epoxide	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Hexachlorobenzene	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Lindane (g-BHC)	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Methoxychlor	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
p,p'-DDD	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
p,p'DDE	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
p,p'-DDT	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Procymidone	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Propanil	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Endosulfan I	Organochlorine Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Alachlor	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Aldicarb	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.1 mg/L
Atrazine	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Bromacil	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.005 mg/L
Carbofuran	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L

Test	Methodology	Detection Limit
Cyanazine	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.005 mg/L
d-BHC	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Metalaxyl-M	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Metolachlor	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Metribuzin	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Molinate	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Oxadiazon	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Pendimethalin	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.002 mg/L
Propazine	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Pyriproxyfen	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Simazine	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Terbuthylazine	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Trifluralin	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Hexazinone	Organonitrogen Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Chlorpyrifos	Organophosphorous Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Diazinon	Organophosphorous Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Dimethoate	Organophosphorous Pesticide compound analysed by in-house method using GC-MS	0.001 mg/L
Pirimiphos methyl	Organophosphorous Pesticide compound analysed by in-house method using GC-MS	0.0001 mg/L
Acenapthene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Acenaphthylene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.001 mg/L
Anthracene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.001 mg/L
benz(a)anthracene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Benzo(a)pyrene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Total Benzo(b) and Benzo(k) fluoranthrene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.001 mg/L
Benzo(g,h,i)perylene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.001 mg/L
Chrysene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Dibenz(a,h)anthracene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Fluoranthene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Fluorene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Indeno(1,2,3-cd)pyrene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Naphthalene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Phenanthrene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
Pyrene	Polyaromatic Hydrocarbon compound analysed by in-house method using GC-MS	0.0001 mg/L
2,2',3,4,4',5'-Hexachlorobiphenyl	Polychlorinated biphenyl compound analysed by in-house method using GC-MS. Also known as PCB 138.	0.001 mg/L
2,2',4,5,5'-Pentachlorobiphenyl	Polychlorinated biphenyl compound analysed by in-house method using GC-MS. Also known as PCB 101.	0.0001 mg/L
2,4,4'-Trichlorobiphenyl	Polychlorinated biphenyl compound analysed by in-house method using GC-MS. Also known as PCB 28.	0.0001 mg/L
2,4-Dichlorobiphenyl	Polychlorinated biphenyl compound analysed by in-house method using GC-MS. Also known as PCB 7.	0.0001 mg/L
2,2',3,4,4',5',6-Heptachlorobiphenyl	Polychlorinated biphenyl compound analysed by in-house method using GC-MS. Also known as PCB 183.	0.0001 mg/L
Bis(2-ethylhexyl)adipate	Phthalate Plasticiser compound analysed by in-house method using GC-MS	0.0001 mg/L
1,2,4-Trimethylbenzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,3,5-Trimethylbenzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Benzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Isopropylbenzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Naphthalene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
n-Butylbenezene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
n-Propylbenzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
o-Xylene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
p-Isopropyltoluene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
sec-Butylbenzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Styrene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
tert-Butylbenzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Toluene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Total p,m Xylene, Ethylbenzene	VOC Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0015 mg/L
1,1,1,2-Tetrachloroethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,1,1-Trichloroethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,1,2,2-Tetrachloroethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L

Test	Methodology	Detection Limit
1,1,2-Trichloroethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,1-Dichloroethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,1-Dichloroethene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,1-Dichloropropene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,2,3-Trichloropropane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,2-Dibromo-3-chloropropane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.001 mg/L
1,2-Dibromoethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0002 mg/L
1,2-Dichloroethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,2-Dichloropropane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,3-Dichloropropane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
2,2-Dichloropropane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Allyl chloride	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Bromochloromethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0012 mg/L
Bromomethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.001 mg/L
Carbon tetrachloride	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260. Also known as Tetrachloromethane.	0.0005 mg/L
Chloroethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.001 mg/L
Chloromethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.006 mg/L
cis-1,2-Dichloroethene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
cis-1,3-Dichloropropene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Dibromomethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Dichlorodifluoromethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.001 mg/L
Dichloromethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.005 mg/L
Hexachlorobutadiene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0002 mg/L
Tetrachloroethene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
trans-1,2-Dichloroethene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
trans-1,3-Dichloropropene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Trichloroethene	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Trichlorofluoromethane	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Vinyl Chloride	VOC Halogenated Alkanes and Alkenes Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,2,3-Trichlorobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,2,4-Trichlorobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA	0.0005 mg/L

Test	Methodology	Detection Limit
	Method 8260.	
1,2-Dichlorobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,3-Dichlorobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,4-Dichlorobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
2-Chlorotoluene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
4-Chlorotoluene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Bromobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Chlorobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
1,3,5-Trichlorobenzene	VOC Halogenated Aromatic Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
4-Methyl-2-Pentanone	VOC Other Volatile Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Carbon disulphide	VOC Other Volatile Compound analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Bromodichloromethane	VOC Trihalomethane analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Bromoform	VOC Trihalomethane analysed by GCMS following an in house method based on USEPA Method 8260. Also known as Tribromomethane.	0.0005 mg/L
Chloroform	VOC Trihalomethane analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L
Dibromochloromethane	VOC Trihalomethane analysed by GCMS following an in house method based on USEPA Method 8260.	0.0005 mg/L

Unless otherwise stated, all tests are performed in Wellington.
The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.
"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.
For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.
Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36580
Issue: 1
27 October 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36580-01	Levin TD1		07/10/2021 00:00	08/10/2021 09:33	0

Notes: 231841-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.2		08/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	15	g/m³	08/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	28.1	g/m³	11/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	182	g CaCO3/m³	08/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	60.4	mS/m	08/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	98	g/m³	08/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	08/10/2021	Gordon McArthur KTP
0602	Chloride	71.8	g/m³	11/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.39	g/m³	11/10/2021	Divina Lagazon KTP
0607	Sulphate	3.57	g/m³	11/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.53	g/m³	09/10/2021	Divina Lagazon KTP
1642	Total Hardness	139	g CaCO3/m³	11/10/2021	Edwin Lowe KTP
1810	Calcium - Dissolved	26.8	g/m³	11/10/2021	Edwin Lowe KTP
1819	Iron - Dissolved	2.09	g/m³	11/10/2021	Edwin Lowe KTP
1822	Magnesium - Dissolved	17.4	g/m³	11/10/2021	Edwin Lowe KTP
1834	Sodium - Dissolved	59.4	g/m³	11/10/2021	Edwin Lowe KTP
2088	Dissolved Reactive Phosphorus	0.017	g/m³	09/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.025	g/m³	08/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.002	g/m³	08/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.30	g/m³	08/10/2021	Sharon van Soest KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	08/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	08/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0006	g/m³	08/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.157	g/m³	08/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	08/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0020	g/m³	08/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	19.1	g/m³	08/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	0.005	g/m³	08/10/2021	Sharon van Soest KTP
M0104	E. coli	200	cfu/100mL	08/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Lizzie Addis Transcribed by
P1859	Sample Filtration	Completed		08/10/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

Unless otherwise stated, all tests are performed in Wellington.

The laboratory is not responsible for the information provided by the customer which can affect the validity of the results, for example: sampling information such as date/time, field data etc.

"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36504
Issue: 1
17 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36504-01	Levin Xd1		14/10/2021 00:00	15/10/2021 08:52	0

Notes: 231823-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	7.5		15/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	72	g/m³	15/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	4.6	g/m³	15/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	180	g CaCO3/m³	15/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	54.3	mS/m	15/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	31	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	62.7	g/m³	19/10/2021	Amit Kumar KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	19/10/2021	Amit Kumar KTP
0607	Sulphate	< 0.02	g/m³	19/10/2021	Amit Kumar KTP
0760	Ammonia Nitrogen	0.38	g/m³	18/10/2021	Divina Lagazon KTP
1642	Total Hardness	149	g CaCO3/m³	16/10/2021	Amit Kumar KTP
1810	Calcium - Dissolved	35.0	g/m³	16/10/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.048	g/m³	16/10/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	15.0	g/m³	16/10/2021	Amit Kumar KTP
1834	Sodium - Dissolved	45.1	g/m³	16/10/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.118	g/m³	18/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.003	g/m³	16/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.05	g/m³	20/10/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	16/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	16/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.471	g/m³	16/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	5.31	g/m³	16/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	< 0.002	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	< 4	cfu/100mL	15/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		15/10/2021	Emily Couper .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36507
Issue: 1
17 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36507-01	Levin Xs1		14/10/2021 00:00	15/10/2021 08:52	0

Notes: 231824-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	6.5		15/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	45	g/m³	15/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	25.7	g/m³	15/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	331	g CaCO3/m³	15/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	86.6	mS/m	15/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	68	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 6	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	52.5	g/m³	18/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	< 0.01	g/m³	18/10/2021	Divina Lagazon KTP
0607	Sulphate	29.7	g/m³	18/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	11.2	g/m³	15/10/2021	Divina Lagazon KTP
1642	Total Hardness	273	g CaCO3/m³	16/10/2021	Amit Kumar KTP
1810	Calcium - Dissolved	69.3	g/m³	16/10/2021	Amit Kumar KTP
1819	Iron - Dissolved	2.61	g/m³	16/10/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	24.1	g/m³	16/10/2021	Amit Kumar KTP
1834	Sodium - Dissolved	45.3	g/m³	16/10/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.025	g/m³	15/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.006	g/m³	16/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	0.001	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	0.09	g/m³	12/11/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	16/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	16/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	1.60	g/m³	12/11/2021	Amit Kumar KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	0.0006	g/m³	16/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	12.2	g/m³	16/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	< 0.002	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	8	cfu/100mL	15/10/2021	Maria Norris KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		15/10/2021	Emily Couper .

Comments:

***** Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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"<" means that no analyte was found in the sample at the level of detection shown. Detection limits are based on a clean matrix and may vary according to individual sample.

For liquid samples g/m3 is the equivalent to mg/L and ppm, solid samples are reported as mg/kg which is equivalent to ppm.

Samples will be retained for a period of time, in suitable conditions appropriate to the analyses requested.

Report Released By
Rob Deacon

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Eurofins ELS Limited

Analytical Report

Downer EDI Levin - Landfill
P O Box 642
LEVIN 5540
Attention: Bruce Marshall

Report Number: 21/36512
Issue: 1
17 November 2021

Sample	Site	Map Ref.	Date Sampled	Date Received	Order No.
21/36512-01	Levin Xs2		14/10/2021 00:00	15/10/2021 08:52	0

Notes: 231825-0 Levin Landfill Sample

	Test	Result	Units	Test Date	Signatory
0001	pH	6.8		15/10/2021	Gordon McArthur KTP
0002	Suspended Solids - Total	7	g/m³	15/10/2021	Gordon McArthur KTP
0040	Total (NP) Organic Carbon	2.2	g/m³	15/10/2021	Sharon van Soest KTP
0052	Alkalinity - Total	49	g CaCO3/m³	15/10/2021	Gordon McArthur KTP
0055	Conductivity at 25°C	16.6	mS/m	15/10/2021	Gordon McArthur KTP
0081	Chemical Oxygen Demand	< 15	g/m³	15/10/2021	Gordon McArthur KTP
0180	BOD5 - Soluble Carbonaceous	< 3	g/m³	15/10/2021	Gordon McArthur KTP
0602	Chloride	11.5	g/m³	18/10/2021	Divina Lagazon KTP
0605	Nitrate - Nitrogen	0.65	g/m³	18/10/2021	Divina Lagazon KTP
0607	Sulphate	9.02	g/m³	18/10/2021	Divina Lagazon KTP
0760	Ammonia Nitrogen	0.10	g/m³	18/10/2021	Divina Lagazon KTP
1642	Total Hardness	41	g CaCO3/m³	16/10/2021	Amit Kumar KTP
1810	Calcium - Dissolved	8.70	g/m³	16/10/2021	Amit Kumar KTP
1819	Iron - Dissolved	0.158	g/m³	16/10/2021	Amit Kumar KTP
1822	Magnesium - Dissolved	4.78	g/m³	16/10/2021	Amit Kumar KTP
1834	Sodium - Dissolved	14.2	g/m³	16/10/2021	Amit Kumar KTP
2088	Dissolved Reactive Phosphorus	0.015	g/m³	18/10/2021	Divina Lagazon KTP
6701	Aluminium - Dissolved	0.008	g/m³	16/10/2021	Sharon van Soest KTP
6703	Arsenic - Dissolved	< 0.001	g/m³	16/10/2021	Sharon van Soest KTP
6707	Boron - Dissolved	< 0.03	g/m³	20/10/2021	Amit Kumar KTP
6708	Cadmium - Dissolved	< 0.0002	g/m³	16/10/2021	Sharon van Soest KTP
6711	Chromium - Dissolved	< 0.001	g/m³	16/10/2021	Sharon van Soest KTP
6713	Copper - Dissolved	0.0007	g/m³	16/10/2021	Sharon van Soest KTP
6718	Lead - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6721	Manganese - Dissolved	0.0725	g/m³	16/10/2021	Sharon van Soest KTP
6722	Mercury - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6724	Nickel - Dissolved	< 0.0005	g/m³	16/10/2021	Sharon van Soest KTP
6726	Potassium - Dissolved	3.31	g/m³	16/10/2021	Sharon van Soest KTP
6738	Zinc - Dissolved	< 0.002	g/m³	16/10/2021	Sharon van Soest KTP
M0104	E. coli	< 4	cfu/100mL	15/10/2021	Sunita Raju KTP
MO-5001	Volatile Fatty Acids	< 5 *	g/m³		Sharon van Soest Transcribed by
MO-5002	Total Halogenated Phenolics	< 0.05	g/m³		Deb Bottrill Transcribed by
P1859	Sample Filtration	Completed		15/10/2021	Emily Couper .

Comments:

* Not an accredited test.

Sampled by customer using ELS approved containers.

