

Masterton Landfill Annual Report Groundwater Level Measurements - Reduced Level

Date	Water Level (m below ground level)					
	Bore 1	Bore 2	Bore 3	Bore 4	Bore 5	Bore 6
Ground Level	99.869	99.125	97.269	96.994	97.219	96.03
19 January 1997	97.359	95.475	94.429	93.744	95.019	93.63
19 February 1997	97.509	95.725	94.329	93.984	95.019	93.74
19 March 1997	97.419	95.645	94.229	93.794	94.869	93.78
19 April 1997	97.409	95.615	94.259	93.874	94.909	93.84
19 May 1997			93.709	93.614	94.719	93.28
19 June 1997	95.679	95.275	94.319	93.964	94.769	94.4
19 July 1997	95.579	95.145	94.169	93.924	94.189	93.61
19 August 1997	95.899	95.465	94.449	94.174	94.699	94.8
19 September 1997	95.559	95.145	94.199	93.834	94.689	94.32
19 October 1997	96.059	95.605	94.339	93.824	95.049	94.15
19 November 1997	95.889	95.625	94.519	94.284	94.529	92.98
19 December 1997	95.989	95.565	94.509	94.194	94.619	91.91
19 January 1998	95.349	94.925	94.069	93.474	94.399	94.03
19 February 1998	95.319	94.885	93.959	93.434	94.349	93.97
19 March 1998	95.289	94.855	93.919	93.394	94.619	93.93
19 April 1998	95.319	94.905	93.939	93.194	94.649	93.94
19 May 1998	95.319	95.005	94.049	93.634	94.449	94.17
19 June 1998	95.499	95.185	94.439	93.694	94.659	94.33
19 July 1998	95.909	95.435	94.139	94.104	94.999	93.4
19 August 1998	95.569	95.155	94.169	93.694	94.539	93.71
19 September 1998	95.609	95.195	94.189	93.754	94.659	93.41
19 October 1998	95.479	95.165	94.419	93.664	94.639	94.3
19 November 1998	95.529	95.195	94.089	93.764	94.639	94.34
19 December 1998	95.809	95.425	94.319	93.844	94.669	94.39
19 January 1999	95.439	95.095	93.999	93.494	94.349	93.98
19 February 1999	95.239	94.845	93.599	93.064	94.509	93.92
19 March 1999	95.429	95.025	94.009	93.514	94.479	93.77
19 April 1999	95.449	95.055	94.059	93.574	94.509	94.1
20 May 1999	95.709	95.295	94.319	93.854	94.669	94.21
10 June 1999	95.709	95.305	94.289	93.884	94.729	94.33
08 July 1999	95.489	95.065	94.099	93.734	94.549	94.12
12 August 1999	95.569	95.135	94.189	93.724	94.499	94.06
09 September 1999	95.619	95.235	94.299	93.784	94.589	94.2
14 October 1999	95.569	95.145	94.219	93.744	95.569	94.1
10 November 1999	95.439	95.015	94.139	93.584	94.389	94.03
09 December 1999	95.509	95.055	94.159	93.624	94.319	94.03

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Date	Water Level (m below ground level)					
	Bore 1	Bore 2	Bore 3	Bore 4	Bore 5	Bore 6
20 January 2000	95.259	94.835	93.859	93.404	94.269	93.82
24 February 2000	95.299	94.885	93.919	93.474	94.399	93.88
23 March 2000	95.449	94.995	94.039	93.604	94.439	94.02
20 April 2000	95.309	95.785	93.909	93.474	94.359	93.87
01 May 2000	95.429	94.995	94.049	93.594	94.429	93.98
01 June 2000	95.549	95.135	94.189	93.714	94.539	94.1
14 July 2000	95.719	95.025	94.059	93.624	94.479	94.23
01 August 2000	95.719	95.315	94.459	94.014	94.819	94.25
01 September 2000	95.649	95.235	94.309	93.864	94.649	94.16
01 October 2000	95.509	95.085	94.189	93.714	94.499	94.12
23 November 2000	95.379	94.945	94.069	93.664	94.429	94.16
22 December 2000	95.309	94.835	93.969	93.494	94.239	93.86
18 January 2001	95.349	94.895	94.019	93.564	94.359	93.98
22 February 2001	95.149	94.805	93.819	93.384	94.249	93.85
29 March 2001	95.289	94.905	93.939	93.544	94.479	94.06
18 April 2001	95.079	94.705	93.759	93.114	94.249	93.85
17 May 2001	95.179	94.805	93.839	93.414	94.299	93.89
29 June 2001	95.409	94.965	94.049	93.614	94.459	94.05
16 July 2001	95.369	94.855	94.369	93.894	94.649	94.27
17 August 2001	96.159	95.715	94.799	94.374	95.119	94.76
26 September 2001	95.239	94.835	93.929	93.454	94.309	93.87
25 October 2001	95.439	95.015	94.129	93.614	94.469	94.03
20 November 2001	95.379	94.965	94.039	93.564	94.409	93.96
12 December 2001	95.769	95.335	94.369	93.944	94.789	94.35
17 January 2002	95.549	95.145	94.179	93.714	94.559	94.12
13 February 2002	95.399	94.975	94.009	93.574	94.499	94.05
27 March 2002	95.329	94.915	93.999	93.544	94.399	93.94
18 April 2002	95.139	94.735	93.819	93.374	94.249	93.79
27 May 2002	95.339	94.895	93.989	93.524	94.439	93.95
24 June 2002	95.959	95.535	94.589	94.094	94.919	94.46
31 July 2002	95.879	95.425	95.539	94.014	94.769	94.32
28 August 2002	95.519	95.105	94.209	93.724	94.549	94.08
23 September 2002	95.569	95.202	94.199	93.854	94.779	94.35
23 October 2002	95.549	95.155	94.189	93.694	94.589	94.15
26 November 2002	95.369	94.975	94.019	93.514	94.449	93.95
24 December 2002	95.339	95.025	93.989	93.534	94.409	93.9
23 January 2003	95.419	95.055	93.949	93.644	94.792	94.26

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Date	Water Level (m below ground level)					
	Bore 1	Bore 2	Bore 3	Bore 4	Bore 5	Bore 6
26 February 2003	94.979	94.575	93.619	93.174	94.059	93.57
27 March 2003	94.919	94.495	93.569	93.134	94.049	93.54
30 April 2003	94.949	94.525	93.589	93.154	94.059	93.55
29 May 2003	95.249	94.845	93.879	93.424	94.329	93.83
24 June 2003	95.619	95.225	94.189	93.794	94.849	94.35
22 July 2003	95.549	95.145	94.179	93.684	94.569	94.07
28 August 2003	95.859	95.435	94.489	93.994	94.809	94.34
29 September 2003	96.409	96.025	94.859	94.694	95.729	95.3
23 October 2003	95.549	95.145	94.219	93.634	94.489	94.01
24 November 2003	95.389	95.025	94.079	92.604	94.469	93.98
23 December 2003	95.299	94.925	93.969	93.474	94.349	93.83
28 January 2004	95.469	95.025	94.089	93.554	94.359	93.86
27 February 2004	96.279	95.845	94.809	94.544	95.509	95.11
31 March 2004	95.149	94.765	93.849	93.374	94.229	93.79
29 April 2004	95.019	94.625	93.689	93.354	94.109	93.67
28 May 2004	95.449	94.985	94.159	93.664	94.409	94
25 June 2004	95.879	95.435	94.549	94.044	94.749	94.35
22 July 2004	95.559	95.105	94.229	93.724	94.419	94
26 August 2004	95.969	95.465	94.619	93.974	94.629	94.23
24 September 2004	95.749	95.345	94.279	94.024	95.019	94.6
28 October 2004	95.539	95.085	94.189	93.704	94.449	94.03
30 November 2004	95.339	94.845	93.939	93.524	94.309	93.9
17 December 2004	95.379	95.005	94.029	93.654	94.469	94.05
20 January 2005	95.109	94.765	93.829	93.374	94.199	93.69
15 February 2005	95.169	94.815	93.869	93.404	94.219	93.72
23 March 2005	95.469	95.025	94.089	93.544	94.299	93.84
06 April 2005	95.529	95.075	94.159	93.604	94.329	93.87
Minimum	94.92	94.50	93.57	92.60	94.05	91.91
Mean	95.58	95.12	94.14	93.67	94.56	94.01
Maximum	97.51	95.79	94.80	94.37	95.57	94.80
Groundwater Fluctuation (m)						
May 1997 - April 1998	0.8	0.8	0.8	1.1	0.9	2.9
May 1998 - April 1999	0.7	0.6	0.8	1.0	0.7	1.0
May 1999 - April 2000	0.5	1.0	0.5	0.5	1.3	0.5
May 2000 - April 2001	0.6	0.6	0.7	0.9	0.6	0.4
May 2001 - April 2002	1.0	1.0	1.0	1.0	0.9	1.0
May 2002 - April 2003	1	1	1	1	0.9	0.9
May 2002 - April 2004	1.4	1.4	1.2	2.1	1.6	1.6
May 2004 - April 2005	0.9	0.7	0.8	0.7	0.8	0.9



APPENDIX F: Groundwater, Surface Water and Macroinvertebrate Survey Monitoring Results

