

Fall 2021 Summary Report

Residential Drinking Water Well Sampling

LRI Landfill

December 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 2021.

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 2021 SAMPLING EVENT

The Fall 2021 event collected water samples at 43 properties between September 27-30, 2021. Spectra Laboratories performed bacteriological analyses, and OnSite Environmental Inc. performed organic and inorganic chemical analyses. Fall 2021 participants received detailed water quality test results in November 2021. 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 2021 sampling event tested VOC water samples from 23 residential wells. 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 2021 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, 8 of the 43 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).

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 2021 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	9/27/2021	0.004	0.025	19	0.01	0.056	9.6	0.16	2.2	9.7	0.01	0.025	0.98	0.21	0.064	2.5	0.05	0.02	5	130	250	S	7.7	
SR0117339	9/30/2021	0.004	ND	26	ND	ND	7.4	0.12	2.3	11	ND	ND	0.28	0.12	0.066	ND	ND	ND	ND	120	250	S	7.8	
SR0117445	9/27/2021	0.003	0.025	12	0.01	0.056	7	0.011	1.2	7.3	0.01	0.025	0.05	0.01	0.05	2.6	1.2	0.02	5	100	160	S	7.2	
SR0117447	9/28/2021	ND	ND	12	0.041	ND	9.4	ND	1.5	7.8	ND	ND	ND	ND	ND	3.8	1.6	ND	ND	130	180	S	6.8	
SR0117449	9/29/2021	ND	ND	20	ND	0.17	7.6	0.14	ND	13	ND	ND	0.54	0.16	ND	2.3	ND	ND	ND	110	220	S	7.8	
SR0117451	9/30/2021	ND	ND	26	ND	ND	17	0.77	1.3	19	ND	ND	ND	0.73	0.083	3.4	ND	ND	23	200	360	S	6.8	
SR0117456	9/28/2021	0.003	ND	51	ND	ND	43	0.82	3	11	ND	ND	0.66	0.84	0.076	130	ND	ND	18	380	740	U	7.5	
SR0117459	9/28/2021	ND	ND	15	ND	0.2	8	0.17	ND	12	ND	ND	0.48	0.17	ND	5.3	ND	ND	ND	110	200	S	7.5	
SR0117478	9/29/2021	ND	ND	16	ND	0.24	7.3	0.18	ND	12	ND	ND	0.6	0.19	ND	2.5	ND	ND	ND	88	200	S	7.6	
SR0117479	9/29/2021	ND	ND	15	ND	0.63	7.1	0.16	ND	10	ND	ND	0.88	0.16	ND	3.2	ND	ND	ND	110	180	S	7.7	
SR0117480	9/29/2021	ND	ND	18	ND	0.62	9.8	0.62	ND	19	ND	ND	0.72	0.65	ND	3.6	ND	ND	ND	150	250	S	7.3	
SR0120529	9/30/2021	ND	ND	15	ND	ND	7.3	0.16	ND	9.1	ND	ND	0.85	0.17	ND	ND	ND	ND	ND	110	180	S	7.6	
SR0120540	9/29/2021	0.004	ND	29	ND	ND	10	0.066	2.7	17	ND	ND	0.21	0.17	ND	27	ND	ND	5.2	170	330	S	7.4	
SR0120559	9/27/2021	0.005	0.025	17	0.01	0.056	6.8	0.1	1.1	13	0.01	0.025	0.52	0.12	0.053	2.3	0.05	0.02	5	92	200	S	7.8	
SR0120560	9/27/2021	0.004	0.025	21	0.01	0.056	9.6	1.1	1.1	17	0.01	0.094	0.05	1.3	0.34	3.1	0.05	0.02	5	140	260	U	7.3	
SR0120561	9/28/2021	0.003	ND	21	ND	0.22	9.7	0.54	1.2	18	ND	ND	0.58	0.55	0.36	7.2	ND	ND	ND	140	270	S	7.3	