All samples analysed as we receive them. Delivery was within the correct time and temperature conditions.

Test Methodology:

Test	Methodology	Detection Limit
pH	Dedicated pH meter following APHA Online Edition Method 4500-H B.	0.1
Suspended Solids - Total	APHA Online Edition Method 2540 D	3 g/m³
Total (NP) Organic Carbon	Total Non-Purgeable Organic Carbon using TOC analyser. APHA Online Edition 5310 B.	0.1 g/m³
Alkalinity - Total	APHA Online Edition Method 2320 B	1 g CaCO3/m³
Conductivity at 25°C	APHA Online Edition Method 2510 B.	0.1 mS/m
Chemical Oxygen Demand	APHA Online Edition Method 5220 D.	15 g/m³
BOD5 - Soluble Carbonaceous	APHA Online Edition Method 5210 B. The sample is filtered through Whatman GFC and treated with nitrification inhibitor.	1 g/m³
Chloride	Ion Chromatography following APHA 4110B.	0.02 g/m³

Test	Methodology	Detection Limit
Nitrate - Nitrogen	Ion Chromatography following APHA 4110B.	0.01 g/m³
Sulphate	Ion Chromatography following APHA 4110B.	0.02 g/m³
Ammonia Nitrogen	Flow Injection Autoanalyser following APHA Online Edition Method 4500 NH3-H.	0.01 g/m³
Total Hardness	ICP-OES following APHA Online Edition Method 3120 B (modified).	1 g CaCO3/m³
Calcium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Iron - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.005 g/m³
Magnesium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.01 g/m³
Sodium - Dissolved	ICP-OES following APHA Online Edition Method 3120 B (modified).	0.02 g/m³
Dissolved Reactive Phosphorus	Flow Injection Autoanalyser following APHA Online Edition Method 4500-P G.	0.005 g/m³
Aluminium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
Arsenic - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Boron - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.03 g/m³
Cadmium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0002 g/m³
Chromium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.001 g/m³
Copper - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Lead - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Manganese - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Mercury - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Nickel - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.0005 g/m³
Potassium - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified)	0.01 g/m³
Zinc - Dissolved	ICP-MS following APHA Online Edition method 3125 (modified).	0.002 g/m³
E. coli	APHA 9222I:Online Edition	1 cfu/100mL
Volatile Fatty Acids	Performed by Eurofins Melbourne following Method: LTM-ORG-2360 Determination of Volatile Fatty Acids in Water by GC-MS. Results are reported as acetic acid equivalent.	5 g/m³
Total Halogenated Phenolics	Analyses at Eurofins Melbourne following Method LTM-INO-4050 Total Phenolics in Waters and solids by CFA	0.05 g/m³
Sample Filtration	Sample filtered through 0.45 micron filter following APHA Online Edition Method 3030B.	n/a

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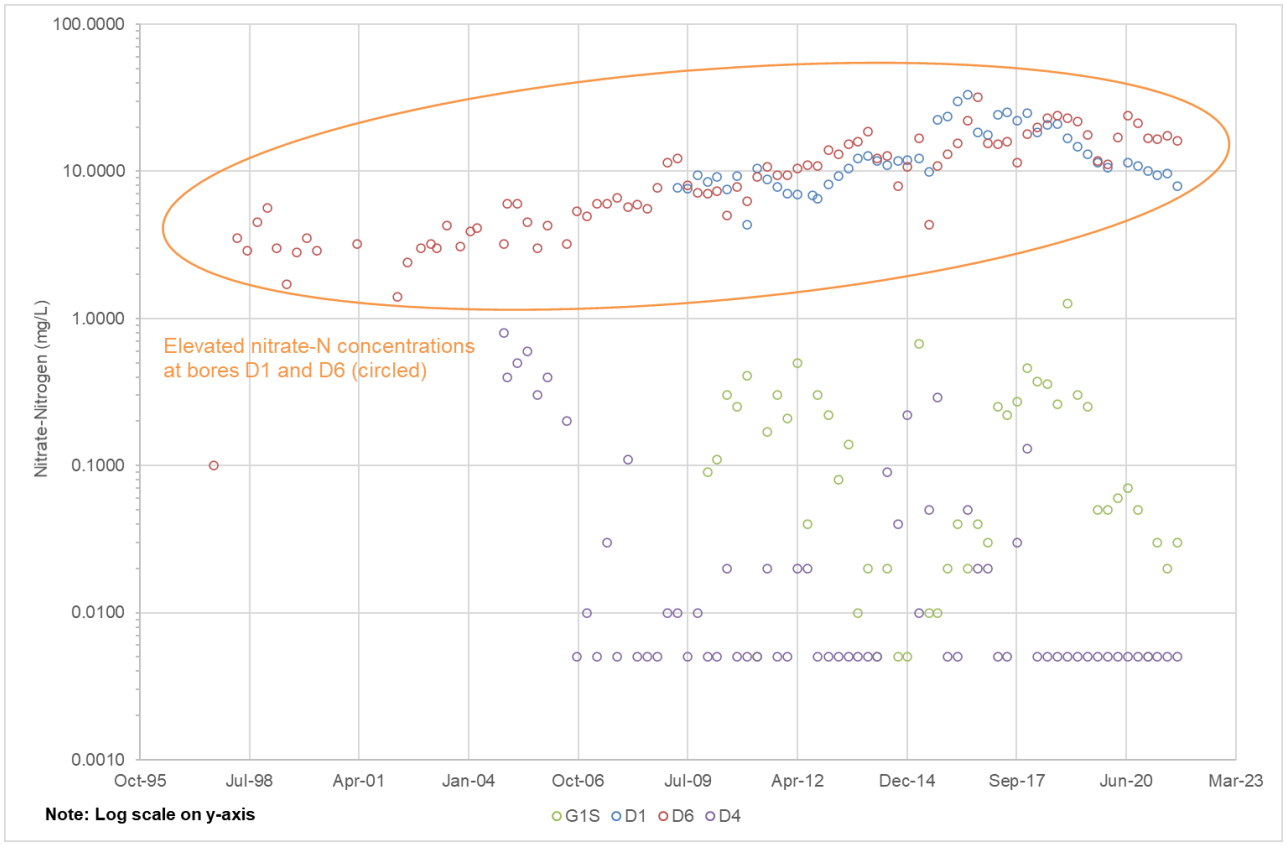
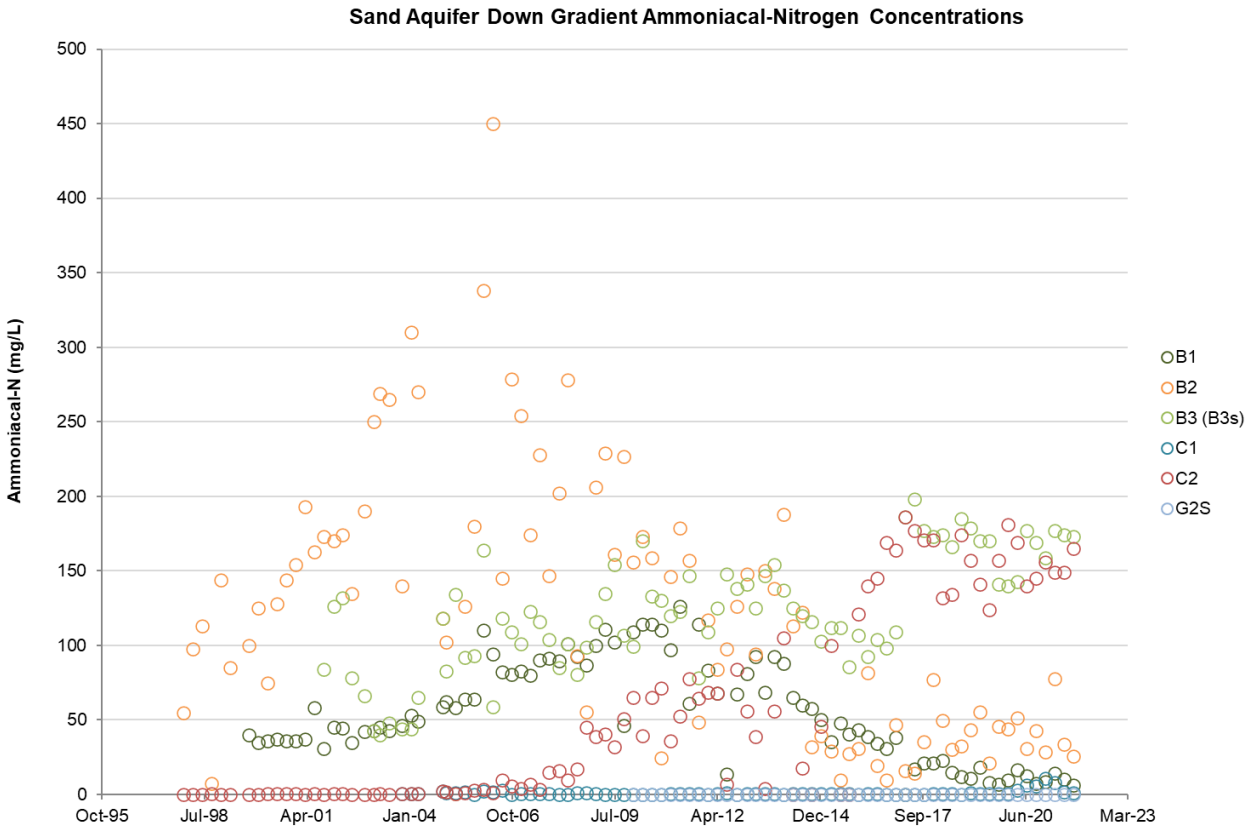
Report Released By
Rob Deacon

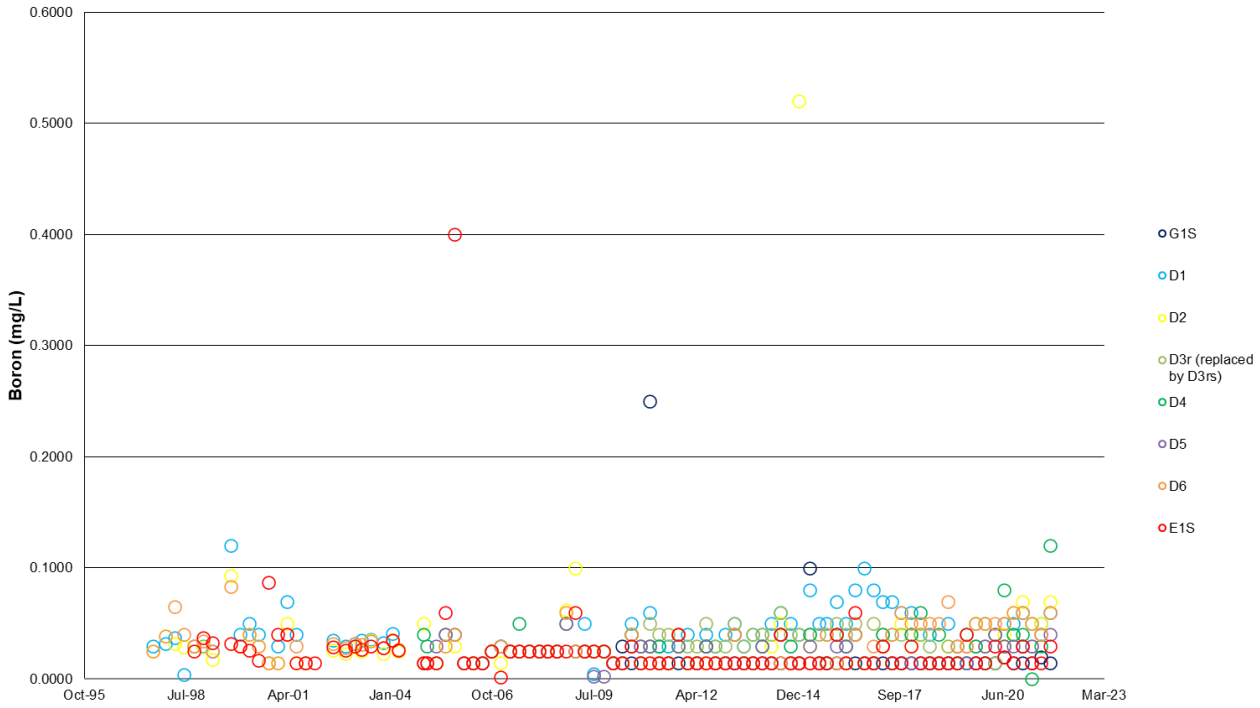
This laboratory is accredited by International Accreditation New Zealand and its reports are recognised in all countries affiliated to the International Laboratory Accreditation Co-operation Mutual Recognition Arrangement (ILAC-MRA). The tests reported have been performed in accordance with our terms of accreditation, with the exception of tests marked "not an accredited test", which are outside the scope of this laboratory's accreditation.