Masterston Landfill Annual Report
Bore 1: Compost Site Control Bore

Date	pH	Temperature °C	Conductivity µS/cm	Alkalinity g/m ³	Hardness g/m ³	Quarterly Monitoring										Iron (soluble) g/m ³	Chloride g/m ³	Zinc g/m ³	Sodium g/m ³	Enterococci per 100 ml	Potassium g/m ³
						Ammoniacal Nitrogen g/m ³	Ammonia g/m ³	Nitrite-N g/m ³	Nitrate-N g/m ³	BO ₅ g/m ³	COD g/m ³										
20-May-96	6.18		121			0.0025	0.006	0.01	1.4	0.82	1	0.025	11	0.0025	9.8			1.6			
31-Jul-96	6.12		165	32.1	48.4	0.006	0.007	0.01	5.08	0.82	1	0.025	10.8	0.0025	9.3			1.5			
21-Oct-96	6.2		136	33.7	42.1	0.0025	0.006		2.16	0.15	6.5	0.05	8.9	0.0025	8.6			1.8			
28-Jan-97	6.48		131	31.7	38.7	0.0025	0.006	0.008	2.27	0.05	5	0.12									
30-Apr-97	DRY																				
29-Jul-97	6.22		131	31.8	43.8	0.014	0.017	0.001	2.89	0.05	1	0.08	11.3	0.0025	9.3			1.4			
28-Jul-97	6.2		138	29.1	45	0.008	0.010	0.001	3.2	0.05	0.5	0.025	9.4	0.009	8.4			1.4			
22-Oct-97	6.22		151	31.9	47.1	0.0025	0.006	0.001	3.91	0.05	0.11	0.11	11	0.0025	9.3			1.5			
23-Feb-98	6.4		130	31.1	39.8	0.02	0.024	0.017	1.49	0.41	0.5	0.18	11.1	0.006	8.6			1.5			
22-Apr-98	6.3		133	30.3	40.1	0.025	0.004	0.001	1.30	0.05	0.5	0.4	12.3	0.006	8.6			1.7			
22-Jul-98	6.1		133	27.6	39	0.015	0.018	0.001	2.904	1.25	0.5	0.025	10.6	0.025	10			1.5			
19-Oct-98	6.1		129	28.1	42.6	0.0025	0.006	0.001	3.931	0.1	0.5	0.025	9	0.0025	9			1.4			
22-Feb-99	6.02		149	30.7	49.6	0.042	0.051	0.001	2.685	0.14	0.5	0.08	12.9	0.0025	9.6			1.5			
22-Apr-99	6.2		146	31.1	40.5	0.053	0.064	0.001	2.244	0.05	7	0.025	12.4	0.0025	9.5			1.5			
8-Jul-99	6.05		132	31.8	42.3	0.017	0.021	0.001	3.599	0.13	9	0.07	8.5	0.0025	11.6			1.7			
14-Oct-99	6.08		139	29.8	45	0.0025	0.006	0.001	3.739	0.02	5	0.05	9.7	0.0025	10			1.6			
20-Jan-00	5.78		137	33.1	47.2	0.0025	0.006	0.002	3.737	0.02	5	0.025	18.9	0.0025	9.2			1.5			
2-May-00	6.12		159	34.5	53.2	0.0025	0.006	0.001	3.991	0.11	5	0.08	13.9	0.0025	11.2			1.7			
18-Jul-00	5.88		139	32.9	57.1	0.011	0.013	0.001	3.739	0.05	12	0.025	10.7	0.0025	11			1.6			
26-Oct-00	6		136	33.7	55.1	0.025	0.006	0.001	4.862	0.12	0.5	0.12	13.4	0.0025	11			1.8			
18-Jan-01	5.98		178	32.7	57	0.012	0.015	0.001	5.91	0.05	0.5	0.42	13.7	0.0025	11	2		1.9			
18-Apr-01	5.82		162	35.1	52.1	0.029	0.005	0.001	2.12	0.05	30	0.025	14.1	0.0025	10.4	0		1.6			
25-Oct-01	6.15		156	31.3	46.3	0.006	0.007	0.001	2.50	0.59	9	0.025	11.7	0.0025	10.0	0		1.6			
13-Feb-02	6.22		165	31.9	46.9	0.0025	0.003	0.001	3.75	0.05	0.5	0.025	11.7	0.0025	10.4	4		1.8			
18-Apr-02	6.30		162	35.3	57.1	0.0025	0.003	0.001	3.5	0.05	5	0.025	13.1	0.0025	11.5	1		1.9			
31-Jul-02	6.10		156	28.5	51.1	0.0025	0.003	0.001	3.29	0.05	0.5	0.025	11.6	0.0025	12.3	0.5		1.9			
25-Oct-02	6.02		146	31.5	48.4	0.0025	0.003	0.001	4.14	0.05	6	0.06	12.2	0.0025	10.4	0.5		1.7			
23-Jan-03	6.13	16	155	32.5	48.1	0.007	0.008	0.001	2.96	0.15	5	0.025	11.9	0.0025	10.4	0.5		1.7			
30-Apr-03	6.00		156	31.8	45.7	0.006	0.007	0.001	2.96	0.05	6	0.025	13.0	0.0025	10.2	3		1.6			
23-Jul-03	6.05	13.02	158	28.6	50.0	0.0025	0.0030	0.001	2.96	0.30	4	0.025	15.0	0.0025	11.0	1		1.6			
23-Oct-03	6.22	14.19	172	29.5	54.2	0.005	0.0061	0.001	4.00	0.05	6.5	0.025	15.0	0.0025	8.6	0.5		1.5			
28-Jan-04	6.20	15.04	175	32.4	51.4	0.007	0.008	0.001	5.32	0.05	0.5	0.05	14.3	0.0025	11.2	3		1.9			
29-Apr-04	6.12	15.51	182	32.4	55.5	0.029	0.0240	0.001	4.82	0.05	10	0.20	13.5	0.0025	16.4	0.5		2.1			
23-Jul-04	6.05	14.4	181	32.2	35	0.012	0.0146	0.002	5.99	0.05	9	0.025	13.4	0.0025	11.2	9		1.9			
28-Oct-04	6.00	13.48	172	33.8	53.1	0.0025	0.001	0.001	5.45	0.05	8	0.025	14.4	0.0025	10.8	18		1.9			
20-Jan-05	6.22	14.44	168	34.4	50.9	0.01	0.0121	0.001	5.43	0.19	14	0.025	11.8	0.0025	11.6	0.5		1.8			
6-Apr-05	6.13	16.08	164	33.9	49.6	0.029	0.0437	0.001	3.99	0.18	0.5	0.015	13.8	0.0025	10.8	0.5		1.8			
Minimum	5.5	13.48	121	27.6	36.7	0.0025	0.003	0.001	1.40	0.05	0.5	0.02	8.5	0.003	8.4	0.0		1.4			
Mean	6.1	14.91	130	32.4	48.1	0.011	0.014	0.002	3.46	0.16	4.9	0.07	13.2	0.003	10.4	2.7		1.7			
90 Percentile	6.3	16.02	173	34.5	55.3	0.0234	0.024	0.005	5.95	0.36	10.6	0.15	14.2	0.004	11.6	2.5		1.9			
Maximum	6.5	16.08	182	35.0	57.1	0.029	0.04	0.017	5.51	1.25	30.0	0.42	18.9	0.025	16.4	18.0		2.1			
ANZECC GUIDELINE VALUES																					
Aquatic	N/A																				
Raw Water	6.5-8.5				500	0.01			1	10			400	5	300						
Irrigation													90-700	20							
Livestock																					

Above lowest guideline value
Above lowest guideline value
Above highest guideline value
Unfiltered (indicative less than detection limit - non-removal value entered as half detection limit for statistical analysis)

Masterston Landfill Annual Report
Bore 1 : Compost Site Control Bore

Date	Annual Monitoring															
	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	0.23	0.07	3.1	0.05	0.025	0.0005	0.005	0.025	0.025	0.025	0.0025	0.008	0.015	5	12.4	2.5
25-Jun-97																0
28-Jul-97		0.06	2.7		0.08	0.0005	0.005	0.025	0.025	0.025	0.0025	0.013	0.09	23.9	11.6	0
22-Apr-99																2
14-Oct-99	0.13	0.025	2.8	0.01	0.05	0.0005	0.005	0.025	0.025	0.025	0.0025	0.01	0.016	7.4	12.7	0
26-Oct-00	0.2	0.025	3.7	0.01	0.025	0.0005	0.005	0.025	0.025	0.025	0.0025	0.007	0.009	7.2	15.9	0
25-Oct-01	0.025	0.025	2.4	0.01	0.025	0.0005	0.005	0.025	0.025	0.025	0.0025	0.007	0.010	3.3	14.8	4
25-Oct-02	0.08	0.025	3.6	0.0025	0.01	0.0005	0.005	0.0015	0.00025	0.00025	0.00025	0.009	0.012	8.2	13.4	0.5
22-Oct-03	0.025	0.025	3.9	0.0025	0.02	0.005	0.0005	0.0015	0.00025	0.00025	0.00025	0.004	0.009	9.0	15.4	3
28-Oct-04	0.025	0.025	2.5	0.005	0.02	0.0005	0.0005	0.0015	0.00025	0.00025	0.00025	0.008	0.008	9.5	17.3	0.5
Minimum	0.03	0.03	2.4	0.00	0.01	0.0005	0.001	0.002	0.000	0.001	0.0003	0.00	0.01	3.3	11.6	0.0
Mean	0.15	0.04	3.1	0.09	0.03	0.0011	0.004	0.016	0.016	0.016	0.0017	0.01	0.02	9.2	14.2	1.6
90 Percentile	0.30	0.06	3.8		0.05	0.0019	0.005	0.025	0.025	0.025	0.0025	0.01	0.04	13.7	16.3	3.3
Maximum	0.23	0.07	3.9		0.08	0.0050	0.005	0.025	0.025	0.025	0.0025	0.01	0.09	23.9	17.3	4.0
ANZECC GUIDELINE VALUES																
Aquatic	N/A - Aquatic guidelines relevant to surfacewater only															
Raw Water	0.3	0.1		0.2	1	0.05	1	0.05	0.1	0.05	0.005			400		
Irrigation	1	2		5/0.5-6	0.1	0.2	0.2	0.2	0.2	1	0.01					
Livestock			600	5	5	0.5	0.5	0.1	1	1	0.01					1000

Above lowest guideline value

Above highest guideline value

Unfilled cells indicates less than detection limit - numerical value entered is half detection limit for statistical analysis

