

Fall 2020 Summary Report

Residential Drinking Water Well Sampling

LRI Landfill

August 2021
Drinking Water Program
Residential Water Sampling Project

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Summary

BACKGROUND

This report is a summary of the water quality sampling event conducted in the Fall of 2020.

All drinking water wells within one-half (1/2) mile of the boundary of the LRI Landfill are eligible for free water quality sampling once a year. Substances chosen for testing by the Health Department are to assess groundwater quality. These tests can show information about possible groundwater impacts from the landfill.

Property owners can have their well water sampled in either the Spring or Fall of each year and may drop out of the program at any time.

The water samples are tested annually for twenty characteristics and substances, including conductivity, pH, ammonia, nitrate, chloride, iron, manganese, magnesium, and Coliform bacteria. In addition to the annual water quality test, participants will have their water tested every five years for 'Volatile Organic Compounds' (VOCs). Starting in Spring 2015, members of the Woodbrook Homeowners Association are eligible for annual VOC testing because of their legal settlement over the relocation of Woodbrook Road (317th Street East).

Although Coliform bacteria in groundwater from a landfill is unusual, the Health Department included Coliform bacteria testing as part of the sampling program. These tests are due to the known health effects of bacterial contamination in drinking water.

The Health Department requires the landfill operator to maintain an on-site groundwater monitoring program. This on-site monitoring program has been in effect since 1999 and every 3 months the landfill samples and tests nine wells around the perimeter of the landfill property. All groundwater monitoring data from these wells is available from the Health Department.

FALL 2020 SAMPLING EVENT

The Fall 2020 event collected water samples at 60 properties between October 5-15, 2020. Spectra Laboratories performed bacteriological analyses, and OnSite Environmental Inc. performed organic and inorganic chemical analyses. Fall 2020 participants received detailed water quality test results in November 2020. No landfill-related impacts to groundwater quality were identified from the water quality test results.

A complete list of water quality test results is in **Table 1**.

The Fall 2020 sampling event tested VOC water samples from 36 residential wells. Analytical results showed VOCs in the water samples from 3 wells. Of the 68 different VOCs included, the tests found CFC-12, carbon disulfide, and styrene in the three separate wells. Health Department staff retested the VOCs at these three wells, and the results showed no carbon disulfide and no styrene. The third

well still showed trace amounts of CFC-12. CFC-12 has low toxicity and the levels detected are trace amounts and not considered unhealthy. The Health Department recommends testing this well again next year for VOCs and reevaluation for future yearly VOC testing.

Arsenic testing results showed that one well was slightly above the 0.01 parts per million Maximum Contaminant Limit (MCL). Historical data shows arsenic in past sampling events, however, this is higher than previous levels for this well. Health Department staff will recommend that the owners have the well tested next year. Arsenic in drinking water information was provided to the well owner.

The remaining Fall 2020 water quality test results are consistent with water quality test results from previous sampling events. The results show groundwater near the landfill is still typical of groundwater chemistry in Pierce County. Iron and manganese levels are consistently above the secondary standards set by the Washington State Department of Health. Elevated iron and manganese levels are typical of groundwater conditions throughout much of Pierce County due to the underlying geology.

The Washington State Department of Health considers iron and manganese a “secondary contaminant.” Secondary contaminants pose aesthetic problems rather than health concerns. High levels of iron and manganese can give water a metallic taste, cause odors, and can cause brown or black staining of porcelain fixtures exposed to the water.

Tables 1 and 2 show the water quality sample results. Results that exceed the state water quality standards are shown in bold. For quality control purposes, duplicate samples were taken at four locations. **Tables 3 and 4** show the results of the quality control samples.

BACTERIA

During this sampling event, 16 of the 60 wells tested had bacteria present in their well water (bacteria in the water is shown as an “unsatisfactory” test result and indicated as a “U” on Table 1). One well has e coli.

CONTACTS

For questions about this report or the sample results, please contact the Health Department’s Drinking Water Program.