APPENDIX D HISTORICAL RESULTS GRAPHS

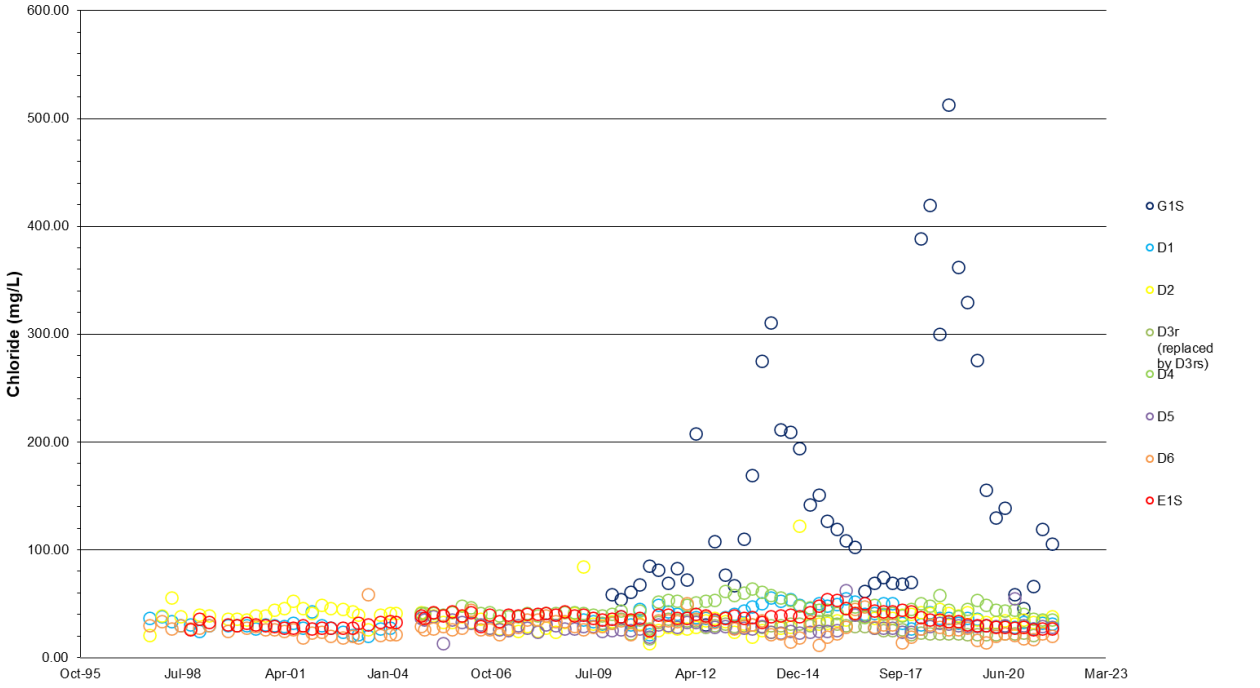

100.0000
10.0000
1.0000
0.1000
0.0100
0.0010
Nitrate-Nitrogen (mg/L)
Elevated nitrate-N concentrations
at bores D1 and D6 (circled)
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Note: Log scale on y-axis
G1S
D1
D6
D4


Sand Aquifer Down Gradient Ammoniacal-Nitrogen Concentrations
Ammoniacal-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
B1
B2
B3 (B3s)
C1
C2
G2S

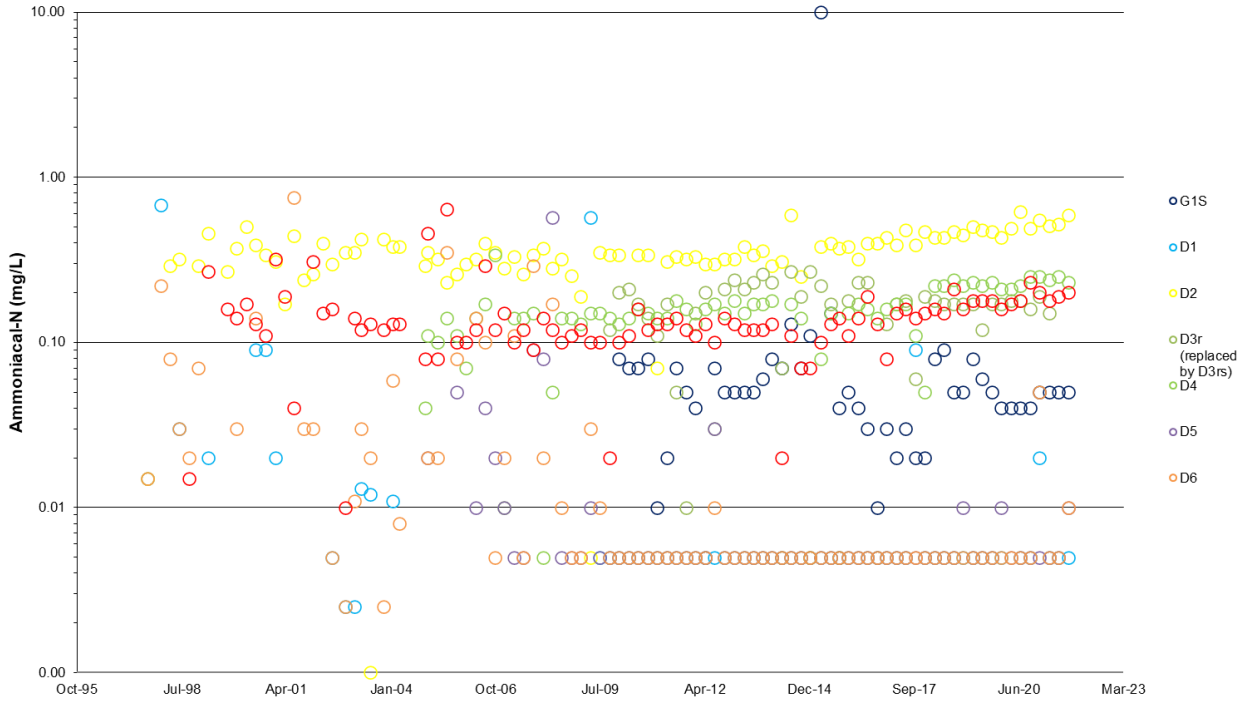
Sand Aquifer Downgrade of New Landfill - Boron Concentrations



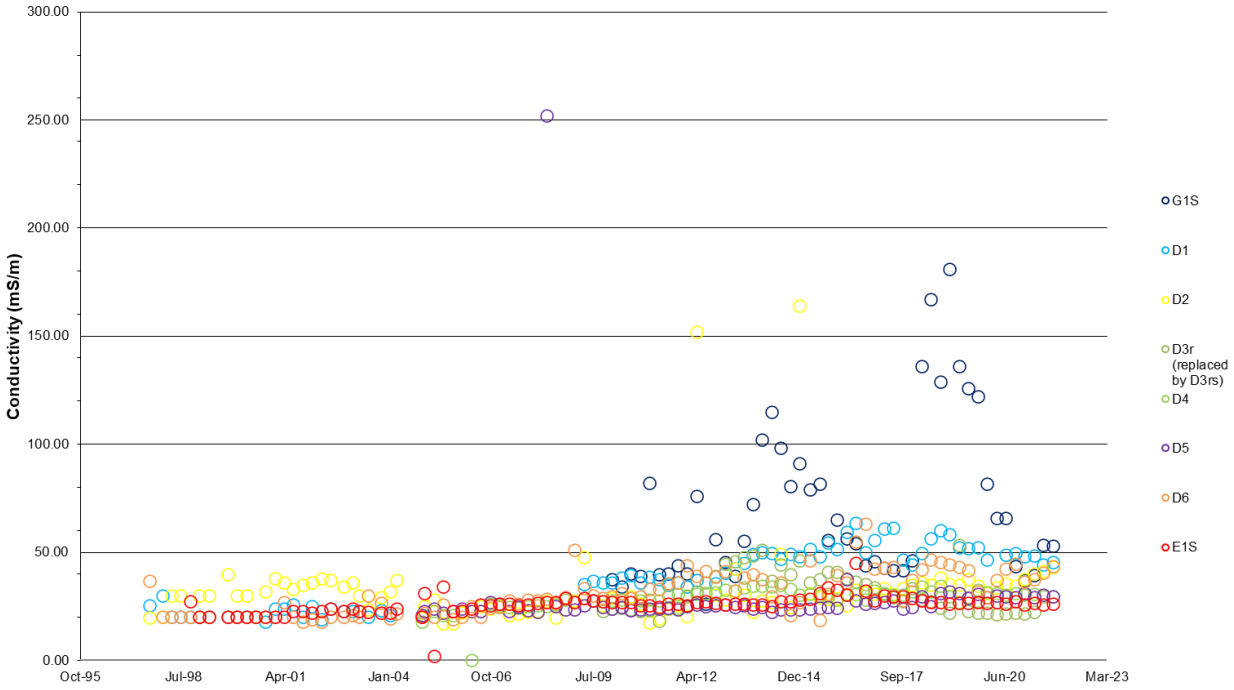
Sand Aquifer Downgrade of New Landfill - Chloride Concentrations



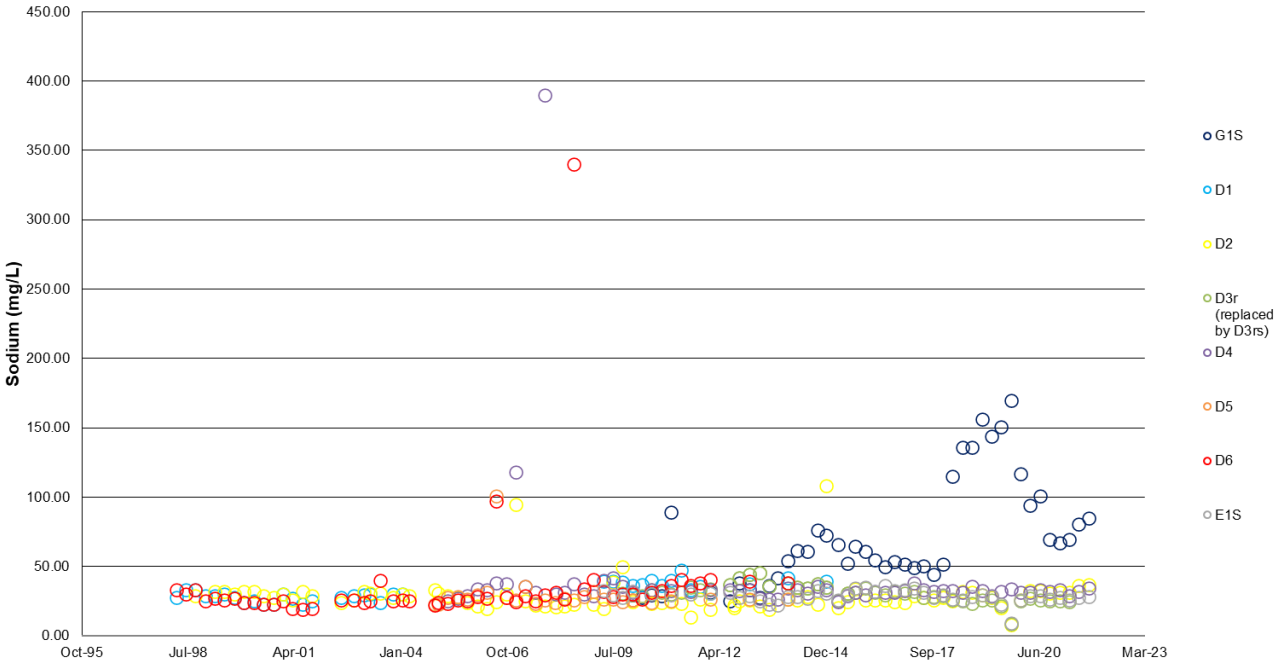
Sand Aquifer Downgrade of New Landfill - Ammoniacal-Nitrogen Concentrations



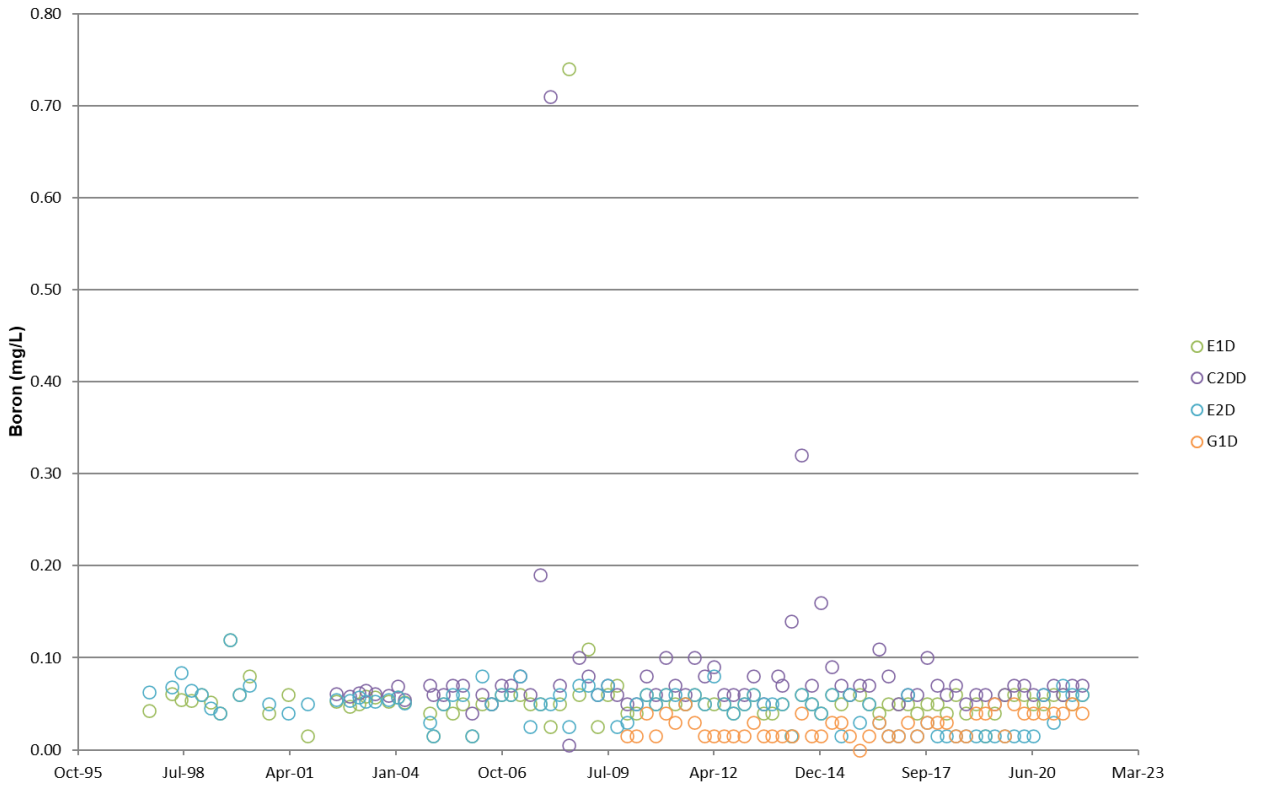
Sand Aquifer Downgrade of New Landfill - Conductivity Levels