Masterton Landfill Annual Report
Bore 2: Adjacent to Roadside

Date	pH	Temperature °C	Conductivity µS/cm	Alkalinity g/m³	Hardness g/m³	Ammoniacal Nitrogen g/m³	Ammonia g/m³	Nitrite- N g/m³	Nitrate- N g/m³	BOD ₅ g/m³	COD g/m³	Iron (soluble) g/m³	Chloride g/m³	Zinc g/m³	Sodium g/m³	Enterococci per 100 ml	Potassium g/m³
30-May-96	6.28		105			0.01	0.012	0.006	1	0.33	3.5	0.025	11.5	0.025	8.4		2.2
31-Jul-96	6.42		142	42.1	45.7	0.0025	0.006	0.001	1.12	0.33	0.025	0.025	10	0.025	8.4		2.4
21-Oct-96	6.45		143	42.7	43.5	0.0025	0.006	0.001	0.79	0.95	0.5	0.025	8	0.025	9.8		2
28-Jan-97	6.6		119	34.7	41	0.0025	0.006	0.001	0.76	0.05	4	0.335	8	0.025	8.5		2
30-Apr-97	6.28		142	40.2	42	0.0025	0.006	0.001	3.155	2.21	8	0.025	11.3	0.0025	8.4		2.2
28-Jul-97	6.18		139	31.8	44.2	0.0025	0.006	0.001	3.852	0.05	0.5	0.06	9.8	0.0025	9.9		1.7
22-Oct-97	6.18		156	35	47.8	0.0025	0.006	0.001	0.024	0.41	1	0.16	11.1	0.0025	8.8		1
23-Feb-98	6.52		142	32.7	45.2	0.01	0.015	0.001	1.615	0.05	0.5	0.14	11.1	0.0025	8.8		1.7
22-Apr-98	6.2		126	29.1	38.2	0.0025	0.006	0.001	2.62	0.04	0.5	0.06	11.1	0.0025	8.8		1.7
22-Jul-98	6.2		134	27.4	37.6	0.0025	0.006	0.001	3.248	0.05	2	0.06	11.7	0.0025	9.5		2.1
19-Oct-98	6.15		141	27.8	44.3	0.0025	0.006	0.001	1.96	0.1	0.5	0.09	12.5	0.0025	9.2		2.1
22-Feb-99	6.12		136	30.7	45.6	0.0025	0.006	0.001	1.821	0.17	5	0.025	10.1	0.0025	6.8		1
22-Apr-99	6.05		132	31.4	39.7	0.0025	0.006	0.001	0.006	0.722	1	0.17	14.1	0.0025	11.8		2.4
9-Jul-99	6.1		149	39.3	46	0.0025	0.006	0.001	2.442	0.05	0.5	0.025	10.3	0.0025	10.6		2.5
14-Oct-99	5.9		142	30.9	42	0.0025	0.006	0.001	0.006	0.05	0.5	0.05	14.7	0.0025	11.2		2.6
20-Jan-00	5.83		165	37.4	47.2	0.0025	0.006	0.001	3.032	0.05	0.5	0.05	13.2	0.0025	11		2.6
2-May-00	5.98		151	36.4	44.3	0.0025	0.006	0.001	2.894	0.05	6	0.025	10.9	0.0025	11		2.5
18-Jul-00	5.9		144	32.6	51.6	0.0025	0.006	0.001	2.804	0.05	6	0.025	13.3	0.0025	13		3.6
26-Oct-00	5.9		175	34.4	59.4	0.0025	0.006	0.001	0.649	0.13	19	0.16	13.3	0.0025	13	61	3.8
18-Jan-01	5.8		194	43.2	61.7	0.0025	0.006	0.001	3.64	0.05	8	0.16	15.7	0.0025	13		2.9
18-Apr-01	5.95		178	31.3	59.5	0.0025	0.006	0.001	0.79	0.05	23	0.025	16.9	0.0025	10.5		2.5
16-Jul-01	5.72		141	33.0	47.7	0.0025	0.006	0.001	1.71	0.32	11	0.025	12.9	0.0025	10.5		2.5
25-Oct-01	6.08		156	33.7	46.9	0.0025	0.006	0.001	3.90	0.05	0.5	0.025	12.4	0.0025	10.8	8	3.7
13-Feb-02	6.08		172	53.0	52.1	0.0025	0.006	0.001	3.46	0.05	3	0.025	13.4	0.0025	13.0	4	3.3
18-Apr-02	6.18		156	34.7	50.9	0.0025	0.006	0.001	2.45	0.05	0.5	0.025	12.7	0.0025	12.5	4	3.3
31-Jul-02	6.08		182	34.7	54.3	0.0025	0.006	0.001	4.24	0.05	5	0.025	15.5	0.0025	11.6	12	4.1
25-Oct-02	6.02	15.6	146	30.8	44.9	0.0025	0.006	0.001	2.68	0.21	4	0.025	12.8	0.0025	10.8	1	3.1
23-Jan-03	6.08		158	32.4	43.3	0.0025	0.006	0.001	2.14	0.05	2	0.025	12.5	0.0025	10.0	3	2.6
30-Apr-03	6.03	15.25	141	30.2	43.0	0.0025	0.006	0.001	2.11	0.29	4	0.025	13.5	0.0025	10.0	1	2.6
22-Jul-03	5.98	15.25	168	30.3	51.7	0.0025	0.006	0.001	4.04	0.05	2	0.025	16.6	0.0025	11.6	2	3.3
25-Oct-03	6.22	16.07	194	35	55.1	0.0025	0.006	0.001	6.14	0.05	0.5	0.025	15.7	0.0025	11.6	2	3.3
28-Jan-04	6.15	15.76	275	27.8	47.4	0.0025	0.006	0.001	4.30	0.16	15	0.05	14.1	0.0025	16.4	605	6.8
25-Apr-04	6.05	16.14	180	32.8	57.4	0.0025	0.006	0.001	5.011	0.05	10	0.025	14.1	0.0025	16.4	1836	5.4
22-Jul-04	6.02	15.46	225	41.5	65.3	0.006	0.007	0.002	4.5	0.05	4	0.05	22.3	0.0025	11.6	1	4.0
28-Oct-04	6.05	14.85	185	35.1	57.5	0.0025	0.006	0.001	4.74	0.23	6	0.025	12.5	0.0025	14.0	520	5.9
29-Jan-05	6.20	15.23	172	37.5	50.8	0.007	0.009	0.001	4.34	0.35	11	0.015	13.5	0.0025	12.4	0.5	5.5
6-Apr-05	6.18	16.99	298	55.1	80.1	0.0025	0.006	0.004	3.04	0.22	0.5	0.09	27.4	0.007	15.6	0.5	3.6
Minimum	5.7	14.85	105	27.4	37.6	0.0025	0.006	0.001	0.72	0.05	0.5	0.02	8.00	0.003	6.8	0	1.0
Mean	6.1	15.70555556	162	42.1	49.3	0.0025	0.006	0.002	3.28	0.25	5.1	0.08	13.87	0.003	11.0	186	3.1
90 Percentile	6.3	16.31	194	43.0	59.5	0.0025	0.006	0.004	4.56	0.63	12.0	0.16	16.75	0.003	13.1	554	5.5
Maximum	6.6	16.99	298	57.0	80.1	0.0025	0.006	0.017	6.14	2.21	23.0	0.59	27.4	0.020	16.4	1836	6.8
ANZECC GUIDELINE VALUES																	
N/A - Aquatic guidelines referent to surfacewater only																	
Aquatic Raw Water Irrigation Livestock	6.5-8.5				500	0.01		1	10	30			400	5	300		
Above lowest guideline value																	
Above highest guideline value																	
Underlined italic indicates less than detection limit - numerical value entered is half detection limit for statistical analysis																	

Masterton Landfill Annual Report
Bore 2: Adjacent to Roadside

Date	Annual Monitoring															
	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	3.05		3.5	0.16	0.025	0.003	0.005	0.025	0.025	0.02	0.0025	0.003	0.071	5	11.1	2.5
26-Jul-97																0
22-Apr-98	1.33	0.025	2	0.01	0.09	0.0005	0.005	0.025	0.025	0.025	0.0025	0.011	0.013	9.5	12	1.6
25-Apr-99	0.09	0.025	2.6	0.01	0.07	0.0005	0.005	0.025	0.025	0.025	0.0025	0.009	0.013	2.5	12.5	
14-Oct-99	0.19	0.025	4.6	0.01	0.025	0.0005	0.005	0.025	0.025	0.025	0.0025	0.016	0.018	7.4	16.1	26
26-Oct-00	0.025	0.025	2.7	0.01	0.06	0.0005	0.005	0.025	0.025	0.025	0.0025	0.011	0.015	3.6	14.3	8
25-Oct-01	0.025	0.025	2.7	0.0025	0.01	0.0005	0.005	0.0015	0.00025	0.0005	0.0005	0.014	0.015	8.7	13.6	1
23-Oct-02	0.025	0.025	2.9	0.012	0.02	0.005	0.001	0.0015	0.00025	0.0005	0.00025	0.019	0.032	10.8	17.3	605
26-Oct-04	0.025	0.025	3.3	0.01	0.03	0.0005	0.001	0.0015	0.00025	0.0005	0.00025	0.029	0.03	10.2	17.5	0.5
Minimum	0.03	0.03	2.0	0.00	0.01	0.0005	0.001	0.002	0.000	0.001	0.0003	0.00	0.01	2.5	11.1	0.0
Mean	0.25	0.05	3.0	0.03	0.04	0.0014	0.004	0.016	0.016	0.015	0.017	0.01	0.03	7.2	14.3	82.4
90 Percentile	3.56	0.07	3.8	0.06	0.08	0.0036	0.006	0.025	0.025	0.025	0.025	0.02	0.04	10.4	17.4	199.7
Maximum	5.65	0.3	4.6	0.16	0.09	0.0090	0.005	0.025	0.025	0.025	0.025	0.03	0.07	10.8	17.5	605.0
ANZBCC GUIDELINE VALUES																
Aquatic	N/A - Aquatic guidelines relevant to surfacewater only															
Raw Water	0.3	0.1	0.2													
Irrigation	1	2	5/0.5-6													
Livestock	600															
Above lowest guideline value																
Above highest guideline value																
Underlined italic indicates less than detection limit - numerical value entered is half detection limit for statistical analysis																

Masterton Landfill Annual Report
Bore 3: Southwest Paddock

Quarterly Monitoring																		
Date	pH	Temperature °C	Conductivity µS/cm	Alkalinity g/m³	Hardness g/m³	Ammoniacal Nitrogen g/m³	Aminonia g/m³	Nitrite-N g/m³	Nitrate-N g/m³	BO ₅ g/m³	COD g/m³	Iron (soluble) g/m³	Chloride g/m³	Zinc g/m³	Sodium g/m³	Enterococci per 100 ml	Potassium g/m³	
20-May-96																		
21-Jul-96	6.68		350	126.2	79	4.51	11,912	0.07	1.97	40.5	17		21.6	0.02	9.8			
21-Oct-96	6.7		405	120.1	79.6	6.94	10,856		4.87	0.73	14		17.6	0.0025	13			
28-Jan-97	6.58		318	114.4	46.8	11.63	14,122	0.001	0.43	36.5	9		18.6	0.0025	7.5			
30-Apr-97	6.4		305	108	50.4	9.53	11,317	0.004	2.91	0.33		1.12		0.0025	18		18	
28-Jul-97	6.3		575	192.1	125.9	15.535	18,864	0.005	0.21	1.45	27			0.0025	33.5		1	
22-Oct-97	6.5		550	192	113.1	14,186	17,226	0.005	0.18	0.93	26	2.6	19.2	0.0025	30		24	
23-Feb-98	6.3		315	105.5	54.2	10,220	12,430	0.014	1.03	1.62	9	0.44	16.7	0.0025	18.5		16	
22-Apr-98	6.42		314	108.5	52.3	9.922	12,048	0.007	0.127	0.63	2	1.44	25.2	0.0025	20		13.5	
22-Jul-98	6.3		346	113.5	62	6.974	12,111	0.003	0.068	3.62	6	1.91	21.1	0.0025	19		17	
19-Oct-98	6.3		368	128	76.4	13,427	16,304	0.004	0.001	1.01	20	1.85	26	0.0025	18		15	
22-Feb-99	6.12		345	119.6	64.1	13,207	16,110	0.011	0.683	1.86	9	1.66	21.1	0.0025	25		17	
22-Apr-99	6.22		315	111.1	68.8	7,089	8,875	0.001	0.21	2.1	10	1.28	20.7	0.0025	25.5		17	
8-Jul-99	6.2		368	126.2	71.4	10,702	12,995	0.006	0.509	1.13	14	1.09	26.5	0.0025	20		13.5	
14-Oct-99	6.15		422	135.8	77.2	12,004	14,576	0.02	3.544	0.83	21.7	0.68	25.5	0.0025	23		20	
20-Jan-00	6.15		432	154.2	84.3	13,319	16,416	0.006	0.159	0.31	0.5	1.64	29.9	0.0025	25.2		18.4	
2-May-00	6.22		422	149.7	83.8	11,926	14,482	0.003	0.146	1.25	93	1.69	28.7	0.0025	14.2		10	
18-Jul-00	6.1		464	164	97.8	11.85	14,389	0.005	0.07	2.56	32	1.47		0.0025	22.2		15.6	
26-Oct-00	6.22		600	213.8	122.8	21.33	25,901	0.002	0.001	1.16	67	3.87		0.0025	33		24.5	
18-Jan-01	6.02		464	142.2	87	13.22	16,660	0.005	4.52	1.81	20	0.63	29.3	0.0025	30		22	
16-Apr-01	6.08		418	146.5	77.6	14.32	17,389	0.006	0.43	1.9	7	1.05	26.9	0.0025	25		20	
16-Jul-01	6.08		328	89.3	65.2	5.885	7,146	0.040	3.67	0.94	16	0.25	26.9	0.0025	22.0		16.0	
25-Oct-01	6.32		472	160.4	93.6	14.56	17,704	0.010	1.06	1.60	32	0.91		0.0025	31.0		22.0	
13-Feb-02	6.178		595	324.4	183.4	14.94	18,143	0.013	0.05	7	0.31			0.0025	41.1		26.5	
18-Apr-02	6.42		525	190.0	110.2	18.11	21,991	0.004	0.68	0.05	103	1.76		0.0025	35.9		22.8	
31-Jul-02	6.28		555	190.0	119.6	15.45	18,761	0.009	0.61	2.93	33	1.69		0.009	34.0		27.9	
25-Oct-02	6.40	16.5	525	191.6	97.2	21.65	26,265	0.006	0.63	1.68	25	1.50		0.0025	33.0		24.5	
25-Jan-03	6.12		550	120.7	113.8	13.90	16,879	0.21	2.14	5.80	69	0.54	27.7	0.007	29.0		24.0	
30-Apr-03	6.18		400	142.6	72.5	13.30	16,259	0.010	1.06	2.15	52	0.30	23.4	0.007	23.0		18.8	
22-Jul-03	6.26	15.19	505	172.0	99.3	14.85	18,032	0.005	0.50	2.02	150	0.59		0.0025	31.0		24.5	
23-Oct-03	6.50	16.68	870	312.8	187.6	28.93	35,129	0.001	0.04	1.20	17	0.56		0.006	48.0		36.9	
26-Jan-04	6.35	15.98	525	173.0	94.7	17.86	20,716	0.006	2.62	2.06	18	0.44		0.006	54.0		41	
29-Apr-04	6.48	15.27	670	248.2	124.0	25.14	30,548	0.005	0.192	1.15	65	1.31		0.0025	36.5		29.2	
22-Jul-04	6.25	14.8	690	225.3	140.3	16.65	20,194	0.012	6.00	0.78	85	0.07		0.006	42.0		35.9	
28-Oct-04	6.52	15.3	760	279.6	132.4	30.88	37,497	0.006	0.24	1.29	74	1.37		0.0025	42.0		34.8	
20-Jan-05	6.6	15.65	665	252.2	117.8	22.84	27,295	0.003	0.49	0.89	38	1.27		0.0025	37.0		32.5	
6-Apr-05	5.9	16	540	114.8	111.2	7.63	9,265	0.007	0.007	1.21	36	0.11		0.026	37			
Minimum	5.9	14.8	305	89.3	46.8	3.84	7,146	0.001	0.00	0.05	0.50	0.03	16.70	0.003	7.5	0	1.0	
Mean	6.3	15.7	480	160.2	94.1	14.56	17,704	0.015	1.79	3.28	40.56	1.11		0.005	27.8	15	21.8	
90 Percentile	6.6	16.5	667.5	226.8	129.0	22.26	27,030	0.0176	4.70	3.28	89.80	1.83		0.009	41.6	39	33.8	
Maximum	6.7	16.7	870	312.8	187.6	30.88	37,497	0.21	6.00	40.50	217.00	3.67		0.020	54.0	113	41.0	
ANZECC GUIDELINE VALUES																		
Aquatic Raw Water Irrigation Livestock	N/A - Aquatic guidelines relevant to surface water only																	
Above lowest guideline value																		
Above highest guideline value																		