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TABLE 1: Fall 2020 Water Quality Result

Chemical or Analyte*----->

		Dissolved Metals											Total Metals		General Chemistry								
Site	Sample Date	Arsenic	Barium	Calcium	Copper	Iron	Magnesium	Manganese	Potassium	Sodium	Vanadium	Zinc	Iron	Manganese	Ammonia	Chloride	Nitrate	Nitrite	Sulfate	Total Dissolved Solids	Conductivity	Bacteria	pH
MCL		0.01	2		1.3								0.3	0.05		250	10	1	250	500	700		
SR0117337	10/6/2020	0.0038	ND	25	ND	ND	11.0	0.180	3.0	12.0	ND	ND	0.720	0.180	0.059	2.8	ND	ND	ND	77	228.0	S	7.80
SR0117338	10/15/2020	ND	ND	11	ND	ND	10.0	0.011	1.7	6.9	ND	ND	0.510	0.021	ND	2.2	0.490	ND	ND	100	161.3	S	7.70
SR0117339	10/8/2020	0.0040	ND	24	ND	ND	7.6	0.120	2.8	11.0	ND	ND	0.440	0.130	0.073	2.9	ND	ND	ND	140	218.0	S	7.65
SR0117362	10/7/2020	ND	ND	12	ND	ND	6.5	ND	1.5	8.6	ND	ND	ND	ND	ND	3.0	0.810	ND	ND	49	132.3	S	6.90
SR0117443	10/15/2020	ND	ND	14	ND	0.260	9.8	0.110	2.8	16.0	ND	ND	1.600	0.110	ND	2.1	ND	ND	ND	120	212.4	U	7.96
SR0117447	10/7/2020	ND	ND	13	0.038	ND	8.6	ND	2.0	8.6	ND	ND	ND	ND	ND	2.6	1.500	ND	ND	89	151.0	S	6.90
SR0117449	10/8/2020	ND	ND	19	ND	ND	7.8	0.150	ND	13.0	ND	ND	0.330	0.150	ND	2.3	ND	ND	ND	110	199.0	S	7.33
SR0117450	10/14/2020	0.0033	ND	24	ND	ND	7.1	0.091	2.5	12.0	ND	0.027	0.083	0.086	ND	2.3	ND	ND	ND	140	210.9	U	8.00
SR0117451	10/15/2020	ND	ND	ND	ND	0.071	ND	ND	ND	71.0	ND	ND	0.130	ND	ND	2.9	ND	ND	13.0	200	307.0	U	7.75
SR0117456	10/7/2020	ND	ND	ND	ND	ND	ND	ND	1.2	150.0	ND	ND	0.073	ND	ND	110.0	ND	ND	15.0	350	599.0	S	7.90
SR0117459	10/6/2020	ND	ND	16	ND	0.330	7.8	0.180	1.5	13.0	ND	ND	0.460	0.180	ND	2.2	ND	ND	ND	130	177.7	S	7.52
SR0117460	10/7/2020	0.0110	ND	23	ND	0.090	8.9	1.800	2.5	17.0	ND	ND	3.200	1.900	0.690	2.9	ND	ND	ND	140	267.0	S	7.28
SR0117478	10/8/2020	ND	ND	15	ND	0.094	7.5	0.190	1.3	12.0	ND	ND	0.710	0.190	ND	2.5	ND	ND	ND	110	181.0	S	7.40
SR0117479	10/8/2020	ND	ND	14	ND	0.450	7.2	0.160	ND	9.8	ND	ND	0.870	0.160	ND	2.6	ND	ND	ND	95	160.8	S	7.90