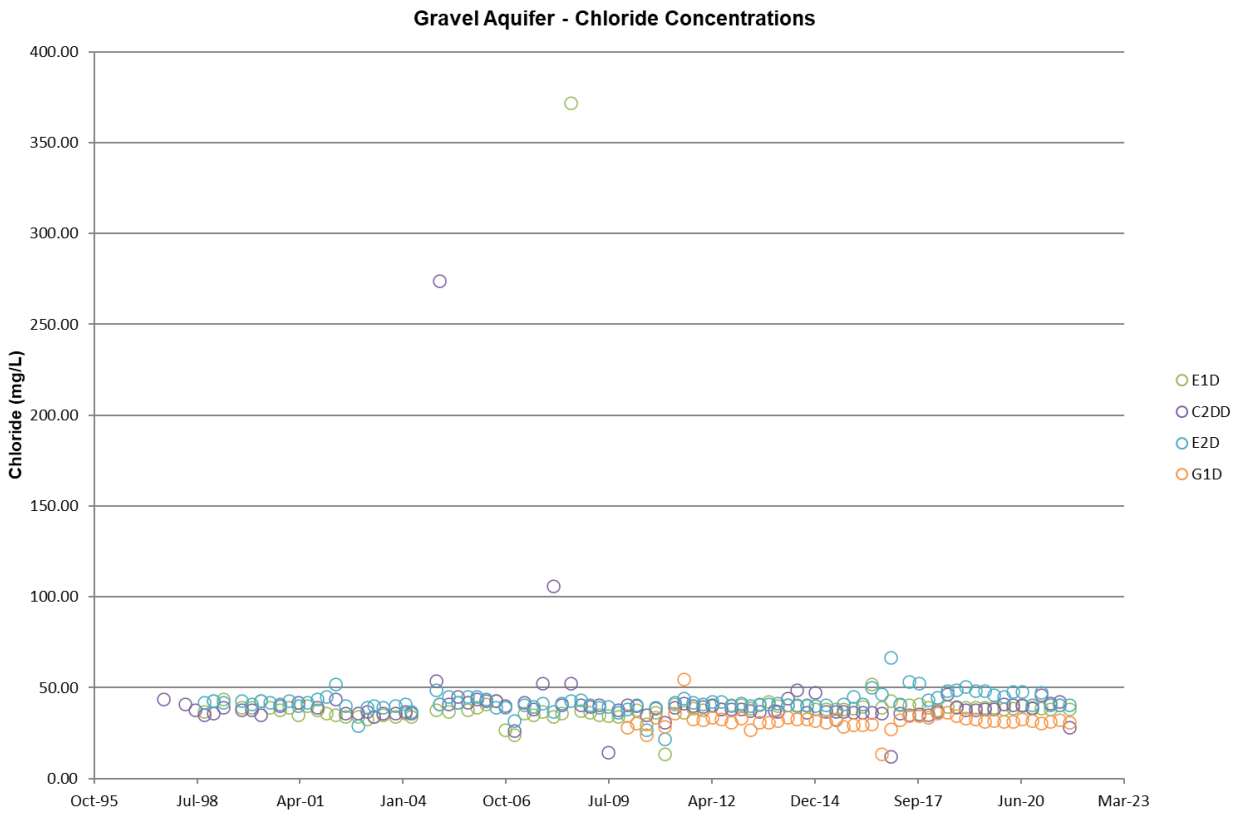


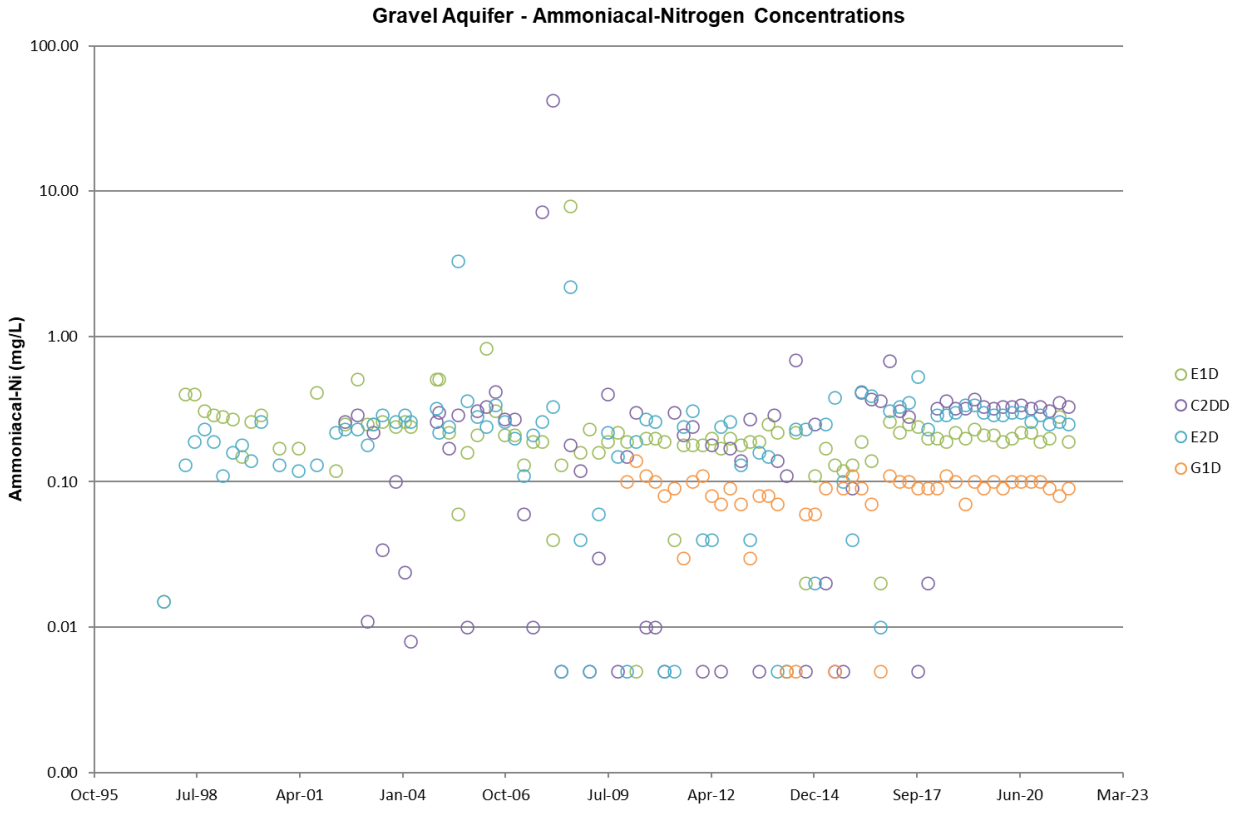
Sand Aquifer Downgrade of New Landfill - Sodium Concentrations