Underlined (italic) indicates less than detection limit - numerical value entered is half detection limit for statistical analysis

**Masterston Landfill Annual Report
Bore 3: Southwest Paddock**

Date	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	1.35		4.3	0.03	0.11	0.004	0.005	0.025	0.025	0.02	0.0025	0.071	0.141	3	13	30
28-Jul-97																
22-Apr-98	2.25		4.1		0.2	0.005	0.005	0.025	0.025	0.025	0.0025	0.055	0.131	2.5	14.2	1
22-Apr-99																
14-Oct-99	1.43		5.5	0.01	0.26	0.002	0.005	0.025	0.025	0.025	0.0025	0.021	0.066	2.5	21.8	1
26-Oct-00	4.43		0.33	0.1	0.44	0.013	0.005	0.025	0.025	0.025	0.0025	0.193	0.433	9.5	33.7	3
26-Oct-01	1.85		6.5	0.01	0.33	0.0065	0.005	0.025	0.025	0.025	0.0025	0.067	0.098	3.7	26.7	10
23-Oct-02	1.80		6.3	0.0025	0.33	0.002	0.0005	0.0015	0.0007	0.001	0.00025	0.174	0.166	6.6	28.5	4
23-Oct-03			4.4	0.005		0.005	0.004	0.0015	0.004	0.001	0.00025	0.045	0.106	15.8	67.8	4
28-Oct-04	2.21		10	0.007		0.005	0.001	0.0015	0.0022	0.002	0.00025	0.208	0.209	10	36.5	0.5
Minimum			0.3	0.00	0.11	0.0005	0.001	0.002	0.001	0.001	0.0003	0.02	0.07	2.5	13.0	0.5
Mean	1.99		5.2	0.05	0.26	0.0046	0.004	0.016	0.016	0.016	0.0017	0.10	0.18	7.2	30.3	6.7
90 Percentile	2.90		7.6	0.14		0.0074	0.005	0.025	0.025	0.025	0.0025	0.20	0.28	11.7	45.9	16.0
Maximum	4.43		10.0			0.0130	0.005	0.025	0.025	0.025	0.0025	0.21	0.43	15.8	67.8	30.0
ANZECC GUIDELINE VALUES																
Aquatic Raw Water	0.3	0.1	N/A - Aquatic guidelines relevant to surface water only													
Irrigation	1	2	600	5	5	0.5	0.2	0.2	0.2	0.1	0.05	0.005		400		
Livestock			5	5	5	0.5	0.5	0.1	0.1	0.05	0.01	0.01			1000	

Above lowest guideline value
 Above highest guideline value
 Underlined/italic indicates less than detection limit - numerical value entered is half detection limit for statistical analysis

Masterston Landfill Annual Report
Bore 4: Southeast Bore

Date	pH	Temperature °C	Conductivity µS/cm	Alkalinity g/m ³	Hardness g/m ³	Ammoniacal Nitrogen g/m ³	Ammonia g/m ³	Nitrite- N g/m ³	Nitrate- N g/m ³	BOD ₅ g/m ³	COD g/m ³	Iron (soluble) g/m ³	Chloride g/m ³	Zinc g/m ³	Sodium g/m ³	Enterococci per 100 ml	Potassium g/m ³
20-May-06																	
31-Jul-06																	21
21-Oct-06																	16
25-Jan-07	6.5		295	96.9	44.3	7.008	9.311	0.012	0.16	0.82	1	0.09				14	
30-Apr-07	6.2		348	125.2	82.2	6.7	11.779	0.02	0.99	1.14	7	0.21				13	
28-Jul-07	6.48		446	185.1	107.4	6.511	11.913	0.012	0.382	1.17	16	0.5	13.3	14		14	
22-Oct-07	6.4		285	89.3	58.2	6.556	7.963	0.034	4.59	25.9	9	3.1	29.5	22.5		18	
25-Feb-08	6.4		228	81.2	47.5	5.932	6.839	0.002	0.031	0.25	0.5	1.42	13.2	16		12	
22-Apr-08	6.26		270	92.2	54.2	6.13	7.444	0.009	0.543	7.09	5	2.29	17.2	16.5		12	
23-Jul-08	6.32		288	106.1	62.5	6.377	11.386	0.005	0.105	1.35	17	2.9	17.5	15		13	
19-Oct-08	6.45		290	83.1	50.1	7.406	9.068	0.002	0.001	0.62	0.5	0.29	8.7	7.4		1.1	
22-Feb-09	6.22		232	82	51.2	6.655	5.620	0.006	0.454	0.87	9	1.25	14	13.5		9.5	
8-Jul-09	6.2		235	80.9	45.4	5.296	6.552	0.005	0.21	0.99	7	1.98	16.7	16		10	
14-Oct-09	6.2		287	99.9	62	6.331	7.683	0.004	0.59	1.05	19	1.42	18.2	17.5		12	
20-Jan-00	6.26		238	81.9	50.9	6.276	5.803	0.002	0.014	0.3	0.5	1.58	16.6	15		8.9	
2-May-00	6.3		252	90.4	56.5	5.914	7.181	0.001	0.001	1.56	15	2.37	17.4	15		9.7	
16-Jul-00	6.12		272	92.1	61.9	6.32	7.917	0.004	0.033	4.5	0.5	0.4	18.4	16		11	
26-Oct-00	6.15		425	150.9	103.7	6.46	11.487	0.001	0.001	1.68	37	3.3	29	0.006	21.5	15	
18-Jan-01	6		322	107	76.3	6.143	6.174	0.003	1.44	0.71	5	1.01	24.3	19	0	13	
18-Apr-01	6.08		285	96.7	62.5	6.913	8.594	0.005	0.9	1.12	19	1.12	20.1	17		12	
16-Jul-01	6.15		288	83.1	69.8	6.236	5.110	0.011	4.12	3.40	37	0.27	20.1	18.0	0	12.0	
25-Oct-01	6.25		324	104.6	74.6	6.156	7.479	0.006	1.19	0.80	2	0.70	23.8	20.0	1	13.0	
15-Feb-02	6.22		393	98.6	98.0	6.2	9.957	0.009	1.62	0.79	10	0.88	22.4	26.3	5	14.5	
18-Apr-02	6.25		315	106.1	79.0	7.1	8.621	0.002	0.26	0.41	148	1.76	22.4	22.2	0.5	11.9	
31-Jul-02	6.25		430	132.6	100.1	10.03	12.179	0.005	0.35	2.09	15	3.66	22.4	24.0	0.5	17.9	
29-Oct-02	6.20		425	137.7	100.1	11.26	13.794	0.005	2.84	1.43	20	2.28	22.4	27.0	0.5	17.6	
25-Jan-03	6.45	16.1	305	100.8	65.0	6.13	7.444	0.004	1.52	1.82	11	1.76	30.4	19.0	0.5	12.0	
30-Apr-03	6.25		235	82.7	53.2	6.46	5.598	0.005	0.14	2.20	11	1.71	14.2	13.0	1	8.4	
22-Jul-03	6.25	15.15	378	124.6	88.9	6.66	10.540	0.002	0.77	0.76	0.5	5.21	28.9	21.5	0.5	16.6	
25-Oct-03	6.32	17.01	755	270.8	201.3	15.15	18.396	0.001	0.20	1.72	48	4.86	37.0	37.0	0.5	24.3	
26-Jan-04	6.40	15.73	438	142.2	95.3	10.82	13.321	0.005	3.00	0.76	32	0.84	28.6	26.0	4	17.9	
29-Apr-04	6.48	15.32	460	158.6	103.6	11.24	14.013	0.004	0.528	1.50	48	2.47	22.4	26.0	5	16.6	
22-Jul-04	6.25	14.26	540	192.2	129.2	11.82	14.535	0.004	2.49	1.13	64	1.59	22.4	29.0	17	22	
28-Oct-04	6.42	13.54	660	252.7	160.0	13.59	22.938	0.003	0.89	1.76	67	4.11	30	0.009	19.0	12.9	
20-Jan-05	6.60	15.85	460	165.5	92.6	11.64	14.134	0.002	0.72	1.81	28	2.29	30	0.0025	27.0	0.5	18.7
6-Apr-05	6.45	16.31	830	295.2	217	16.18	23.290	0.01	0.13	7.25	62	5.9	22.4	0.063	44.0	4	24.9
Minimum	6.0	14.6	228	80.9	44.3	6.14	6.174	0.001	0.00	0.25	0.50	0.09	6.70	0.005	7.4	0	1.1
Mean	6.3	15.7	368	126.8	85.1	8.47	10.239	0.006	0.93	2.34	22.56	1.91	24.71	0.005	20.5	7	14.0
90 Percentile	6.5	16.5	524	186.9	124.8	11.90	14.455	0.0118	2.77	4.03	54.10	3.99	22.4	0.004	27.0	27	19.9
Maximum	6.6	17.0	830	295.2	217.0	16.18	23.290	0.014	4.59	23.90	148.00	5.90	22.4	0.063	44.0	4	24.9
ANZECC GUIDELINE VALUES																	
Aquatic Raw Water	N/A	Aquatic guideline relevant to surfacewater only				0.01		1	10				400	5	300		
Irrigation	6.5-8.5							10	30				30-700	20			
Livestock		Above lowest guideline value															

xxx indicates less than detection limit - numerical value entered is half detection limit for statistical analysis