SR0117480	10/5/2020	ND	ND	18	ND	0.280	10.0	0.550	ND	17.0	ND	ND	0.860	0.550	ND	3.7	ND	ND	ND	130	234.0	S	7.58
SR0120518	10/15/2020	0.0034	ND	ND	ND	ND	ND	ND	ND	48.0	ND	ND	ND	ND	ND	ND	ND	ND	ND	140	195.1	S	8.00
SR0120525	10/14/2020	ND	ND	15	ND	0.200	6.3	0.066	1.5	14.0	ND	ND	0.300	0.066	ND	ND	ND	ND	ND	120	180.7	U	8.49
SR0120529	10/7/2020	ND	ND	15	ND	0.660	7.3	0.170	1.1	10.0	ND	0.030	0.790	0.160	ND	2.3	ND	ND	ND	110	167.1	S	7.46
SR0120540	10/14/2020	0.0035	ND	33	0.049	ND	11.0	0.062	3.1	16.0	ND	ND	ND	0.062	0.053	42.0	ND	ND	ND	200	330.0	S	7.69
SR0120549	10/8/2020	ND	ND	16	ND	0.130	7.5	0.150	ND	12.0	ND	0.035	0.520	0.150	0.065	2.5	ND	ND	ND	110	181.0	S	7.70
SR0120557	10/6/2020	ND	ND	ND	ND	ND	ND	ND	ND	47.0	ND	ND	ND	ND	ND	2.3	ND	ND	ND	130	177.8	U	8.50
SR0120559	10/6/2020	0.0040	ND	18	ND	1.700	6.4	0.110	ND	14.0	ND	ND	0.420	0.110	ND	2.3	ND	ND	ND	120	182.8	U	7.70
SR0120560	10/5/2020	0.0041	ND	26	ND	ND	9.1	1.300	1.9	16.0	ND	0.042	ND	1.300	0.740	2.9	ND	ND	ND	140	256.0	S	7.84
SR0120561	10/5/2020	ND	ND	22	ND	ND	9.4	0.550	1.6	17.0	ND	ND	0.530	0.550	0.310	4.5	ND	ND	ND	140	237.0	S	7.00
SR0120564	10/6/2020	ND	ND	29	ND	ND	12.0	ND	5.4	13.0	ND	0.029	ND	ND	ND	18.0	7.300	ND	20.0	170	300.0	S	Not Tested
SR0120566	10/15/2020	ND	ND	13	ND	0.140	7.7	0.160	ND	8.8	ND	0.048	0.390	0.160	ND	ND	ND	ND	ND	92	155.2	S	8.30
SR0120631	10/6/2020	ND	ND	19	ND	ND	8.1	0.100	1.7	19.0	ND	ND	0.240	0.100	ND	2.5	ND	ND	ND	140	219.0	S	7.93
SR0120633	10/6/2020	ND	ND	17	ND	ND	6.1	0.160	1.2	14.0	ND	ND	0.200	0.170	ND	2.3	ND	ND	ND	120	178.1	S	Not Tested
SR0120634	10/7/2020	ND	ND	11	ND	0.150	6.6	ND	1.6	8.7	ND	ND	0.280	ND	ND	2.3	0.065	ND	ND	120	146.0	S	7.96
SR0120637	10/6/2020	0.0030	ND	29	ND	ND	17.0	0.160	2.7	9.8	ND	ND	0.200	0.220	ND	12.0	ND	ND	10.0	190	286.0	S	7.70
SR0120639	10/14/2020	0.0047	ND	23	ND	ND	11.0	0.570	2.5	9.4	ND	ND	0.560	0.610	0.440	2.5	ND	ND	ND	120	248.0	S	8.40
SR0120644	10/15/2020	0.0057	ND	25	ND	ND	14.0	0.160	3.6	8.5	ND	ND	ND	0.160	ND	7.0	ND	ND	9.7	170	266.0	S	7.80