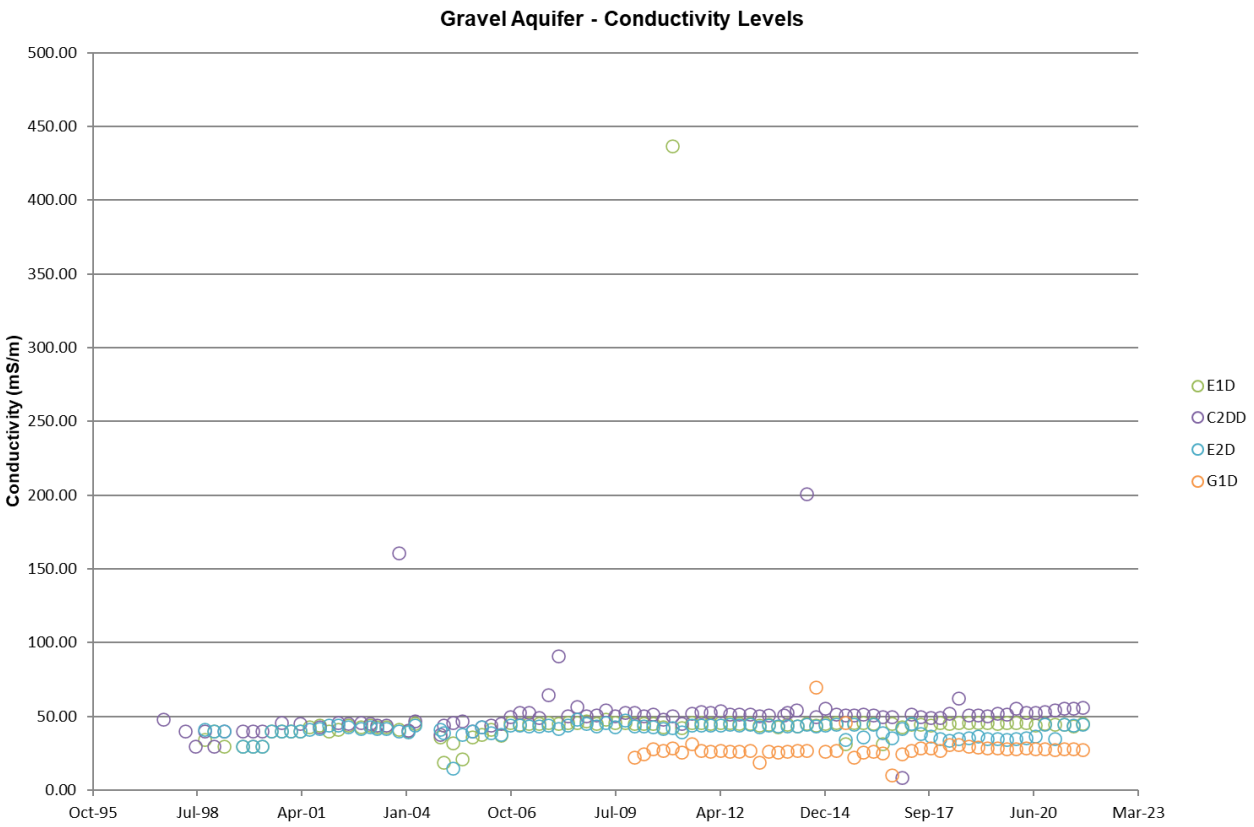


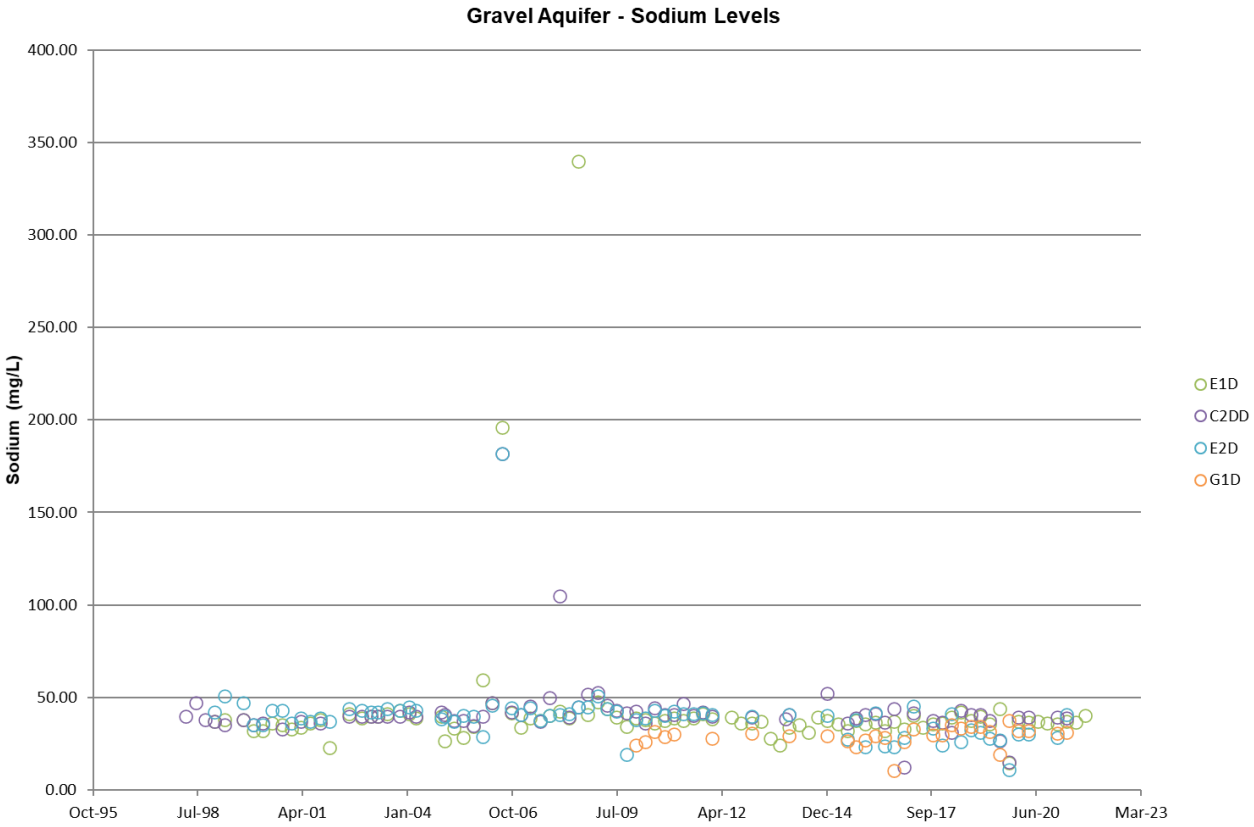
Gravel Aquifer - Boron Concentrations



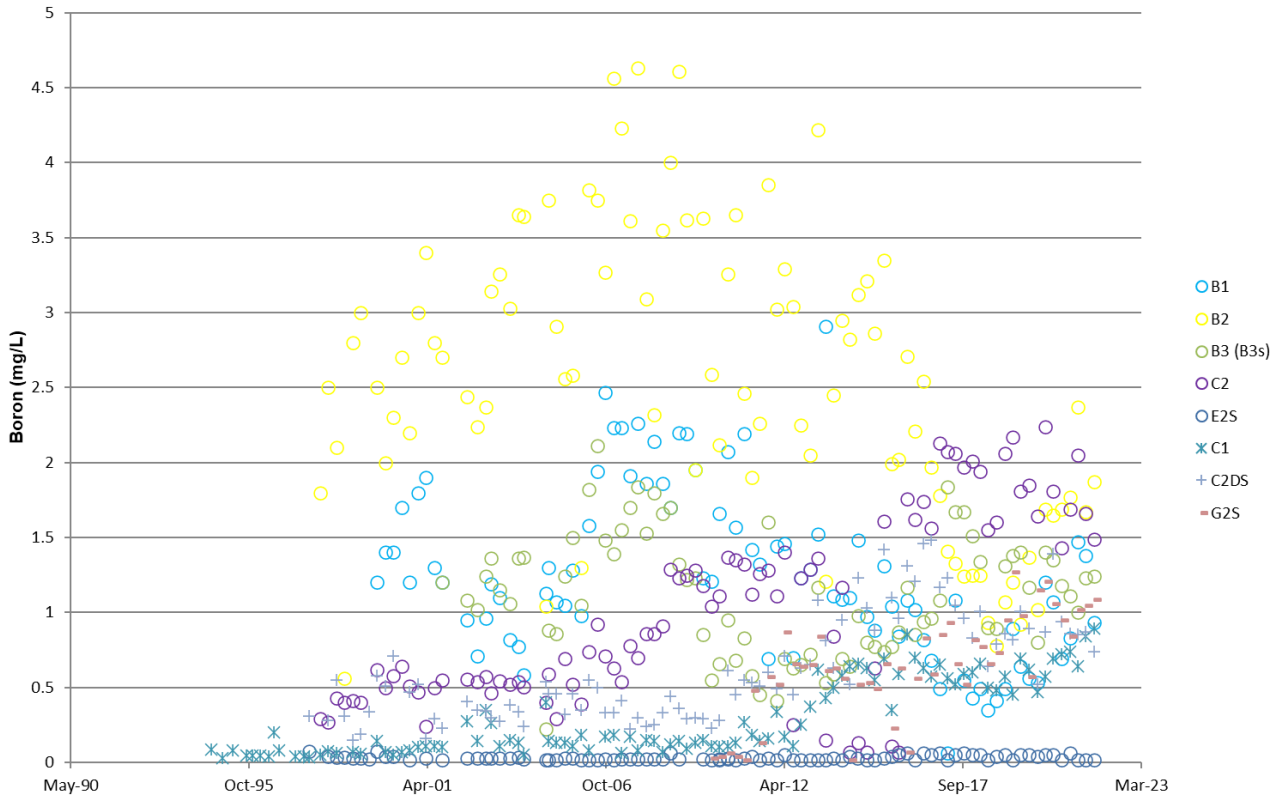

Gravel Aquifer - Chloride Concentrations
Chloride (mg/L)
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
E1D
C2DD
E2D
G1D


Gravel Aquifer - Ammoniacal-Nitrogen Concentrations
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
E1D
C2DD
E2D
G1D

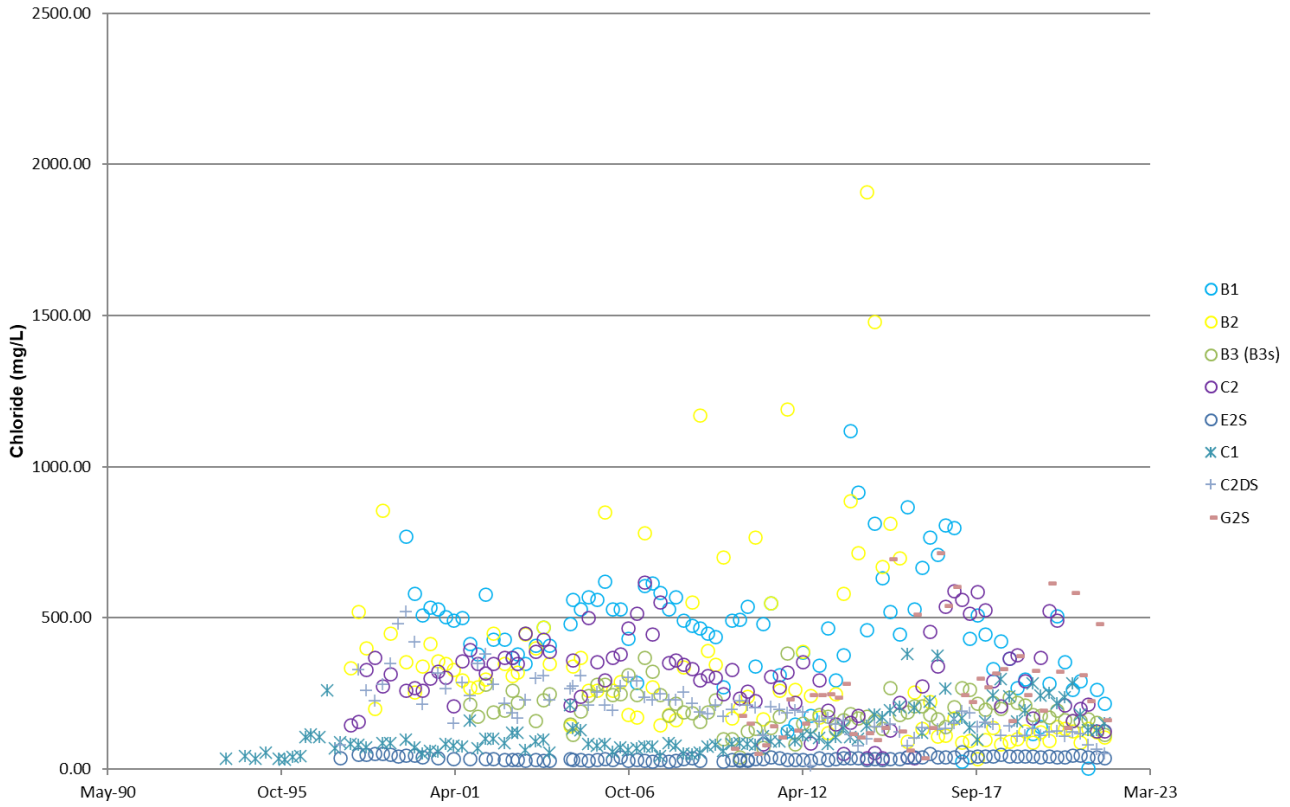

Gravel Aquifer - Conductivity Levels
Conductivity (mS/m)
500.00
450.00
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
E1D
C2DD
E2D
G1D


Gravel Aquifer - Sodium Levels
Sodium (mg/L)
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Oct-95
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
E1D
C2DD
E2D
G1D

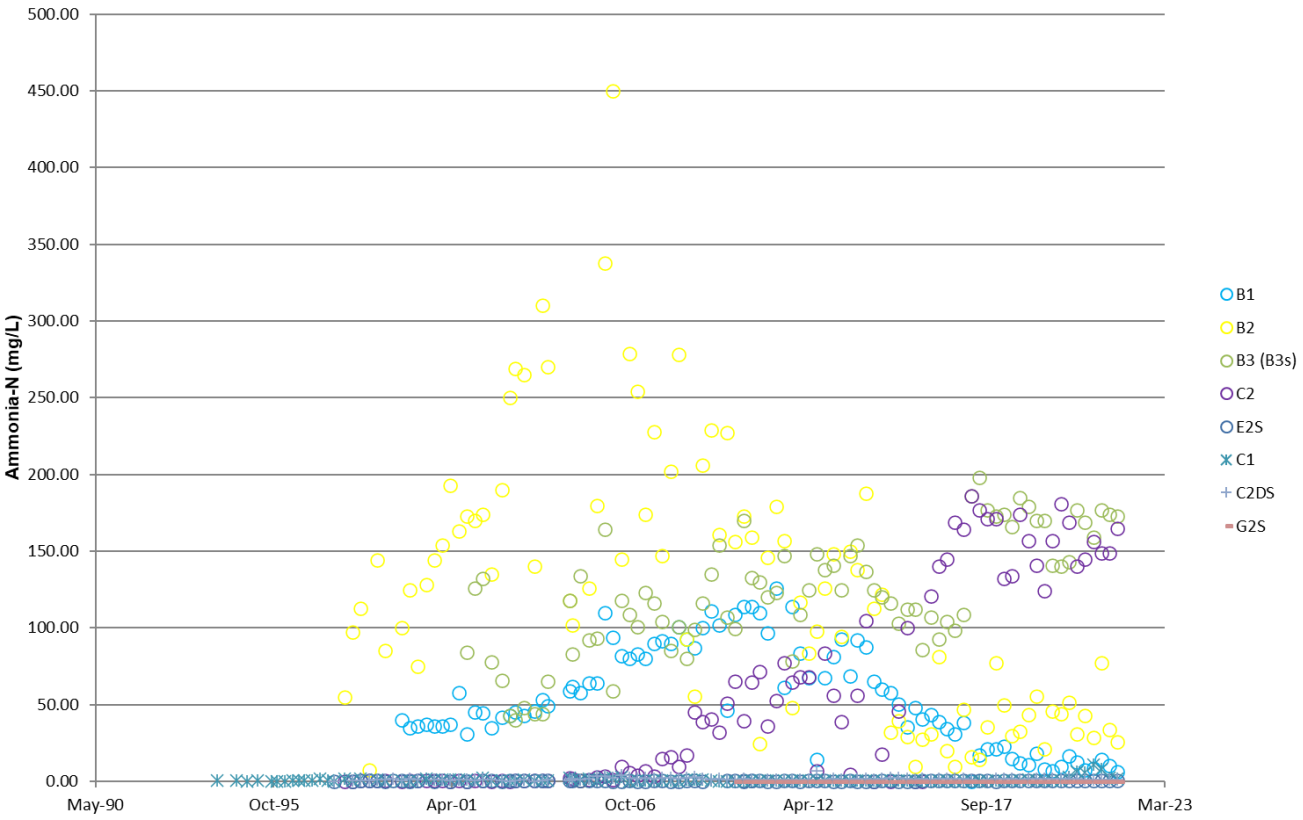
Sand Aquifer Downgrade of Old Landfill - Boron Concentrations



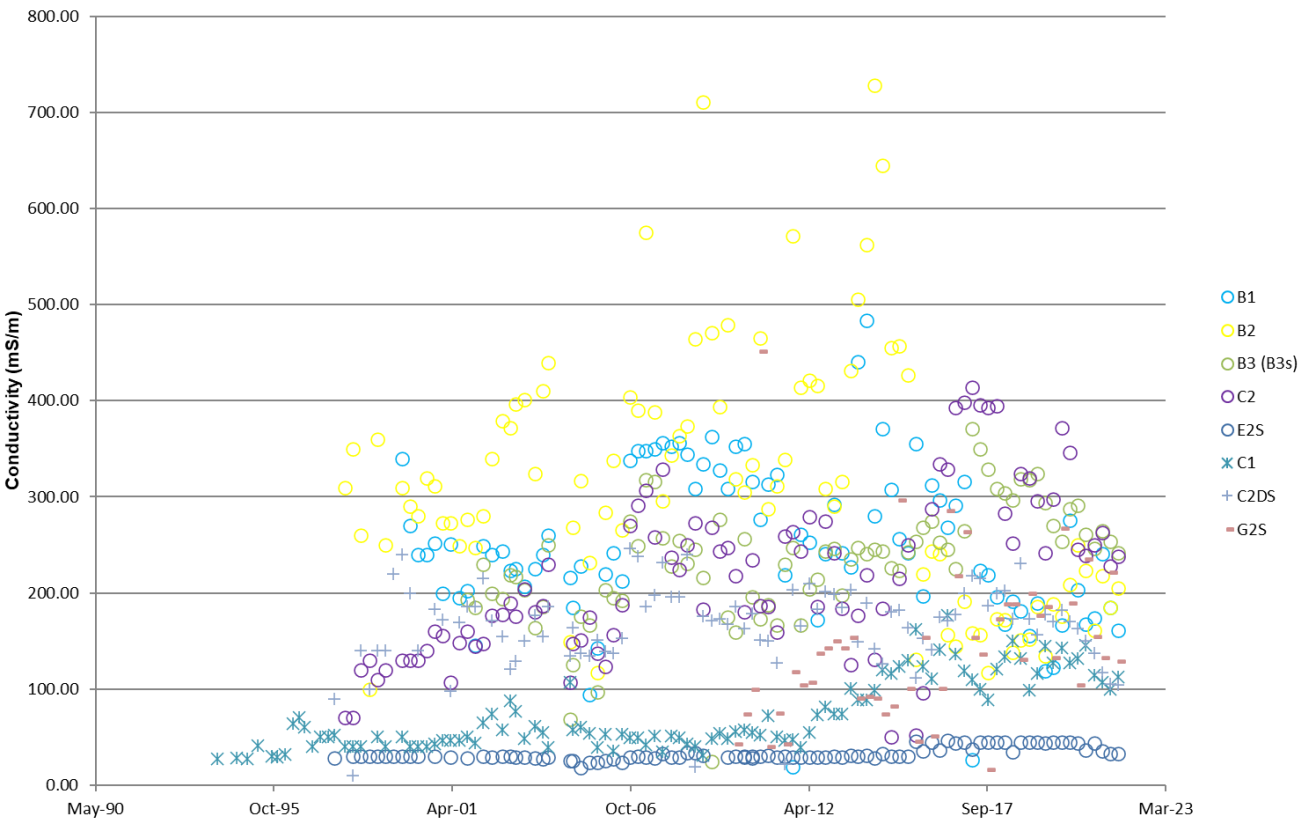
Sand Aquifer Downgrade of Old Landfill - Chloride Concentrations