Masterton Landfill Annual Report
Bore 4: Southeast Bore

Annual Monitoring																
Date	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	5.1	0.16	3.1	0.13	0.007	0.025	0.005	0.025	0.025	0.02	0.0025	0.095	0.308	5	12.5	15
26-Jul-97	2.54	0.16	4.7	0.16	0.005	0.025	0.005	0.025	0.025	0.025	0.0025	0.037	0.149	2.5	11.4	0
22-Apr-98	2.45	0.11	4.4	0.09	0.003	0.025	0.005	0.025	0.025	0.025	0.0025	0.046	0.143	2.5	17.6	0
23-Apr-99	4.79	0.11	7	0.11	0.005	0.025	0.005	0.025	0.025	0.025	0.0025	0.075	0.175	8.5	30	0
14-Oct-99	1.36	0.03	4.8	0.03	0.0005	0.025	0.005	0.025	0.025	0.025	0.0025	0.007	0.027	2.9	22.0	1
25-Oct-01	3.07	0.05	6.3	0.05	0.004	0.0015	0.005	0.0015	0.00025	0.001	0.00025	0.073	0.154	6.8	29.7	0.5
23-Oct-02	6.30	0.11	13.0	0.025	0.42	0.005	0.0025	0.0025	0.0018	0.002	0.00025	0.003	0.231	19.2	59.3	0.5
28-Oct-04	5.79	0.11	11.6	0.012	0.43	0.005	0.001	0.0015	0.0013	0.002	0.00025	0.04	0.303	10.4	45	0.5
Minimum	1.36	0.03	3.1	0.03	0.0005	0.001	0.001	0.002	0.000	0.001	0.0003	0.00	0.04	2.5	11.4	0.0
Mean	3.94	0.05	6.9	0.10	0.28	0.0043	0.003	0.016	0.016	0.016	0.0017	0.05	0.19	7.2	28.4	2.2
90 Percentile	5.94	0.05	12.0	0.05	0.42	0.0056	0.005	0.025	0.025	0.025	0.0025	0.08	0.30	13.0	49.3	5.2
Maximum	6.30	0.11	13.0	0.11	0.43	0.0070	0.005	0.025	0.025	0.025	0.0025	0.10	0.31	19.2	59.3	15.0
ANZECC GUIDELINE VALUES																
Aquatic	N/A - Aquatic guidelines relevant to surfacewater only															
Raw Water	0.3	0.1	0.2	0.2	1	0.05	1	0.05	0.1	0.05	0.005			400		
Irrigation	1	2	5	5	5	0.1	0.2	0.2	0.2	1	0.01					
Livestock	1	2	5	5	5	0.1	0.5	0.1	1	1	0.01				1000	

Above lowest guideline value

Above highest guideline value

Underlined italic indicates less than detection limit - numerical value entered is half detection limit for statistical analysis

Masterston Landfill Annual Report
Bore 5: Northwest Side of Landfill

Date	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	0.26	0.025	2.3	0.08	0.025	0.0005	0.005	0.025	0.025	0.02	0.0025	0.013	0.024	5	15.2	2.5
28-Jul-97																0
22-Apr-98	0.26	0.025	1.6	0.1	0.09	0.0005	0.005	0.025	0.025	0.025	0.0025	0.01	0.018	5.3	14.6	0
22-Apr-99	0.19	0.025	0.9	0.01	0.07	0.0005	0.005	0.025	0.025	0.025	0.0025	0.01	0.01	2.5	15.4	3
14-Oct-99	0.23	0.025	2.9	0.01	0.16	0.0005	0.005	0.025	0.025	0.025	0.0025	0.011	0.012	6.7	23	0
26-Oct-00	0.025	0.025	2.4	0.01	0.07	0.0005	0.005	0.025	0.025	0.025	0.0025	0.007	0.010	2.9	16.9	0
25-Oct-01	0.025	0.025	2.2	0.0025	0.07	0.0005	0.005	0.0015	0.00025	0.0005	0.00025	0.007	0.010	6.0	18.0	0.5
23-Oct-02	0.025	0.025	2.2	0.0025	0.09	0.01	0.002	0.0015	0.00025	0.0005	0.00025	0.008	0.007	10.0	26.4	0.5
23-Oct-03	0.025	0.025	2.2	0.0025	0.11	0.0005	0.002	0.0015	0.00025	0.0005	0.00025	0.008	0.008	8.2	22.9	0.5
28-Oct-04	0.025	0.025	1.6	0.0025												
Minimum	0.03	0.03	0.9	0.00	0.03	0.0005	0.001	0.002	0.000	0.001	0.0003	0.00	0.01	2.5	14.6	0.0
Mean	0.14	0.03	2.1	0.03	0.09	0.0017	0.004	0.016	0.016	0.015	0.0017	0.01	0.01	5.8	19.1	0.9
90 Percentile	0.28	0.03	2.6	0.09	0.13	0.0034	0.005	0.025	0.025	0.025	0.0025	0.01	0.02	8.7	24.0	2.7
Maximum	0.53	0.03	2.9	0.10	0.16	0.0100	0.005	0.025	0.025	0.025	0.0025	0.01	0.02	10.0	26.4	3.0
ANZECC GUIDELINE VALUES																
Aquatic	N/A - Aquatic guidelines relevant to surfacewater only															
Raw Water	0.3	0.1	600	0.2	1	0.05	1	0.05	0.1	0.05	0.005	0.01	0.01	400	1000	
Irrigation	1	2		5/0.5-6	5	0.1	0.3	0.2	0.2	0.2	1	1	1			
Livestock				5	5	0.5	0.5	0.1	1	1	1	1	1			

Above lowest guideline value

Above highest guideline value

Unfilled cells indicates less than detection limit - numerical value entered is half detection limit for statistical analysis

Masterston Landfill Annual Report
Bore 6: Northeast side of landfill

Annual Monitoring																
Date	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	0.11	0.05	2.6	0.02		0.0005	0.006	0.025	0.025	0.025	0.0025	0.006	0.012	5	19.8	2.5
23-Jun-97																
28-Jul-97																
22-Apr-98		0.07	2.5	0.03	0.11	0.0005	0.005	0.025	0.025	0.025	0.0025	0.008	0.027	7.4	11.4	2
22-Apr-99																
14-Oct-99	0.25	0.025	1.5	0.01	0.11	0.0005	0.005	0.025	0.025	0.025	0.0025	0.01	0.01	2.5	14	3
26-Oct-00		0.025	5.7	0.09	0.22	0.0005	0.005	0.025	0.025	0.025	0.0025	0.006	0.01	7.2	27.3	3
25-Oct-01	0.17	0.025	3.3	0.01	0.10	0.0005	0.005	0.025	0.025	0.025	0.0025	0.007	0.010	2.6	17.0	107
23-Oct-02	0.025	0.025	3.4	0.0025	0.13	0.0005	0.005	0.0015	0.0025	0.0005	0.00025	0.009	0.010	6.0	16.9	0.5
28-Oct-03	0.08	0.025	5.7	0.0025	0.15	0.005	0.004	0.0015	0.00025	0.0005	0.00025	0.003	0.008	7.5	27.7	2
26-Oct-04	0.025	0.025	2.8	0.009	0.2	0.0005	0.005	0.0015	0.0006	0.0005	0.00025	0.008	0.009	9	26.4	0.5
Minimum	0.03	0.03	1.5	0.00	0.10	0.0005	0.003	0.002	0.000	0.001	0.0003	0.000	0.01	2.5	11.4	0.0
Mean	0.20	0.03	3.4	0.02	0.28	0.0011	0.006	0.016	0.016	0.016	0.0017	0.01	0.01	5.9	20.1	14.7
90 Percentile		0.06	5.7	0.05		0.0019	0.006	0.028	0.028	0.028	0.0025	0.01	0.02	8.0	27.4	34.2
Maximum		0.07	5.7	0.09		0.0050	0.006	0.025	0.025	0.025	0.0025	0.01	0.03	9.0	27.7	107.0
ANZECC GUIDELINE VALUES																
Aquatic	N/A - Aquatic guidelines relevant to surfacewater only															
Raw Water	0.3	0.1		0.2	1	0.05	1	0.05	0.1	0.05	0.005					
Irrigation	1	2		5/0.5-6	5	0.1	0.2	0.2	0.2	1	1					
Livestock			600	5	5	0.5	0.5	0.1	1	1	0.01			400	1000	

Above lowest guideline value

Above highest guideline value

Underlined italic indicates less than detection limit - numerical value entered in half detection limit for statistical analysis