SR0120645	10/8/2020	ND	ND	17	ND	ND	7.0	0.210	1.2	13.0	ND	ND	0.110	0.210	0.057	2.5	ND	ND	ND	100	191.0	S	7.29
SR0120646	10/5/2020	0.0044	ND	19	ND	ND	7.5	0.240	2.2	11.0	ND	ND	0.280	0.260	0.093	4.5	ND	ND	ND	110	199.5	U	7.34
SR0120742	10/6/2020	ND	ND	17	ND	0.089	6.1	0.140	ND	7.7	ND	ND	0.110	0.130	ND	2.2	ND	ND	ND	110	150.9	S	7.60
SR0120928	10/6/2020	ND	ND	ND	ND	ND	ND	ND	ND	62.0	ND	ND	ND	ND	ND	2.6	ND	ND	ND	130	229.0	S	8.00
SR0126566	10/5/2020	ND	ND	17	ND	ND	6.6	0.360	1.4	13.0	ND	ND	0.240	0.390	ND	2.1	ND	ND	ND	92	182.5	S	7.18
SR0126801	10/15/2020	0.0047	ND	31	ND	ND	22.0	0.012	3.6	9.0	ND	ND	ND	0.022	ND	7.9	ND	ND	14.0	230	337.0	U	8.01
SR0126807	10/15/2020	ND	ND	13	ND	0.059	9.2	ND	1.6	8.6	ND	ND	0.071	0.011	ND	3.4	0.540	ND	8.3	100	173.8	S	7.20
SR0126809	10/8/2020	0.0043	ND	17	ND	ND	6.4	0.071	ND	9.1	ND	ND	0.160	0.078	ND	2.2	ND	ND	ND	110	181.6	S	8.10
SR0133428	10/5/2020	ND	ND	17	ND	0.081	6.8	0.140	ND	11.0	ND	ND	6.800	0.180	ND	2.2	ND	ND	ND	96	170.4	U	7.55
SR0133429	10/15/2020	ND	ND	13	ND	0.630	6.9	0.120	ND	9.5	ND	ND	1.500	0.120	ND	ND	ND	ND	ND	87	165.5	S	8.47
SR0133430	10/14/2020	ND	ND	17	ND	0.120	7.1	0.130	ND	10.0	ND	ND	0.700	0.150	ND	ND	ND	ND	ND	100	176.0	S	8.22
SR0133431	10/8/2020	ND	ND	14	ND	0.700	7.7	0.066	1.2	17.0	ND	ND	1.300	0.065	ND	2.6	ND	ND	ND	99	195.7	U	7.90
SR0142928	10/8/2020	ND	ND	12	ND	0.510	8.5	0.090	1.8	8.3	ND	ND	1.400	0.093	ND	2.4	ND	ND	ND	130	155.1	U	7.50
SR0154486	10/14/2020	ND	ND	13	ND	ND	5.7	0.220	ND	6.7	ND	ND	0.130	0.230	ND	ND	ND	ND	ND	93	137.3	U	7.81
SR0169553	10/8/2020	0.0038	ND	18	ND	ND	7.9	0.190	1.7	13.0	ND	0.038	ND	0.180	ND	3.8	ND	ND	ND	130	210.1	S	8.00
SR0169703	10/14/2020	0.0093	ND	24	ND	0.140	8.8	0.720	2.1	14.0	ND	ND	1.800	0.760	1.000	3.3	ND	ND	ND	170	247.0	U	8.14
SR0169704	10/7/2020	0.0035	ND	19	ND	0.140	8.0	0.110	ND	13.0	ND	ND	0.430	0.110	ND	ND	ND	ND	ND	100	192.9	S	7.22
SR0170781	10/6/2020	0.0081	ND	ND	0.018	ND	ND	ND	ND	88.0	ND	ND	ND	ND	0.300	9.8	ND	ND	ND	250	342.0	S	8.00