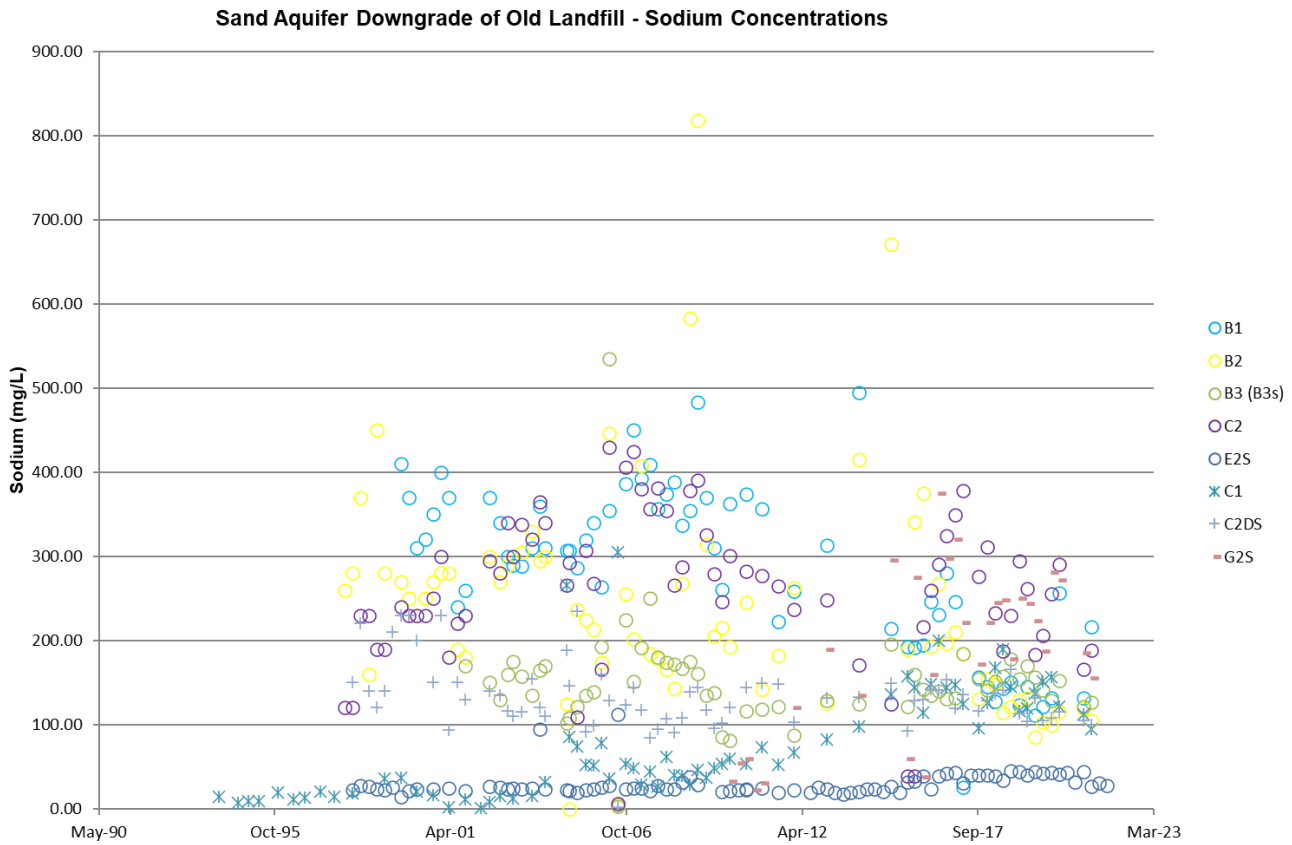


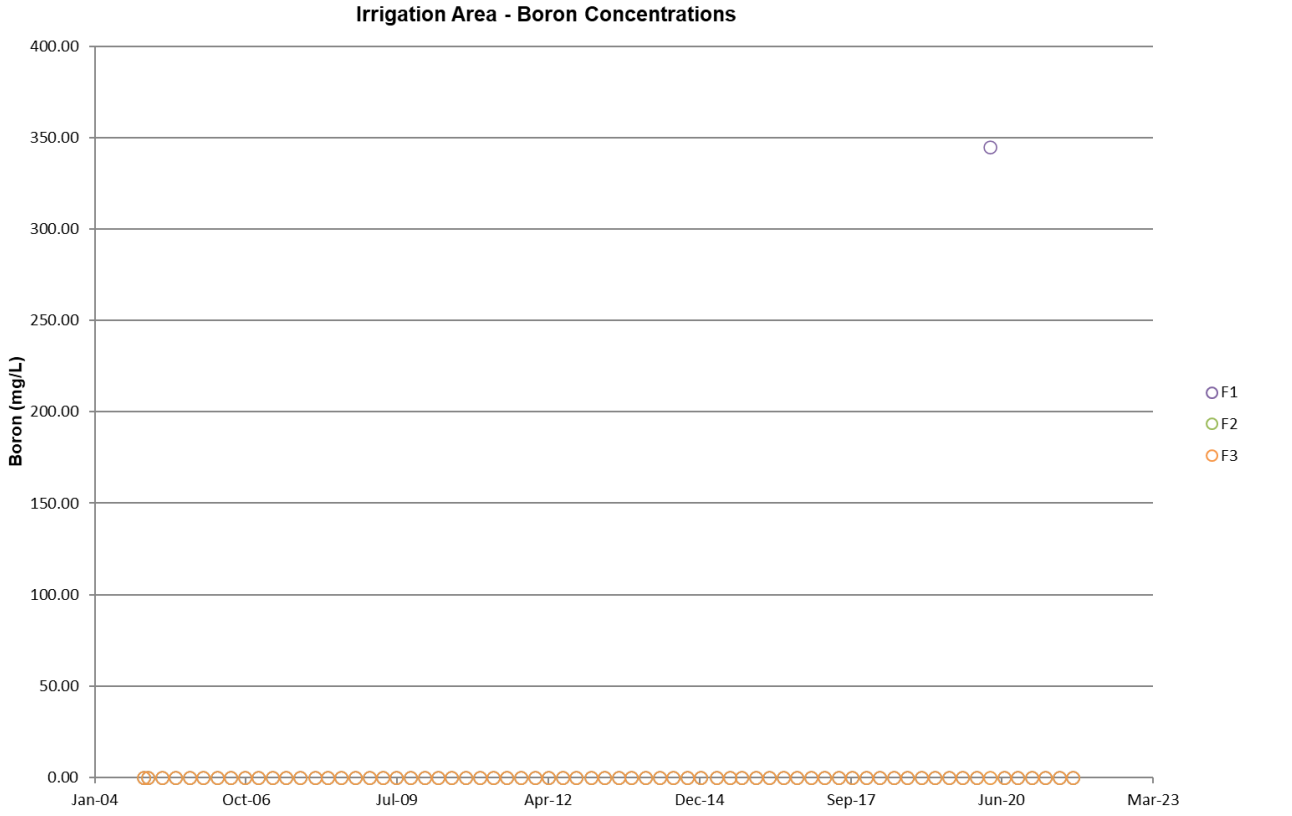
Sand Aquifer Downgrade of Old Landfill - Ammonia-N Concentrations

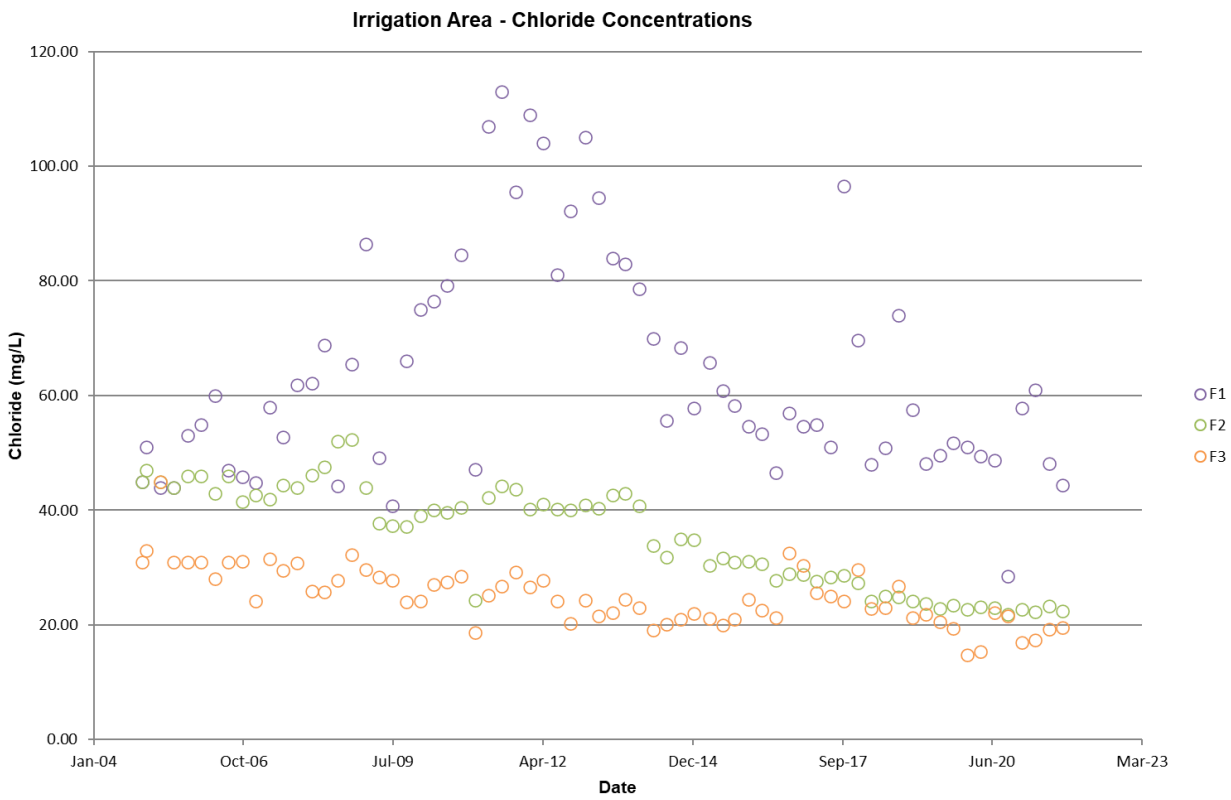


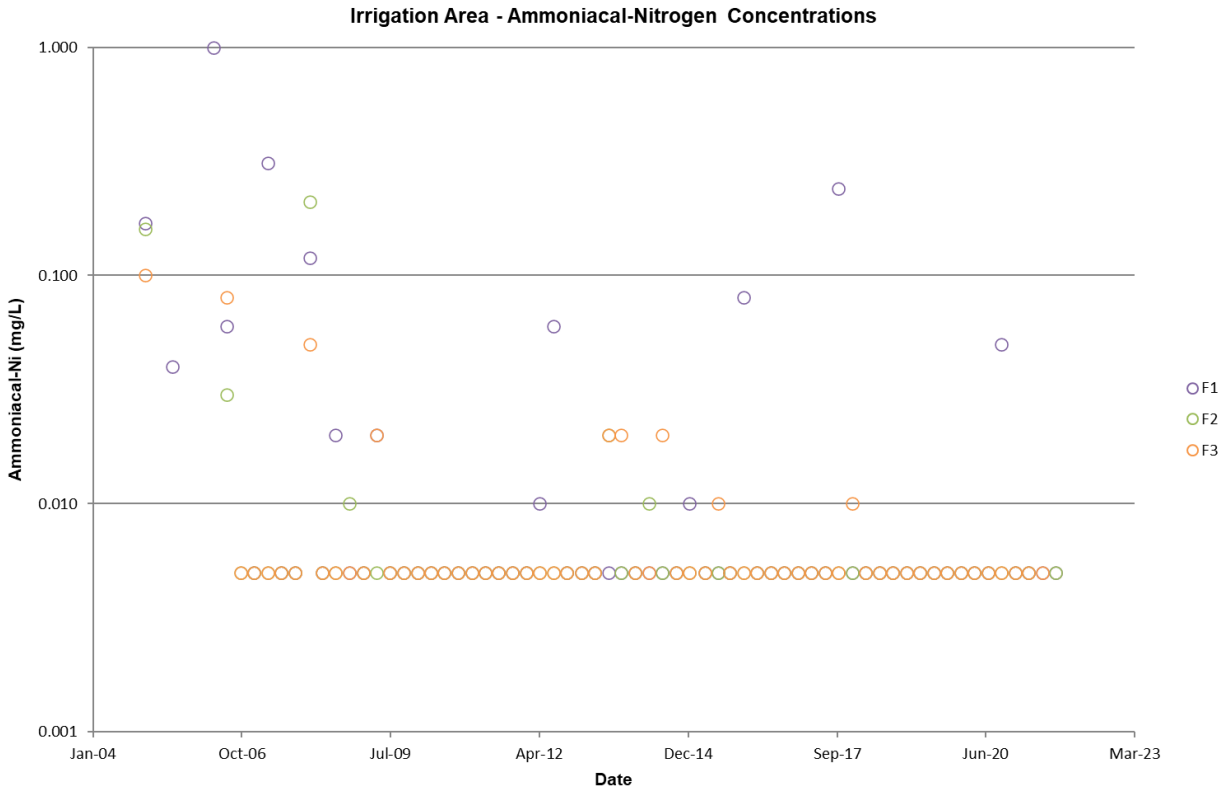
Sand Aquifer Downgrade of Old Landfill - Conductivity Levels