Masterton Landfill Annual Report
Additional Bores

Quarterly Monitoring																	
Date	pH	Temperature	Conductivity	Alkalinity	Hardness	Ammoniacal Nitrogen	Nitrite-N	Nitrate-N	BOD ₅	COD	Iron (soluble)	Chloride	Zinc	Sodium	Enterococci	Potassium	
			uS/cm	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	g/m ³	per 100 ml	g/m ³	
Bore 7: FN21 Masterton-Martinborough Road																	
13-Feb-02	~2.2		166	33.5	52.4	0.0025	0.001	4.23	0.05	17	0.025	12.6	0.012	12.2	6	2.3	
18-Apr-02	~3.0		165	35.7	55.1	0.0025	0.001	3.58	0.12	16	0.025	11.2	0.0025	12.5	0.5	2.3	
31-Jul-02	~3.0		167	31.5	53.2	0.0025	0.001	4.22	0.48	0.5	0.025	12.7	0.021	10.4	0.5	2.2	
23-Oct-02	~4.1		165	34.6	53.1	0.0025	0.001	3.59	0.17	3	0.025	13.6	0.025	10.8	3	2.1	
30-Apr-03	~0.08		162	33.2	49.3	0.0025	0.001	3.51	0.45	6	0.025	14.0	0.0025	10.8	0.5	2.1	
23-Oct-03	~1.8		172	36.2	65.1	0.0025	0.001	5.32	0.05	7	0.025	14.3	0.014	10.4	0.5	2.2	
29-Apr-04	~2.2	15.47	182	32.5	58.7	0.017	0.001	5.771	0.05	0.5	0.025	14.4	0.006	11.3	7	2.2	
28-Oct-04	~1.5	14.81	186	36.6	57.9	0.006	0.001	5.27	0.15	0.5	0.025	13.2	0.015	12	0.5	2.1	
Bore 8: FN25 Masterton-Martinborough Road																	
13-Feb-02	~3.5		162	44.9	51.3	0.009	0.007	2.04	0.05	22	0.025	12.7	0.007	12.4	28	2.3	
18-Apr-02	~2.2		165	33.4	52.4	0.009	0.002	3.94	0.18	32	0.025	11.7	0.009	12.8	3	2.3	
31-Jul-02	~1.3		146	33.4	49.4	0.028	0.002	3.58	0.05	9	0.025	12.4	0.0025	10.0	0.5	2.0	
23-Oct-02	~1.3		162	34.3	49.2	0.017	0.002	3.76	0.23	11	0.025	13.0	0.011	11.2	2	2.1	
30-Apr-03	~1.2		156	30.9	53.1	0.017	0.001	4.11	0.05	4	0.025	13.2	0.0025	10.8	12	2.0	
23-Oct-03	~3.2		170	34.4	55	0.0025	0.001	4.55	0.005	17	0.025	13.3	0.013	10.4	12	2.2	
29-Apr-04	~1.8	15.12	178	32.9	61.6	0.017	0.001	5.192	0.05	0.5	0.025	13.6	0.011	11.3	756	2.1	
28-Oct-04	~1.2	14.25	175	37.2	54.5	0.0025	0.001	4.08	0.05	11	0.025	12.8	0.01	11.2	0.5	2	
Bore 9: 9a Pokohiwi Road																	
13-Feb-02	6.92		355	151.8	64.5	~1.1	0.015	0.52	9.42	35	22.3	14.8	0.007	13.6	13	6.7	
18-Apr-02	6.82		133	52.4	55.0	0.0025	0.001	0.81	0.05	29	0.025	7.5	0.0025	9.1	1	1.5	
31-Jul-02	6.72		137	41.3	53.8	0.0025	0.001	1.34	2.71	2	0.58	10.0	0.0025	7.8	0.5	1.3	
23-Oct-02	6.78		120	36.5	44.5	0.0025	0.001	0.89	0.28	0.5	0.025	10.0	0.014	7.2	5	1.2	
30-Apr-03	6.55		142	45.9	51.1	0.0025	0.001	0.92	1.02	14	0.025	10.0	0.011	8.2	0.5	1.5	
23-Oct-03	6.62		240	63.1	92.5	0.0025	0.002	5.03	0.05	22	0.025	16.4	0.009	12	0.5	2.0	
29-Apr-04	~3.5	15.28	206	55.6	77.7	0.036	0.001	2.55	0.05	0.5	0.025	17.0	0.020	11.6	1	2.1	
28-Oct-04	~5	12.11	147	46.3	51.5	0.0025	0.001	1.28	0.12	6	0.025	9.8	0.0025	8.8	0.5	1.6	
Bore 10: 11 Pokohiwi Road																	
13-Feb-02	6.55		170	36.0	51.9	0.0025	0.001	3.92	0.05	19	0.025	12.4	0.020	13.4	2	3.5	
18-Apr-02	~4.0		174	37.5	56.7	0.0025	0.001	3.98	0.05	55	0.025	11.7	0.043	13.6	0.5	3.4	
31-Jul-02	~1.8		176	39.6	59.2	0.0025	0.001	3.56	2.71	2	0.025	14.9	0.008	11.6	0.5	3.2	
23-Oct-02	~2.0		185	39.2	54.8	0.0025	0.001	4.44	0.33	2	0.025	15.1	0.007	12.8	0.5	3.2	
30-Apr-03	~1.5		166	33.3	48.3	0.0025	0.001	4.08	0.39	9	0.025	13.6	0.096	11.6	0.5	3.1	
23-Oct-03	~2.8		185	38.1	62.5	0.0025	0.001	4.46	0.05	0.5	0.025	14.8	0.010	12.6	2	3.2	
29-Apr-04	~2.8	14.56	178	34.0	60.0	0.010	0.001	4.955	0.05	0.5	0.025	14.3	0.0025	11.4	2	2.8	
28-Oct-04	~2	13.65	195	42.3	61.9	0.0025	0.001	4.99	0.05	3	0.025	13.6	0.012	12.8	0.5	2.9	
Bore 11: 17 Pokohiwi Road																	
13-Feb-02	~2.5		162	34.2	51.5	0.0025	0.001	3.95	0.05	32	0.025	11.8	0.0025	12.8	1	2.2	
18-Apr-02	~1.5		165	33.7	53.0	0.0025	0.001	4.00	0.16	0.5	0.025	10.7	0.015	13.0	1	2.1	
31-Jul-02	~2.2		167	36.1	56.7	0.0025	0.001	3.67	0.05	7	0.025	13.2	0.020	10.8	0.5	2.0	
23-Oct-02	~2.0		165	34.6	51.1	0.0025	0.001	4.28	0.37	13	0.025	13.5	0.0025	11.4	0.5	2.1	
30-Apr-03	~2.8		168	19.7	49.6	0.0025	0.001	4.73	0.41	6	0.025	14.5	0.006	11.6	0.5	2.0	
23-Oct-03	~4.0		176	35.8	63.7	0.0025	0.001	4.44	0.05	24	0.025	14.2	0.0025	11.6	30	2.1	
29-Apr-04	~2.2	14.93	175	32.9	56.1	0.011	0.001	5.015	0.05	0.5	0.025	14.5	0.0025	11.2	13	2.0	
28-Oct-04	~1.8	14.31	182	41.1	57	0.0025	0.001	4.48	0.1	9	0.025	13.2	0.034	12	0.5	2.1	
Bore 12: 11 Honebush Road																	
13-Feb-02	~2.2		166	36.8	50.7	0.0025	0.001	3.80	0.26	23	0.025	12.3	0.0025	13.2	7	2.1	
18-Apr-02	~1.2		160	37.1	51.9	0.0025	0.001	3.63	0.55	0.5	0.025	11.0	0.0025	13.0	0.5	2.0	
31-Jul-02	~3.2		162	35.5	52.5	0.0025	0.001	3.90	0.05	10	0.10	12.1	0.0180	10.8	0.5	1.8	
23-Oct-02	~1.5		170	35.5	52.9	0.0025	0.001	3.94	0.016	0.016	0.025	13.3	0.0025	11.6	0.5	1.9	
30-Apr-03	~1.8		168	35.0	51.3	0.0025	0.001	3.90	0.56	6	0.025	13.8	0.0060	11.6	0.5	1.9	
23-Oct-03	~3.0		188	32.9	60.1	0.0025	0.002	5.62	0.05	4	0.025	15.7	0.0310	12.4	1	2.0	
29-Apr-04	~1.0	14.51	182	33.6	55.6	0.013	0.001	4.72	0.05	0.5	0.025	15.7	0.0070	11.4	0.5	1.9	
28-Oct-04	~1	13.21	185	38	59.9	0.0025	0.001	4.73	0.11	0.5	0.025	15.4	0.0025	11.6	0.5	1.9	
Bore 13: 11 Kahikatea Road																	
13-Feb-02	6.68		224	71.2	82.9	0.005	0.010	2.26	0.05	71	0.05	12.4	0.029	14.2	3	1.5	
18-Apr-02	6.62		218	67.7	89.7	0.0025	0.003	2.60	0.05	4	0.025	10.4	0.0025	14.0	0.5	1.6	
31-Jul-02	6.60		216	66.9	81.0	0.0025	0.003	2.31	0.05	4	0.30	11.7	0.0190	12.0	0.5	1.5	
23-Oct-02	6.62		220	66.1	78.6	0.016	0.009	2.97	0.36	1	0.05	12.5	0.0090	12.8	0.5	1.5	
30-Apr-03	6.52		222	67.3	80.7	0.0025	0.002	2.44	1.13	4	0.025	12.1	0.0025	12.0	0.5	1.5	
23-Oct-03	6.68		235	65.4	90.9	0.0025	0.001	5.62	0.05	0.05	0.025	13.2	0.0080	12.8	0.5	1.6	
29-Apr-04	6.65	14.01	242	67.7	82.3	0.035	0.001	3.724	0.05	13	0.025	14.5	0.009	12.6	0.5	1.5	
28-Oct-04	6.58	13.16	240	68.7	88.3	0.0025	0.001	3.63	0.12	3	0.025	14.8	0.0025	13.8	0.5	1.5	
ANZECC GUIDELINE VALUES																	
Aquatic Raw Water Irrigation Livestock	N/A - Aquatic guidelines relevant to surfacewater only 6.5-8.5				500	0.01	1	10				400 30-700	5 2 20	300			

Above lowest guideline value
Above highest guideline value
Underlined (italic) indicates less than detection limit
 - numerical value entered is half detection limit for statistical analysis

Masterton Landfill Annual Report
Site 7: Ruamahanga River Upstream of Landfill

Annual Monitoring																
Date	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	1.1	0.06	1.4	0.03	0.025	0.0005	0.005	0.025	0.025	0.02	0.0025	0.009	5	5	14.1	55
28-Jul-97	0.14	0.025	1.5	0.01	0.09	0.0005	0.005	0.025	0.025	0.025	0.0025	0.006	7.4	7.4	17.4	436
22-Apr-98	0.3	0.025	0.7	0.03	0.03	0.0005	0.005	0.025	0.025	0.025	0.0025	0.009	2.5	2.5	11.6	860
14-Oct-99	0.12	0.025	3.5	0.04	0.025	0.0005	0.005	0.025	0.025	0.025	0.0025	0.009	6.8	6.8	20.1	65
26-Oct-00	0.17	0.025	1.6	0.03	0.025	0.0005	0.005	0.025	0.025	0.025	0.0025	0.009	2.6	2.6	15.1	88
25-Oct-01	0.025	0.025	1.2	0.06	0.005	0.0005	0.0005	0.0015	0.0025	0.0005	0.00025	0.007	3.8	3.8	10.5	40
23-Oct-02	0.025	0.025	2.1	0.016	0.005	0.005	0.0005	0.0015	0.0025	0.0005	0.00025	0.006	8.0	8.0	20.4	27
25-Oct-03	0.25	0.025	2	0.068	0.005	0.0005	0.0005	0.0015	0.0025	0.0005	0.00025	0.01	7.0	7.0	16.7	10
28-Oct-04	0.03	0.03	0.7	0.01	0.01	0.0005	0.001	0.002	0.000	0.001	0.0003	0.01	2.5	2.5	10.5	10.0
Minimum	0.25	0.03	1.8	0.04	0.03	0.0011	0.003	0.016	0.016	0.015	0.0017	0.01	5.4	5.4	15.7	197.6
Mean	0.17	0.04	2.5	0.06	0.05	0.0019	0.005	0.025	0.025	0.025	0.0025	0.01	7.6	7.6	20.2	563.2
90 Percentile	0.025	0.06	3.5	0.07	0.09	0.0050	0.005	0.025	0.025	0.025	0.0025	0.01	8.0	8.0	20.4	860.0
Maximum	0.025	0.025											7			
ANZECC GUIDELINE VALUES																
Aquatic	1												0.01-0.1			
Raw Water	0.3	0.1		0.2	1	0.05	1	0.05	0.1	0.05	0.005			400		
Irrigation	1	2		5	5-6	0.1	0.2	0.2	0.2	1	0.01					
Livestock			600	5	5	0.5	0.5	0.1	1	1	0.01				1000	

Blue indicates less than detection limit - numerical value entered is half detection limit for statistical analysis
 Above lowest guideline value
 Above highest guideline value