TABLE 1: Fall 2020 Water Quality Result
Chemical or Analyte*----->

		Dissolved Metals											Total Metals		General Chemistry									
Site	Sample Date	Arsenic	Barium	Calcium	Copper	Iron	Magnesium	Manganese	Potassium	Sodium	Vanadium	Zinc	Iron	Manganese	Ammonia	Chloride	Nitrate	Nitrite	Sulfate	Total Dissolved Solids	Conductivity	Bacteria	pH	
MCL		0.01	2		1.3								0.3	0.05		250	10	1	250	500	700			
SR0173998	10/5/2020	ND	ND	12	0.017	ND	11.0	ND	1.5	7.7	0.011	ND	ND	ND	ND	3.2	1.900	ND	ND	120	165.4	U	6.65	
SR0185993	10/7/2020	ND	ND	17	ND	0.180	7.9	0.130	1.2	11.0	ND	ND	0.590	0.120	ND	2.2	ND	ND	ND	56	170.6	S	7.45	
SR0192658	10/5/2020	0.0040	ND	ND	ND	0.067	ND	ND	ND	54.0	ND	ND	0.087	ND	ND	7.5	ND	ND	ND	130	233.0	S	8.19	
SR0198408	10/14/2020	ND	ND	21	ND	0.400	9.8	0.680	1.2	15.0	ND	ND	1.500	0.700	ND	ND	ND	ND	ND	160	240.0	S	8.22	
SR0217737	10/8/2020	ND	ND	ND	ND	ND	ND	ND	ND	43.0	ND	ND	0.150	ND	ND	2.3	ND	ND	ND	130	164.0	U	8.29	
SR0217738	10/15/2020	ND	ND	17	ND	0.390	10.0	0.550	ND	18.0	ND	ND	1.000	0.550	0.120	ND	ND	ND	ND	130	220.0	S	7.87	
SR0244897	10/6/2020	ND	ND	ND	ND	ND	ND	ND	ND	44.0	ND	ND	ND	ND	ND	2.5	ND	ND	ND	130	168.9	U	8.10	
SR0254903	10/7/2020	ND	ND	16	ND	ND	11.0	ND	2.2	9.0	ND	ND	ND	ND	ND	3.1	1.300	ND	ND	110	198.8	E	7.80	
SR0254904	10/7/2020	0.0050	ND	26	ND	ND	12.0	0.160	3.6	12.0	ND	ND	0.490	0.160	0.070	2.6	ND	ND	ND	140	254.0	S	7.90	
SR0254905	10/7/2020	ND	ND	16	ND	0.250	9.7	0.460	1.3	19.0	ND	0.130	2.500	0.450	ND	2.7	ND	ND	ND	100	207.4	S	7.90	

Units of measurement = Parts Per Million (mg/L), except for bacteria, conductivity, and pH
ND = Not detected at the specified laboratory detection limit
U = Unsatisfactory (bacteria are present in the sample)
S = Satisfactory
E = E. coli present
MCL = Maximum Contamination Level
Please refer to the “Water Quality and Abbreviation and Notes” page for information about the terms used on this table.

TABLE 2: Fall 2020 Water Quality Result VOC Results

[illegible]

TABLE 2: Fall 2020 Water Quality Result VOC Results

	MCL	SR0133431	SR0142928	SR0154486	SR0169553	SR0169703	SR0169704	SR0185993	SR0198408	SR0217737	SR0217738	SR0254903	SR0254904	SR0254905
1,1,1,2-Tetrachloroethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.2	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.6	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	4	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinylether	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	0.3	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CFC-11	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
CFC-12	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylene dibromide	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
m, p-Xylene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Iodide	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl Isobutyl Ketone	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl t-Butyl Ether	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
o-Xylene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,3-Dichloropropene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.02	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

Units of measurement = Parts per Billion (ug/L)
ND = Not detected at the specified laboratory detection limit
MCL = Maximum Contamination Level

TABLE 3: Fall 2020 Water Quality Duplicate Results

Chemical or Analyte*----->

		Dissolved Metals											Total Metals		General Chemistry					
Site	Sample Date	Arsenic	Barium	Calcium	Copper	Iron	Magnesium	Manganese	Potassium	Sodium	Vanadium	Zinc	Iron	Manganese	Ammonia	Chloride	Nitrate	Nitrite	Sulfate	Total Dissolved Solids
MCL		0.1	2		1.3							5	0.3	0.05		250	10	1	250	500
SR0117460	10/7/2020	0.0110	ND	22	ND	0.088	8.8	1.80	2.5	17	ND	ND	3.30	1.90	0.76	2.9	ND	ND	ND	140
SR0117478	10/8/2020	ND	ND	15	ND	0.140	7.4	0.19	1.4	12	ND	ND	0.60	0.18	ND	2.6	ND	ND	ND	110
SR0120561	10/5/2020	ND	ND	22	ND	0.130	9.4	0.54	1.6	17	ND	ND	0.47	0.56	0.31	4.8	ND	ND	ND	110
SR0133430	10/14/2020	ND	ND	17	ND	0.099	7.1	0.13	ND	10	ND	ND	0.66	0.16	ND	ND	ND	ND	ND	120
SR0170781	10/6/2020	0.0089	ND	ND	0.016	ND	ND	ND	ND	88	ND	ND	ND	ND	0.30	9.9	ND	ND	ND	230
SR0217738	10/15/2020	ND	ND	17	ND	0.710	10.0	0.55	ND	18	ND	ND	0.90	0.54	0.12	ND	ND	ND	ND	140

Units of measurement = Parts Per Million (mg/L)

ND = Not detected at the specified laboratory detection limit

MCL = Maximum Contamination Level

MCL exceedances for Iron and Manganese do not pose a health risk.