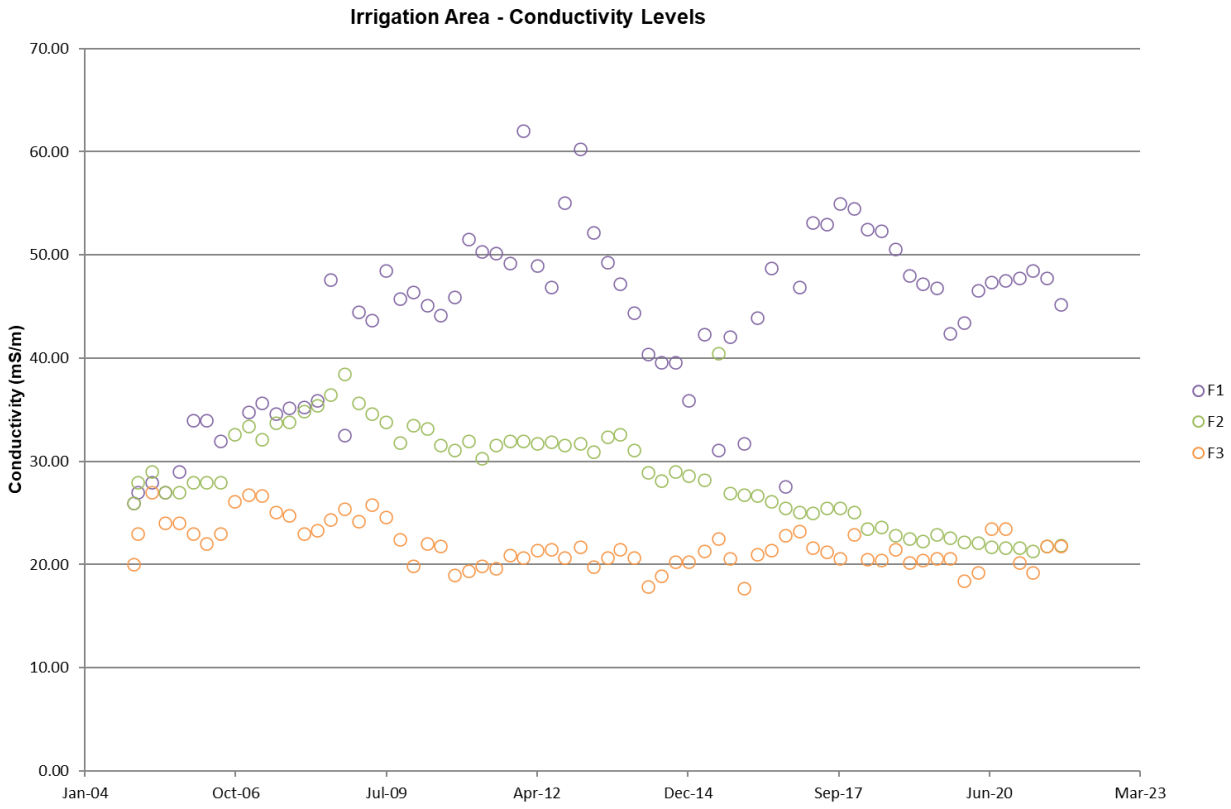


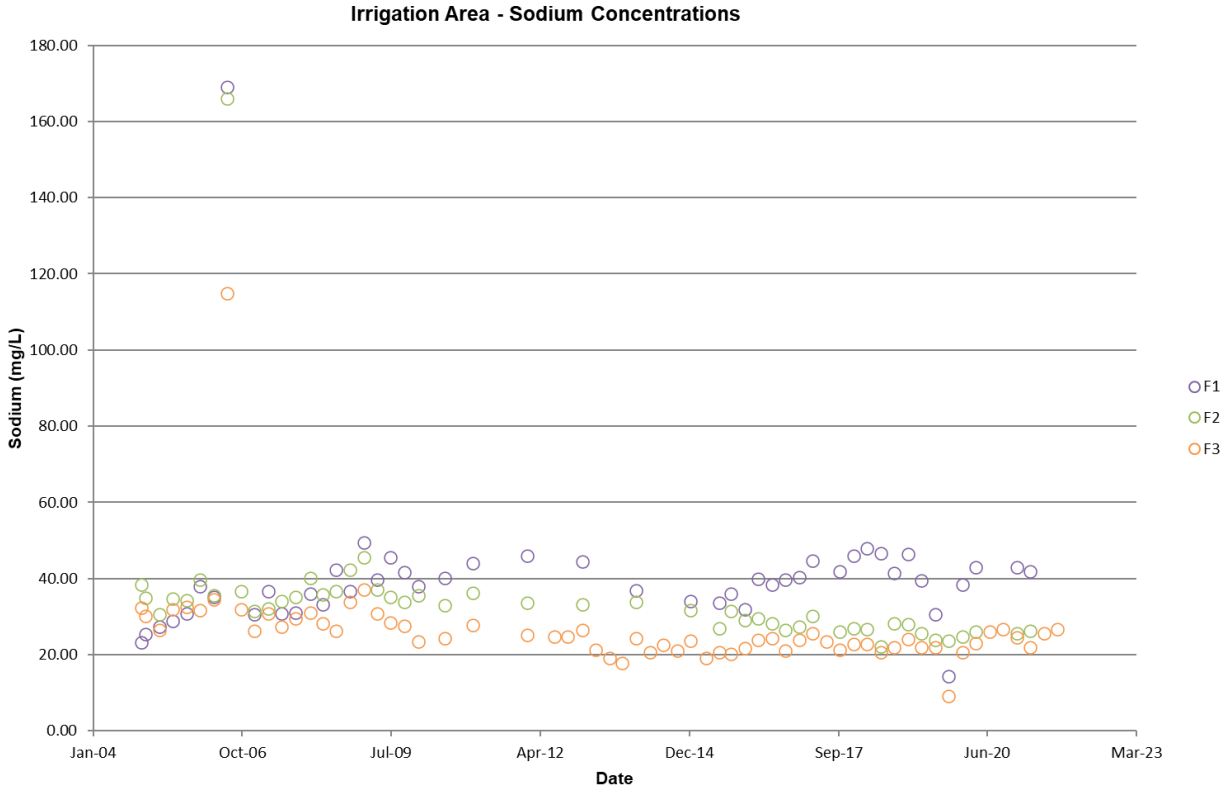

Sand Aquifer Downgrade of Old Landfill - Sodium Concentrations
Sodium (mg/L)
900.00
800.00
700.00
600.00
500.00
400.00
300.00
200.00
100.00
0.00
May-90
Oct-95
Apr-01
Oct-06
Apr-12
Sep-17
Mar-23
B1
B2
B3 (B3s)
C2
E2S
C1
C2DS
G2S

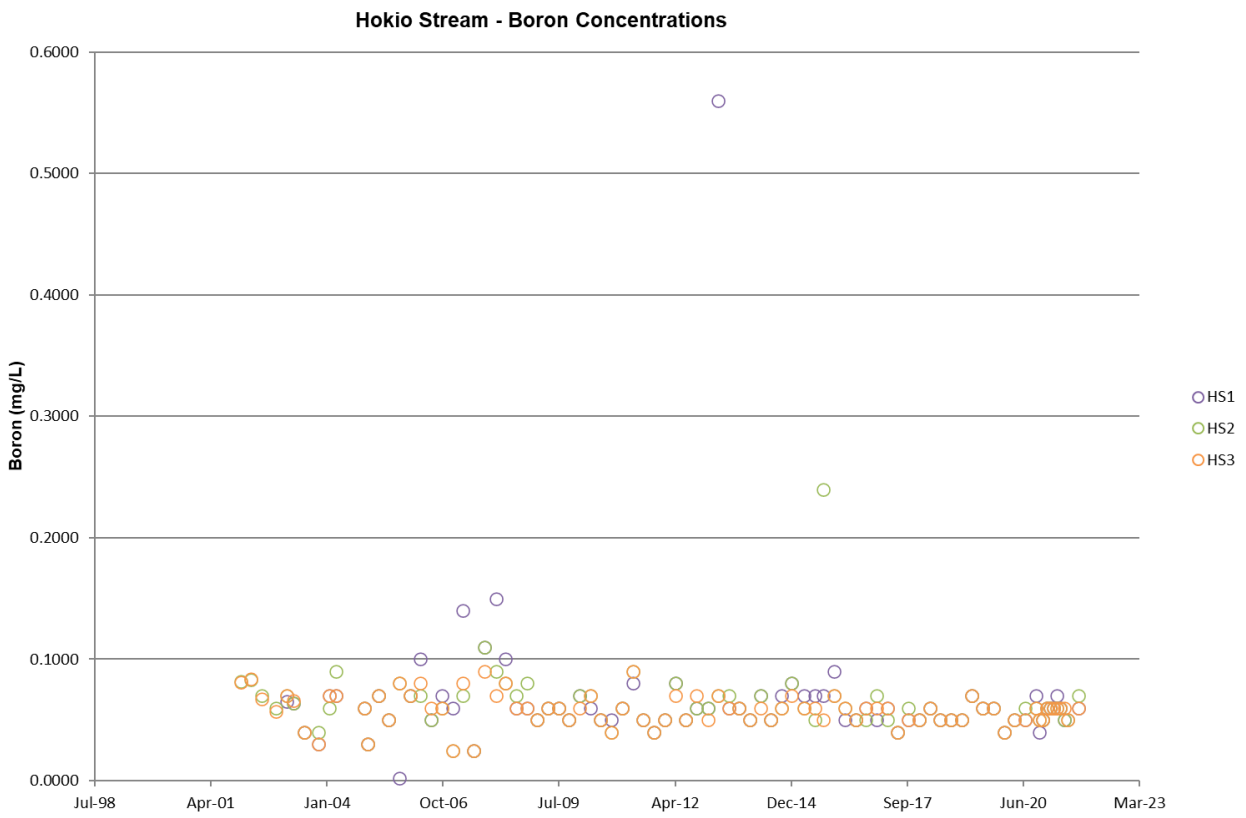

Irrigation Area - Boron Concentrations
Boron (mg/L)
400.00
350.00
300.00
250.00
200.00
150.00
100.00
50.00
0.00
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
F1
F2
F3

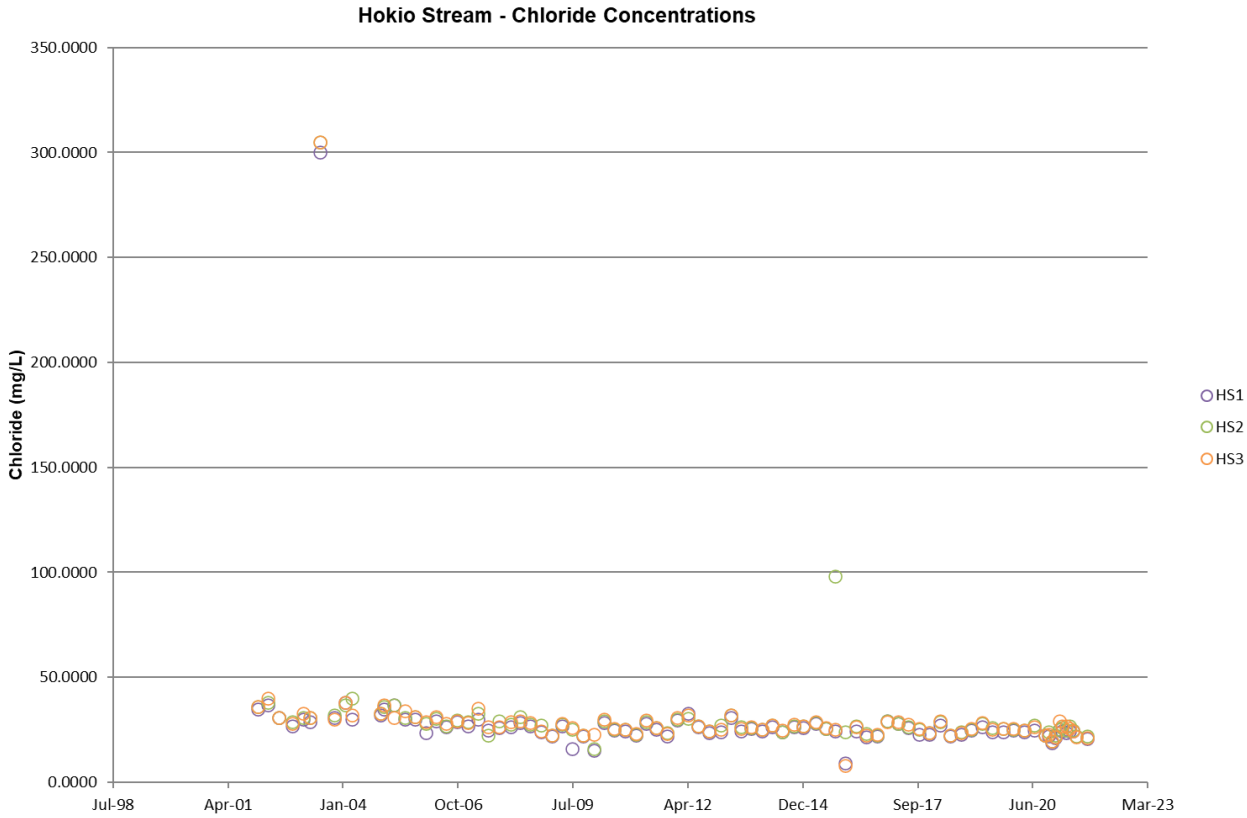

Irrigation Area - Chloride Concentrations
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Chloride (mg/L)
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Date
F1
F2
F3