Masterton Landfill Annual Report
Site 8: Ruamahanga River Downstream of Landfill

Quantity Monitoring																		
Date	pH	Temperature °C	Conductivity µS/cm	Alkalinity g/m³	Hardness g/m³	Ammoniacal Nitrogen g/m³	Azotemia g/m³	Nitrite- N g/m³	Nitrate- N g/m³	BOD ₅ g/m³	COD g/m³	Iron (soluble) g/m³	Chloride g/m³	Zinc g/m³	Sodium g/m³	Enterococci per 100 ml	Potassium g/m³	
30-May-96																		
31-Jul-96	7.52		127	38.3	40.2	0.005	0.043	0.002	1.2	0.05	6.5	0.11	7.9	0.0025	6.5		0.9	
21-Oct-96	7.78		131	46	46.6	0.0025	0.006	0.008	0.67	0.44	3.5	0.07	6.6	0.0025	2.5		1	
28-Jan-97	7.5		515	242.7	259.5	0.0025	0.006	0.006	1.31	0.58	37	0.46	7.9	0.0025	16		10	
30-Apr-97	7.8		125	43.1	42.3	0.0025	0.006	0.002	0.001	0.39	0.25	0.025	7.8	0.0025	6.0		1.1	
28-Jul-97	7.7		156	49.8	57.9	0.009	0.011	0.002	1.396	0.13	0.5	0.12	9.6	0.0025	7.8		1	
22-Oct-97	7.52		107	34.1	36.3	0.009	0.011	0.002	0.002	0.2	0.6	0.51	7.9	0.0025	6.7		0.9	
23-Feb-98	8.02		46	55.7	56.7	0.017	0.021	0.001	0.001	0.31	0.23	0.16	8.2	0.0025	6.0		1	
22-Apr-98	8.02		131	46.9	50.3	0.011	0.013	0.001	0.273	0.5	3	0.19	7.4	0.008	6.2		0.8	
22-Jul-98	7.58		66	20.4	20.8	0.014	0.023	0.002	0.441	0.71	8	0.18	4.5	0.0025	4.3		0.9	
19-Oct-98	7.5		102	31	32.5	0.0025	0.006	0.002	0.275	0.16	7	0.21	7.7	0.0025	6.5		0.9	
22-Feb-99	7.92		168	59.7	65.6	0.01	0.196	0.002	0.488	0.35	5	0.29	8.7	0.0025	7.4		1.1	
22-Apr-99	7.38		107	29.1	34.3	0.02	0.024	0.006	0.002	0.44	12	0.25	10.1	0.0025	6.8		1	
8-Jul-99	7.6		133	40	45.6	0.023	0.024	0.006	0.002	0.929	0.5	7	10.5	0.0025	8.5		1.1	
14-Oct-99	7.48		154	30.2	33.7	0.0025	0.006	0.001	0.442	0.5	9	0.13	5.1	0.0025	5.1		0.8	
20-Jan-00	7.72		151	58	58.8	0.011	0.013	0.001	0.566	0.28	0.5	0.28	8.9	0.0025	7.9		1.1	
2-May-00	7.98		151	33.4	34.1	0.005	0.017	0.002	0.477	0.43	0.5	0.5	9.8	0.0025	8.2		1.1	
18-Jul-00	8.08		139	44.5	52.3	0.014	0.017	0.002	0.745	0.5	0.5	0.25	9.8	0.0025	8.2		1.1	
26-Oct-00	7.48		168	33.5	70.6	0.006	0.007	0.006	1.105	0.43	0.5	0.22	9	0.0025	8.4		1.3	
18-Jan-01	7.38		129	44.5	50.9	0.008	0.010	0.001	0.69	0.5	23	0.25	9.3	0.0025	6.7	270	1	
18-Apr-01	7.3		168	59.8	64.3	0.006	0.007	0.001	0.4	0.5	10	0.025	10.4	0.0025	7.6	2	1.1	
15-Jul-01	7.50		139	35.8	45.9	0.0025	0.005	0.002	1.22	0.34	7	0.025	10.5	0.0025	7.6	1	1.0	
25-Oct-01	7.68		126	40.4	45.0	0.0025	0.005	0.002	0.67	0.05	54	0.08	8.2	0.0025	7.1	50	1.0	
13-Feb-02	7.56		111	41.3	40.3	0.0025	0.005	0.001	0.36	0.13	2	0.05	8.1	0.0025	6.8	1320	1.2	
18-Apr-02	8.48		148	33.3	61.2	0.0025	0.005	0.001	0.38	0.34	9	0.025	7.0	0.0025	7.9	78	1.1	
31-Jul-02	7.50		129	37.6	45.2	0.008	0.006	0.004	1.32	0.05	0.5	0.06	10.2	0.0025	7.6	85	1.1	
23-Oct-02	7.50	18	94	28.7	32.7	0.0025	0.003	0.002	0.48	0.72	9	0.025	9.0	0.0025	6	10	0.8	
29-Jan-03	7.48		67	20.6	23.4	0.0025	0.003	0.002	0.15	0.78	3	0.05	8.0	0.0025	4.5	600	0.8	
30-Apr-03	8.28		168	61.3	65	0.006	0.046	0.002	0.37	0.47	11	0.025	9.0	0.0025	7.8	75	1	
22-Jul-03	7.42	7.21	122	31.0	40.3	0.017	0.021	0.002	1.08	0.05	7	0.025	11.2	0.0025	7.9	20	1.1	
23-Oct-03	7.70	17.87	168	47.9	61.6	0.0025	0.003	0.002	2.00	0.21	0.5	0.025	10.5	0.0025	8.7	30	1.4	
28-Jan-04	7.72	20.43	144	45.5	51.7	0.006	0.006	0.002	0.71	0.05	0.5	0.025	9.5	0.0025	7.2	195	1.1	
29-Apr-04	8.20	13.27	182	62.0	73.9	0.007	0.045	0.002	1.000	0.31	0.5	0.025	10.9	0.0025	8.2	40	1.1	
22-Jul-04	7.50	8.28	150	44.9	54.6	0.012	0.015	0.004	1.290	0.15	2	0.025	9.4	0.0025	7.5	15	1.2	
28-Oct-04	7.68	15.62	131	44.2	48.3	0.007	0.009	0.003	0.990	0.17	8	0.025	7.7	0.0025	4.9	10	0.7	
20-Jan-05	7.90	18.32	141	51.9	54.6	0.006	0.007	0.002	0.380	0.52	3	0.025	8.8	0.0025	6.6	55	1	
27-Apr-05	7.55	16.39	141	44.9	50.6	0.01	0.012	0.002	0.760	0.27	0.5	0.08	9.8	0.0025	7.4	47	0.9	
Minimum	7.4	7.2	46	20.4	20.8	0.003	0.003	0.001	0.00	0.05	0.50	0.02	4.50	0.003	2.5	1	0.7	
Mean	7.7	13.0	141	49.2	54.1	0.014	0.018	0.003	0.72	0.34	7.41	0.11	8.71	0.003	7.1	171	1.3	
90 Percentile	8.1	18.7	166.5	59.3	65.3	0.020	0.025	0.005	1.30	0.59	11.60	0.27	10.50	0.004	8.3	369	1.2	
Maximum	8.5	20.4	515	242.7	292.5	0.020	0.196	0.008	2.00	0.78	54.00	0.51	11.50	0.010	16.0	1520	10.0	
ANZECC GUIDELINE VALUES																		
Aquatic Raw Water	6.5-9.0		1500		500	0.01	0.01	0.01	1	10			400	0.05	300			
Irrigation Livestock	6.5-8.5								10	30			30-700	2				

Above lowest guideline value
Above highest guideline value
Undertaken (fish) indicates less than detection limit - numerical value entered is half detection limit for statistical analysis

Masterton Landfill Annual Report
Site 8: Ruamahanga River Downstream of Landfill

Date	Annual Monitoring															
	Iron (Total) g/m ³	Manganese g/m ³	Magnesium g/m ³	Aluminium g/m ³	Boron g/m ³	Arsenic g/m ³	Copper g/m ³	Lead g/m ³	Nickel g/m ³	Chromium g/m ³	Cadmium g/m ³	Phosphorus (Dissolved Reactive) g/m ³	Phosphorus (Total) g/m ³	Sulphate g/m ³	Calcium g/m ³	Enterococci per 100 ml
30-Apr-97	0.2	0.025	1.4	0.04	0.025	0.0005	0.005	0.025	0.025	0.02	0.0025	0.006	0.006	5	14.5	35
26-Jul-97	0.2	0.025	1.9	0.11	0.06	0.0005	0.005	0.025	0.025	0.025	0.0025	0.008	0.008	2.5	12.1	350
22-Apr-98	0.26	0.025	1.5	0.03	0.03	0.0005	0.005	0.025	0.025	0.025	0.0025	0.011	0.011	5.4	11.1	715
14-Oct-99	0.10	0.025	4.2	0.07	0.08	0.0005	0.005	0.025	0.025	0.025	0.0025	0.008	0.008	6.8	21.4	130
26-Oct-00	0.10	0.025	1.7	0.02	0.025	0.0005	0.005	0.025	0.025	0.025	0.0025	0.010	0.010	2.5	15.2	50
25-Oct-01	0.025	0.025	1.4	0.065	0.005	0.0005	0.0005	0.0015	0.0025	0.0005	0.00025	0.007	0.007	5	10.8	10
23-Oct-02	0.025	0.025	2.2	0.018	0.005	0.005	0.0005	0.0015	0.00025	0.0005	0.00025	0.006	0.006	7.2	21.1	20
28-Oct-04	0.24	0.025	0.9	0.063	0.005	0.0005	0.0005	0.0015	0.00025	0.0005	0.00025	0.01	0.01	7.4	18	10
Minimum	0.03	0.03	0.9	0.02	0.01	0.0005	0.001	0.002	0.000	0.001	0.0003	0.01	0.01	2.5	10.8	10.0
Mean	0.24	0.03	1.9	0.06	0.03	0.0011	0.003	0.016	0.016	0.015	0.0017	0.01	0.01	5.2	15.5	165.0
90 Percentile	0.03	0.03	2.8	0.08	0.07	0.0019	0.005	0.025	0.025	0.025	0.0025	0.01	0.01	7.3	21.2	459.5
Maximum	0.26	0.03	4.2	0.11	0.08	0.0050	0.005	0.025	0.025	0.025	0.0025	0.01	0.01	7.4	21.4	715.0
ANZECC GUIDELINE VALUES																
Aquatic	1															
Raw Water	0.3	0.1		0.2	1	0.05	1	0.05	0.1	0.05	0.005			400		
Irrigation	1	2		5	5-6	0.1	0.2	0.2	0.2	1	0.01					
Livestock			600	5	5	0.5	0.5	0.1	1	1	0.01				1000	

Above lowest guideline value

Above highest guideline value

Identified italic indicates less than detection limit - numerical value entered is half detection limit for statistical analysis



C A W T H R O N

17 BRIDGEWAY, PALMERSTON NORTH

98 HALIFAX ST EAST PRIVATE BAG 2 NELSON NEW ZEALAND TEL 0-3-548 2319 FAX 0-3-546 9464

Site	Score	Ruamahunga above landfill			Ruamahunga below landfill		
		(WRC - 2777)			(WRC - 2778)		
		1	2	3	1	2	3
Sample							
Date		25-Mar-03	25-Mar-03	25-Mar-03	25-Mar-03	25-Mar-03	25-Mar-03
TAXA	Score						
EPIHEMEROPTERA							
<i>Dolophilum</i>	8	VVA	VA	VA	VA	VA	VA
<i>Nasannellata</i>	9	C	C	C	C	C	C
MEGALOPTERA							
<i>Amphichaullodus</i>	7	C	C	C	-	R	R
COLEOPTERA							
<i>Gonatus</i>	5	-	-	-	-	-	-
Elmidae	6	VA	VA	VA	VA	VA	VA
Hydraenidae	8	-	-	-	R	-	R
HEMIPTERA							
<i>Saldula</i>	5	-	-	-	R	-	-
ODONATA							
<i>Xanthoconia</i>	5	-	-	-	-	-	-
DIPTERA							
Anthomyiidae	3	-	-	-	-	-	-
<i>Aphrophila</i>	5	-	-	-	-	R	-
<i>Austrosimulium</i>	3	C	R	R	-	R	R
<i>Chironomus</i>	1	-	-	-	-	-	-
Eriopterini	9	C	C	A	C	A	C
Hexatomini	5	-	-	-	-	-	R
<i>Maoridlamosa</i>	3	-	-	-	-	-	-
<i>Misachoderus</i>	4	-	R	-	-	-	-
<i>Molophilus</i>	5	R	R	-	R	-	-
Orthocladinae	2	A	A	A	C	R	C
<i>Parachironomus</i>	2	-	-	-	-	-	-
<i>Polypadilum</i>	3	-	-	-	-	-	R
Tanypodinae	5	R	-	-	-	-	-
<i>Tanytarsus</i>	3	A	A	C	C	-	C
TRICHOPTERA							
<i>Aotaeapsyche</i>	4	VA	A	A	A	A	A
<i>Coatichorema</i>	7	-	R	R	-	R	-
<i>Hudsonema</i>	6	-	-	-	-	-	-
<i>Hydrobiosis</i>	5	C	C	C	C	C	C
<i>Olinga</i>	9	C	R	-	R	-	R
<i>Photrocnemia</i>	8	-	R	-	-	-	-
<i>Polyplectropus</i>	8	-	-	-	-	-	-
<i>Pallochorema</i>	8	C	A	C	R	R	C
<i>Pycnocentria</i>	7	R	R	-	-	-	R
<i>Pycnocentroides</i>	5	-	-	R	-	-	R
CRUSTACEA							
Amphipoda	5	-	-	-	-	-	-
MOLLUSCA							
<i>Gyraulus</i>	3	R	-	-	-	-	-
<i>Physa</i>	3	R	-	-	-	-	-
<i>Potamopyrgus</i>	4	C	C	R	-	R	C
HIRUDINEA							
<i>Oligochaeta</i>	1	-	-	-	-	-	-
NEMATOMORPHA							
	3	-	-	-	-	-	-
SQMCI		6.87	6.26	6.50	6.62	6.87	6.57
MCI		111	120	114	125	118	119
Number of taxa		18	18	14	13	13	18