Please refer to the “Water Quality and Abbreviation and Notes” page for information about the terms used on this table

TABLE 4: Fall 2020 Water Quality VOC Duplicate Results

	MCL	SR0117460	SR0117478	SR0133430	SR0217738
1,1,1,2-Tetrachloroethane	---	ND	ND	ND	ND
1,1,1-Trichloroethane	0.2	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	---	ND	ND	ND	ND
1,1,2-Trichloroethane	---	ND	ND	ND	ND
1,1-Dichloroethane	1	ND	ND	ND	ND
1,1-Dichloroethene	---	ND	ND	ND	ND
1,1-Dichloropropene	---	ND	ND	ND	ND
1,2,3-Trichlorobenzene	---	ND	ND	ND	ND
1,2,3-Trichloropropane	---	ND	ND	ND	ND
1,2,4-Trichlorobenzene	---	ND	ND	ND	ND
1,2,4-Trimethylbenzene	---	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	---	ND	ND	ND	ND
1,2-Dichlorobenzene	---	ND	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	ND	ND
1,2-Dichloropropane	0.6	ND	ND	ND	ND
1,3,5-Trimethylbenzene	---	ND	ND	ND	ND
1,3-Dichlorobenzene	---	ND	ND	ND	ND
1,3-Dichloropropane	---	ND	ND	ND	ND
1,4-Dichlorobenzene	4	ND	ND	ND	ND
2,2-Dichloropropane	---	ND	ND	ND	ND
2-Butanone	---	ND	ND	ND	ND
2-Chloroethylvinylether	---	ND	ND	ND	ND
2-Chlorotoluene	---	ND	ND	ND	ND
2-Hexanone	---	ND	ND	ND	ND
4-Chlorotoluene	---	ND	ND	ND	ND
Acetone	---	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND
Bromobenzene	---	ND	ND	ND	ND
Bromochloromethane	0.3	ND	ND	ND	ND
Bromoform	5	ND	ND	ND	ND
Bromomethane	---	ND	ND	ND	ND
Carbon Disulfide	---	ND	ND	ND	ND
Carbon Tetrachloride	0.3	ND	ND	ND	ND
CFC-11	---	ND	ND	ND	ND
CFC-12	---	ND	ND	ND	ND
Chlorobenzene	---	ND	ND	ND	ND
Chloroethane	---	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND
Chloromethane	---	ND	ND	ND	ND
Cis-1,2-Dichloroethene	---	ND	ND	ND	ND
Cis-1,3-Dichloropropene	---	ND	ND	ND	ND
Dibromochloromethane	---	ND	ND	ND	ND
Dibromomethane	---	ND	ND	ND	ND
Dichlorobromomethane	---	ND	ND	ND	ND
Ethylbenzene	---	ND	ND	ND	ND
Ethylene dibromide	---	ND	ND	ND	ND
Hexachlorobutadiene	---	ND	ND	ND	ND
Isopropylbenzene	---	ND	ND	ND	ND
m, p-Xylene	---	ND	ND	ND	ND
Methyl Iodide	---	ND	ND	ND	ND
Methyl Isobutyl Ketone	---	ND	ND	ND	ND
Methyl t-Butyl Ether	---	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND
Naphthalene	---	ND	ND	ND	ND
n-Butylbenzene	---	ND	ND	ND	ND
n-Propylbenzene	---	ND	ND	ND	ND
o-Xylene	---	ND	ND	ND	ND
p-Isopropyltoluene	---	ND	ND	ND	ND
sec-Butylbenzene	---	ND	ND	ND	ND
Styrene	---	ND	ND	ND	ND
tert-Butylbenzene	---	ND	ND	ND	ND
Tetrachloroethene	---	ND	ND	ND	ND
Toluene	---	ND	ND	ND	ND
Trans-1,2-Dichloroethene	---	ND	ND	ND	ND
Trans-1,3-Dichloropropene	---	ND	ND	ND	ND
Trichloroethene	---	ND	ND	ND	ND
Vinyl Acetate	---	ND	ND	ND	ND
Vinyl Chloride	0.02	ND	ND	ND	ND