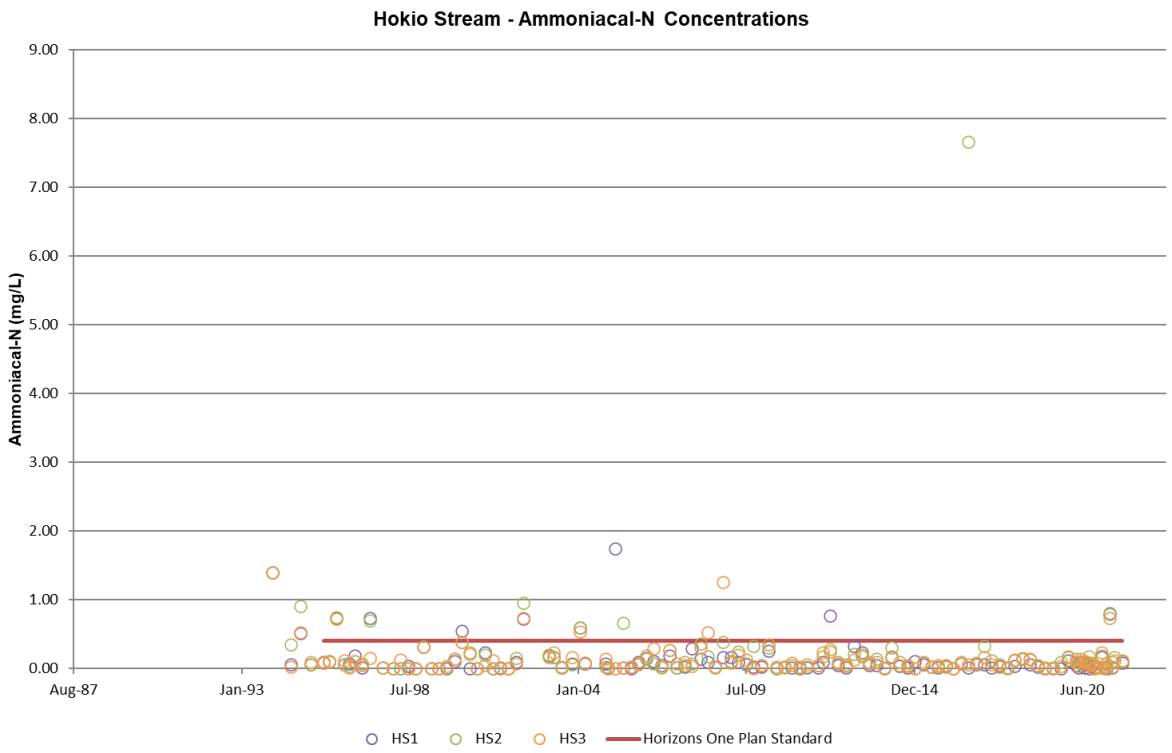

Irrigation Area - Ammoniacal-Nitrogen Concentrations
1.000
0.100
0.010
0.001
Ammoniacal-Ni (mg/L)
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Date
F1
F2
F3

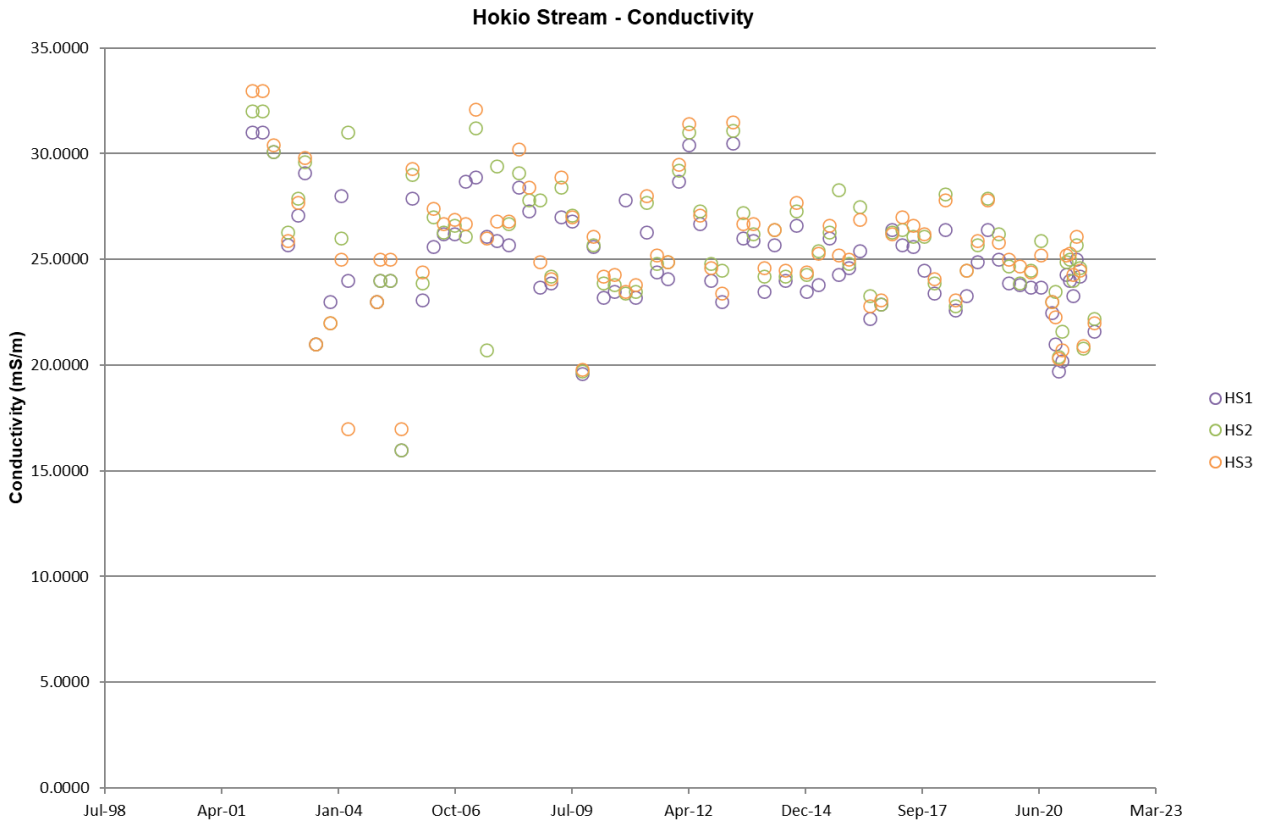

Irrigation Area - Conductivity Levels
Conductivity (mS/m)
70.00
60.00
50.00
40.00
30.00
20.00
10.00
0.00
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
F1
F2
F3

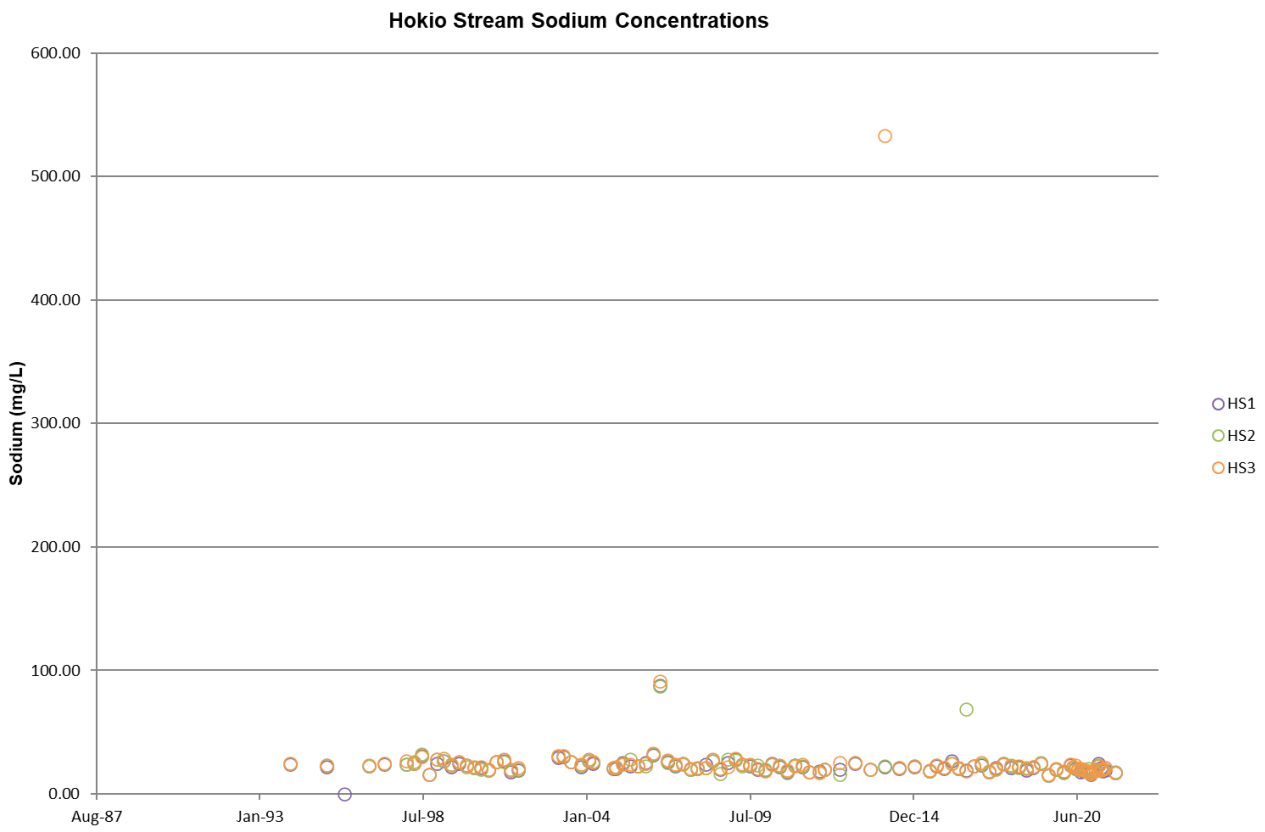

Irrigation Area - Sodium Concentrations
Sodium (mg/L)
180.00
160.00
140.00
120.00
100.00
80.00
60.00
40.00
20.00
0.00
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
Date
F1
F2
F3


Hokio Stream - Boron Concentrations
Boron (mg/L)
0.6000
0.5000
0.4000
0.3000
0.2000
0.1000
0.0000
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
HS1
HS2
HS3


Hokio Stream - Chloride Concentrations
Chloride (mg/L)
350.0000
300.0000
250.0000
200.0000
150.0000
100.0000
50.0000
0.0000
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
HS1
HS2
HS3


Hokio Stream - Ammoniacal-N Concentrations
Ammoniacal-N (mg/L)
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Aug-87
Jan-93
Jul-98
Jan-04
Jul-09
Dec-14
Jun-20
HS1
HS2
HS3
Horizons One Plan Standard


Hokio Stream - Conductivity
Conductivity (mS/m)
35.0000
30.0000
25.0000
20.0000
15.0000
10.0000
5.0000
0.0000
Jul-98
Apr-01
Jan-04
Oct-06
Jul-09
Apr-12
Dec-14
Sep-17
Jun-20
Mar-23
HS1
HS2
HS3


Hokio Stream Sodium Concentrations
600.00
500.00
400.00
300.00
200.00
100.00
0.00
Sodium (mg/L)
Aug-87
Jan-93
Jul-98
Jan-04
Jul-09
Dec-14
Jun-20
HS1
HS2
HS3

APPENDIX E LANDFILL GAS MONITORING RESULTS AT GW BORES FOR OCTOBER 2021

Date	Time	Bore	Methane (CH4)	Carbon Dioxide (CO2)	Hydrogen Sulphide (H2S)	Oxygen (O2)	Air temperature °C
7/10/2021	11:49:00 a.m.	D1	0	0.19	0	20.3	15
7/10/2021	11:51:00 a.m.	D2	0	0.3	0	20.3	15
7/10/2021	11:53:00 a.m.	D4	0	0.1	0	20.5	16
7/10/2021	11:54:00 a.m.	D5	0	0.1	0	20.5	16.6
7/10/2021	11:55:00 a.m.	D6	0	0.05	0	20.6	14.9
7/10/2021	11:56:00 a.m.	E1d	0	0.06	0	20.5	16
7/10/2021	11:57:00 a.m.	E1s	0	0.04	0	20.5	16
7/10/2021	11:58:00 a.m.	E2s	0	0.09	0	20.3	16
7/10/2021	12:01:00 p.m.	E2d	0	0.1	0	20.3	16
7/10/2021	12:01:00 p.m.	F1	0	0.08	0	20.8	14.9
7/10/2021	12:55:00 p.m.	F1	0	0.08	0	20.8	14.9
7/10/2021	12:56:00 p.m.	F2	0	0.61	0	18.6	17.2
7/10/2021	12:57:00 p.m.	F3	0	0.15	0	20.6	15
7/10/2021	12:58:00 p.m.	G1d	0.03	0	0	21.5	16.7
7/10/2021	12:59:00 p.m.	G1s	0	0	0	21.4	16.7
7/10/2021	1:01:00 p.m.	G2s	0	1.42	0	18.2	18.5
7/10/2021	1:02:00 p.m.	Xs1	0	0.03	0	20.1	19.5
7/10/2021	1:03:00 p.m.	Xs2	0.02	0	0	21.1	15.6
7/10/2021	1:04:00 p.m.	Xd1	0.1	0.23	0	21	19
7/10/2021	2:45:00 p.m.	B1	0	0.44	0	19.2	17.9
7/10/2021	2:47:00 p.m.	B2	0	8.12	0	1.5	17.8
7/10/2021	2:50:00 p.m.	B3s	0	0.05	0	20.3	16.5
7/10/2021	2:52:00 p.m.	C1	0	0.17	0	19.5	18
7/10/2021	2:54:00 p.m.	C2	0	0.03	0	20.1	17.4
7/10/2021	2:57:00 p.m.	C2dd	0	0.22	0		17.4
7/10/2021	3:18:00 p.m.	C2ds	0	0.58	0	19.8	17.4

CREATING COMMUNITIES

Communities are fundamental. Whether around the corner or across the globe, they provide a foundation, a sense of belonging. That's why at Stantec, we always **design with community in mind**.

We care about the communities we serve—because they're our communities too. We're designers, engineers, scientists, and project managers, innovating together at the intersection of community, creativity, and client relationships. Balancing these priorities results in projects that advance the quality of life in communities across the globe.

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