Phone: (04) 569 0598

P.O. Box 11 646, Wellington
[Located at Mabey Road, Lower Hutt]

Fax: (04) 567 3562

Masterton District Council
P.O. Box 444
Masterton
Attention: David John

Date Collected: 24-03-03
Collected By: WRC Laboratory - J.F. Taylor/ P. Kinaston

Sample description: Macroinvertebrate samples
Masterton Landfill - upstream and downstream

Site Description: Masterton Landfill - upstream

	Flow: Time:	Medium 10:30		Substrate %					Periphyton % cover Bare	
		Velocity Head (cm)	Depth (m)	Boulder s	Large Cobbles	Small Cobbles	Large Gravel	Small Gravel		Sand
SS1		1.0	0.10		30	30	30	10		10(60% brown film, 30% green film)
SS2		2.5	0.07		30	40	30			20(60% brown film, 20% green film)
SS3		1.5	0.07		30	40	30			10(60% brown film, 30% green film)
SS4		2.0	0.08		40	30	20	10		30(50% brown film, 20% green film)
SS5		3.0	0.05		10	40	30	20		10(50% brown film, 20% green film)

	Flow: Time:	Medium 10:30		Substrate %					Periphyton % cover Bare	
		Velocity Head (cm)	Depth (m)	Boulder s	Large Cobbles	Small Cobbles	Large Gravel	Small Gravel		Sand
SS1		1.0	0.05		20	30	40	10		15%(50% brown film, 30% green film,5%green fila.)
SS2		1.0	0.09		20	20	40	20		40%(50% brown film, 10% green film)
SS3		2.0	0.09		20	30	30	20		30%(50% brown film, 20% green film)
SS4		2.0	0.13		30	20	30	20		30%(50% brown film, 20% green film)
SS5		2.0	0.09		20	30	40	10		30%(60% brown film, 10% green film)

	Flow: Time:	Medium 10:30		Substrate %					Periphyton % cover Bare	
		Velocity Head (cm)	Depth (m)	Boulder s	Large Cobbles	Small Cobbles	Large Gravel	Small Gravel		Sand
SS1		1.5	0.10		30	20	20	30		20%(40% brown film, 40% green film)
SS2		1.5	0.11		10	30	40	20		20%(60% brown film, 20% green film)
SS3		2.5	0.15		30	20	10	40		30%(50% brown film, 20% green film)
SS4		2.0	0.08		10	30	30	30		30%(60% brown film, 10% green film)
SS5		4.0	0.09		30	40	20	10		30%(60% brown film, 10% green film)





greater WELLINGTON

THE REGIONAL COUNCIL

Phone: (04) 569 0598

P.O. Box 11 646, Wellington
[Located at Mabe Road, Lower Hutt]

Fax: (04) 567 3562

Masterton District Council

P.O. Box 444

Masterton

Attention: David John

Date Collected: 24-03-03

Collected By: WRC Laboratory - J.F. Taylor/ P. Kinaston

Sample description: Macroinvertebrate samples
Masterton Landfill - upstream and downstream

Site Description: Masterton Landfill - downstream

	Flow: Medium Time: 11:45		Substrate %						Periphyton % cover Bare
	Velocity Head (cm)	Depth (m)	Boulder s	Large Cobbles	Small Cobbles	Large Gravel	Small Gravel	Sand	
SS1	1.0	0.14		20	20	20	40		40(60% brown film)
SS2	2.0	0.12		20	30	20	30		30(60% brown film, 10% green film)
SS3	2.0	0.19		10	30	30	30		25(60% brown film, 10% green film, 5% green fila.)
SS4	3.0	0.09			40	40	20		50(50% brown film)
SS5	4.5	0.08		10	40	40	10		30(60% brown film, 10% green film)

	Flow: Medium Time: 11:45		Substrate %						Periphyton % cover Bare
	Velocity Head (cm)	Depth (m)	Boulder s	Large Cobbles	Small Cobbles	Large Gravel	Small Gravel	Sand	
SS1	2.5	0.09			30	50	20		60%(40% brown film)
SS2	2.0	0.07			20	40	40		55%(40% brown film, 5% green film)
SS3	4.0	0.11		20	30	30	20		30%(50% brown film, 10% green film, 10% green fila.)
SS4	3.0	0.13		10	30	40	20		35%(50% brown film, 10% green film, 5% green fila.)
SS5	2.0	0.12		10	20	40	30		20%(50% brown film, 15% green film, 10% green fila.)

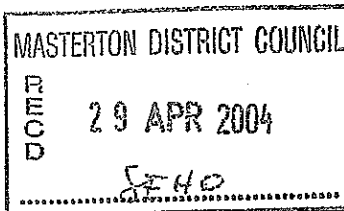
	Flow: Medium Time: 11:45		Substrate %						Periphyton % cover Bare
	Velocity Head (cm)	Depth (m)	Boulder s	Large Cobbles	Small Cobbles	Large Gravel	Small Gravel	Sand	
SS1	2.0	0.13		10	30	40	20		40%(50% brown film, 10% green film)
SS2	2.5	0.14		10	30	40	20		30%(50% brown film, 15% green film, 5%green fila.)
SS3	2.0	0.15		20	30	40	10		40%(50% brown film, 10% green film)
SS4	1.5	0.11		20	30	40	10		25%(55% brown film, 15% green film, 10% green fila.)
SS5	1.0	0.12		20	30	30	20		20%(50% brown film, 15% green film, 15% green fila.)

Water, air, earth and energy elements in Greater Wellington's logo first combine to create and sustain life. Greater Wellington promotes
Quality for Life by ensuring our environment is protected while meeting the economic, cultural and social needs of the community.



181981

30-07



CAWTHON

27 April 2004

Masterton District Council
P.O. Box 444
Masterton

Attention: David John

Dear David,

RE: Ruamahanga landfill monitoring samples (purchase order 381824)

Please find attached the results and invoice from the processing of consent monitoring macroinvertebrate samples collected in March 2004 from the Ruamahanga River upstream and downstream of the landfill (purchase order 381824).

Please do not hesitate to contact me should you have any queries relating to these results.

Yours Sincerely,

Karen Shearer
Freshwater Biologist

98 HALIFAX ST EAST PRIVATE BAG 2 NELSON NEW ZEALAND TEL 0-3-548 2319 FAX 0-3-548 9464



CAWTHRON

Environmental Services

Site		Ruamahunga River upstream of Masterton landfill			Ruamahunga River downstream of Masterton landfill		
Sample		3211A	3211B	3211C	3212A	3212B	3212C
Date		31-Mar-04	31-Mar-04	31-Mar-04	31-Mar-04	31-Mar-04	31-Mar-04
Time		09:40	09:50	10:00	11:25	11:35	11:45
Taxa	Score						
EPHEMEROPTERA							
<i>Coloburiscus</i>	9	R	-	-	-	-	R
<i>Daleatidium</i>	8	VVA	VVA	VVA	VA	VA	VA
<i>Nosamelatus</i>	9	R	-	R	-	-	-
PLECOPTERA							
<i>Megaloptera</i>	9	-	-	-	R	-	-
<i>Zelandoptera</i>	10	R	-	-	-	R	R
MEGALOPTERA							
<i>Archichauliodes</i>	7	R	R	-	-	-	-
COLEOPTERA							
Elmidae	6	A	A	A	A	A	A
DIPTERA							
<i>Austrosimulium</i>	3	R	R	R	C	C	-
Cnephidae	3	-	-	-	-	R	-
Etopterini	9	C	R	A	C	C	C
Orthocladinae	2	R	-	-	C	C	R
<i>Polypodium</i>	3	-	-	-	-	-	R
TRICHOPTERA							
<i>Acteopaycha</i>	4	C	-	-	-	-	R
<i>Coelochorema</i>	7	-	-	-	-	R	-
<i>Psychoblosia</i>	5	-	-	R	-	-	R
<i>Orthopaycha</i>	9	-	-	-	R	R	R
<i>Oxyethira</i>	2	-	-	R	-	-	-
<i>Palliochorema</i>	8	R	-	-	-	-	-
<i>Pycnocentroides</i>	5	R	-	-	-	-	-
MOLLUSCA							
<i>Physa</i>	3	-	-	-	R	-	-
<i>Potamopygus</i>	4	R	-	-	-	-	-
ACARINA							
	5	R	R	R	R	-	-
BQMC1		7.86	7.91	7.93	7.31	7.33	7.63
MCI		127	127	118	120	127	130
Number of taxa		14	6	8	9	9	10

Ruamahunga Landfill consent monitoring:

Field collection by Summer Warr (Greater Wellington) and Pita Kinaston (Masterton District Council)

Identifications by Judy McKenzie (Cawthron).

Data entry by Karen Shearer (Cawthron).



CAWTHON

Results

In 2004, Semi-quantitative Macroinvertebrate Community Index (SQMCI) values were significantly lower downstream of the discharge compared to upstream (Table 1). However, the SQMCI at both sites were both high (>6). This indicates that despite the statistical difference, invertebrate communities at both sites were "healthy" and indicative of in clean water environment (see Table 2). The SQMCI values obtained in 2004 were higher than in the previous two years samplings (Table 1)

There was no statistical or ecological difference detected between upstream and downstream of the landfill in 2004. Apart from one sample, Macroinvertebrate Community Index (MCI) values upstream and downstream of the landfill in 2004 were greater than 120, which is indicative of clean water levels (Table 2). Overall, MCI values upstream and downstream of the landfill were slightly better in 2004 than the previous two years (Table 1).

The number of taxa collected upstream of the landfill did not differ significantly from the number collected downstream of the landfill in any year (Table 1). Although more taxa were collected in 2003 than in 2002 and 2004, this could be attributed to factors such as each sampling being undertaken at different times following a flood event or even differences in sampling effort between years.

Table 1 Mean values for community metrics (SQMCI, MCI and Number of taxa) calculated for Ruamahaunga Landfill for 2002-2004 and significance of results using t-test for upstream/downstream comparisons. NS = No significant difference between metrics upstream and downstream of the landfill. * statistical difference between metrics upstream and downstream of the landfill of $P < 0.05$.

Metric	Mean value - upstream	Mean value - downstream	Significance
SQMCI			
2002	7.23	6.66	NS
2003	6.54	6.69	NS
2004	7.90	7.42	*
MCI			
2002	126	122	NS
2003	115	121	NS
2004	124	126	NS
Number of taxa			
2002	9	8	NS
2003	17	15	NS
2004	9	9	NS

Table 2 Interpretation of MCI and SQMCI scores in stony streams with respect to water quality and/or pollution levels. Adapted from Stark (1998).

Water/pollution status	MCI range	SQMCI range
Clean water	120	>6
Doubtful quality or possible mild pollution	100-120	5-6
Probable moderate pollution	80-100	4-5
Probable severe pollution	<80	<4

Summary

Overall, there was no indication in the three years of sampling that any potential run-off or leaching from the Ruamahunga landfill was impacting on macroinvertebrate communities.