Units of measurement = Parts per Billion (ug/L)
ND = Not detected at the specified laboratory detection limit
MCL = Maximum Contamination Level

TABLE 5: Fall 2020 Water Quality VOC Resample Results

	MCL	SR0117451	SR0117451 - R	SR0120529	SR0120529 - R	SR0133429	SR0133429 - R	SR0133429 - RD
1,1,1,2-Tetrachloroethane	---	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	0.2	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	---	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	---	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	1	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	---	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	---	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	---	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	---	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	---	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	0.5	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	0.6	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	---	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	---	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	---	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	4	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	---	ND	ND	ND	ND	ND	ND	ND
2-Butanone	---	ND	ND	ND	ND	ND	ND	ND
2-Chloroethylvinylether	---	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	---	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	---	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	---	ND	ND	ND	ND	ND	ND	ND
Acetone	---	ND	ND	ND	ND	ND	ND	ND
Benzene	1	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	---	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	0.3	ND	ND	ND	ND	ND	ND	ND
Bromoform	5	ND	ND	ND	ND	ND	ND	ND
Bromomethane	---	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	---	ND	ND	0.23	ND	ND	ND	ND
Carbon Tetrachloride	0.3	ND	ND	ND	ND	ND	ND	ND
CFC-11	---	ND	ND	ND	ND	ND	ND	ND
CFC-12	---	ND	ND	ND	ND	1.7	1.2	1.1
Chlorobenzene	---	ND	ND	ND	ND	ND	ND	ND
Chloroethane	---	ND	ND	ND	ND	ND	ND	ND
Chloroform	7	ND	ND	ND	ND	ND	ND	ND
Chloromethane	---	ND	ND	ND	ND	ND	ND	ND
Cis-1,2-Dichloroethene	---	ND	ND	ND	ND	ND	ND	ND
Cis-1,3-Dichloropropene	---	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	---	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	---	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	---	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	---	ND	ND	ND	ND	ND	ND	ND
Ethylene dibromide	---	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	---	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	---	ND	ND	ND	ND	ND	ND	ND
m, p-Xylene	---	ND	ND	ND	ND	ND	ND	ND
Methyl Iodide	---	ND	ND	ND	ND	ND	ND	ND
Methyl Isobutyl Ketone	---	ND	ND	ND	ND	ND	ND	ND
Methyl t-Butyl Ether	---	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	5	ND	ND	ND	ND	ND	ND	ND
Naphthalene	---	ND	ND	ND	ND	ND	ND	ND
n-Butylbenzene	---	ND	ND	ND	ND	ND	ND	ND
n-Propylbenzene	---	ND	ND	ND	ND	ND	ND	ND
o-Xylene	---	ND	ND	ND	ND	ND	ND	ND
p-Isopropyltoluene	---	ND	ND	ND	ND	ND	ND	ND
sec-Butylbenzene	---	ND	ND	ND	ND	ND	ND	ND
Styrene	---	0.2	ND	ND	ND	ND	ND	ND
tert-Butylbenzene	---	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	---	ND	ND	ND	ND	ND	ND	ND
Toluene	---	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethene	---	ND	ND	ND	ND	ND	ND	ND
Trans-1,3-Dichloropropene	---	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	---	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	---	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.02	ND	ND	ND	ND	ND	ND	ND

Units of measurement = Parts per Billion (ug/L)
ND = Not detected at the specified laboratory detection limit
MCL = Maximum Contamination Level

R – Resample
RD – Resample Duplicate

Water Quality Abbreviations and Notes:

Analyte: The chemical or metal tested for in the water sample.

Result: The level of the chemical or mineral detected by the laboratory in this water sample.

ND: Non-Detect, the chemical or metal was not detected in this water sample.

Unit: The unit of measure reported by the laboratory.

mg/l: milligrams per liter, or 1 part per million.

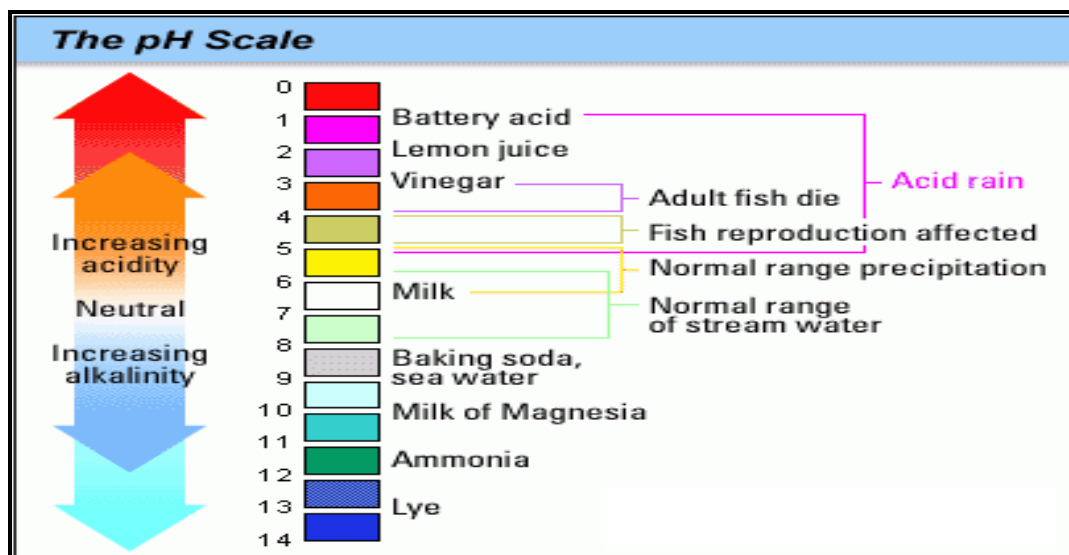
MCL: "Maximum Contaminant Level". The water quality standard established by state or federal regulation.

#/100ml: The number of bacteria colonies detected in 100 milliliters of water.

Note: An MCL of "0.00" means that there should be no bacteria detected in the water sample.

uS/cm: microSiemens per centimeter, a measurement of the ability of the water to conduct an electrical charge (sometimes reported as microMhos). Used to help determine the presence of some chemical ions.

pH: A numerical measure of the level of acidity or alkalinity of the water. See the table below.



ppb: Parts per billion often expressed as micrograms per liter (ug/L)

Unit: The unit of measure reported by the laboratory.

#/100ml: Unit of measure for *Bacteria* test, the number of bacteria colonies detected in 100 milliliters of water. Note: An MCL of "0/100" means that there should be zero bacteria detected in the 100-milliliter water sample.

(---): The Environmental Protection Agency and/or the Centers for Disease Control and Prevention have not established a health-risk based maximum contaminant level (MCL) for this chemical, metal, or property.

APPENDIX A

Sampling for Volatile Organic Compounds

In 2007, several program participants and members of the Graham Land Use Advisory Commission asked why ‘volatile organic compounds’ (VOCs) had not been included in the original LRI Landfill residential drinking water sampling program. They asked to have the sampling program modified to include testing for these volatile organic compounds. Because of the request and inquiries, the sampling program changed to include 68 VOCs for analysis.

The program modification included a provision to test each participating well every five-year period for VOCs. This modification began during the Fall 2007 sampling event with the testing of nine residential wells for VOCs.

Where do VOCs come from?

Common artificial sources of VOCs are many and varied, but can include paint thinners, dry cleaning solvents, and some constituents of petroleum-based fuels (e.g., gasoline and natural gas). Landfills, through the anaerobic digestion of waste generate methane gas, which is also considered a VOC.