SR0120564	9/27/2021	0.003	0.025	27	0.01	0.056	13	0.011	4.6	12	0.01	0.025	0.05	0.01	0.05	18	6.9	0.02	24	170	350	S	6.6	
SR0120566	9/29/2021	ND	ND	14	ND	ND	6.9	0.15	ND	9.5	ND	0.032	0.47	0.16	ND	2.9	ND	ND	ND	93	170	S	7.7	
SR0120633	9/29/2021	ND	ND	16	ND	ND	6	0.15	ND	12	ND	ND	0.3	0.16	0.054	2.6	ND	ND	ND	120	190	S	7.8	
SR0120634	9/30/2021	ND	ND	11	ND	0.16	6.9	ND	1.1	8.1	ND	ND	0.3	ND	ND	ND	ND	ND	ND	95	150	S	7.2	
SR0120637	9/29/2021	ND	ND	26	ND	ND	15	0.18	1.7	8.6	ND	ND	0.16	0.19	ND	10	ND	ND	9.8	150	300	S	7.6	
SR0120644	9/30/2021	0.006	ND	27	ND	ND	13	0.16	2.8	8.9	ND	ND	0.18	0.16	0.064	7.9	ND	ND	9.4	160	290	U	7.8	
SR0120645	9/27/2021	0.003	0.025	17	0.01	0.056	7	0.2	1.1	12	0.01	0.025	0.13	0.24	0.05	2.3	0.05	0.02	5	110	200	S	8	
SR0120647	9/30/2021	ND	ND	17	ND	0.12	7.3	0.19	ND	12	ND	0.032	0.28	0.18	ND	2.8	ND	ND	ND	96	200	U	7.7	
SR0120939	9/28/2021	ND	ND	13	ND	0.22	6.9	0.19	1.1	8.7	ND	ND	0.5	0.2	0.076	2.9	ND	ND	ND	100	170	S	7.7	
SR0121035	9/27/2021	0.007	0.025	15	0.01	0.29	7.9	0.32	1.6	14	0.01	0.025	0.57	0.36	0.17	3	0.05	0.02	5	110	210	S	7.4	
SR0126794	9/27/2021	0.007	0.025	24	0.01	0.056	9.5	0.67	1.5	14	0.01	0.048	2.2	0.83	0.32	3.2	0.12	0.02	5	150	260	S	7.3	
SR0126801	9/27/2021	0.005	0.025	27	0.01	0.056	20	0.011	2.9	8.1	0.01	0.025	0.093	0.72	0.05	12	0.05	0.02	15	200	380	U	7.7	
SR0126807	9/27/2021	0.003	0.025	13	0.01	0.056	8.7	0.018	1.3	8.1	0.01	0.027	0.28	0.3	0.05	3.9	0.56	0.02	7.6	91	180	U	7	
SR0126808	9/28/2021	ND	ND	12	0.018	ND	14	ND	1.3	8.6	0.01	ND	ND	ND	ND	8	4.6	ND	ND	160	230	U	7	
SR0126809	9/29/2021	0.004	ND	17	ND	ND	6.2	0.11	ND	9.2	ND	ND	0.15	0.11	ND	3	ND	ND	ND	100	180	S	7.9	
SR0133428	9/28/2021	ND	ND	16	ND	0.063	6.9	0.14	ND	11	ND	ND	0.18	0.14	ND	2.8	ND	ND	ND	130	190	S	7.7	
SR0138417	9/29/2021	ND	ND	17	ND	0.089	6.7	0.14	ND	13	ND	ND	0.49	0.14	ND	2.9	ND	ND	ND	110	200	S	7.7	
SR0154486	9/30/2021	0.003	ND	13	ND	0.057	5.9	0.24	ND	8.2	ND	ND	0.13	0.24	ND	ND	ND	ND	ND	72	150	S	7.8	
SR0169553	9/29/2021	0.006	ND	22	ND	0.087	8.5	0.15	1.7	13	ND	ND	0.75	0.15	0.11	5.2	ND	ND	ND	140	240	S	7.8	
SR0170781	9/30/2021	0.01	ND	31	ND	ND	15	0.72	2.9	14	ND	ND	2.2	0.74	0.83	4.5	ND	ND	ND	190	350	S	7.3	
SR0192658	9/30/2021	0.005	ND	ND	ND	ND	ND	ND	ND	52	ND	ND	ND	ND	ND	6.3	ND	ND	ND	130	240	S	8.3	
SR0192724	9/28/2021	ND	ND	15	ND	0.96	8.1	0.29	ND	16	ND	ND	1.8	0.28	ND	3	ND	ND	ND	130	210	S	7.3	
SR0198408	9/28/2021	ND	ND	19	ND	0.57	10	0.7	ND	16	ND	ND	1.6	0.72	ND	2.5	ND	ND	ND	140	250	S	7.4	
SR0217737	9/30/2021	ND	ND	ND	ND	ND	ND	ND	ND	42	ND	ND	ND	ND	ND	ND	ND	ND	ND	100	190	U	7.7	

TABLE 1: Fall 2021 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			
SR0217738	9/28/2021	ND	ND	ND	0.012	ND	ND	ND	ND	61	ND	0.058	ND	ND	ND	3.2	ND	ND	ND	160	250	S	7.6	
SR0254905	9/29/2021	ND	ND	16	ND	0.91	9.5	0.42	ND	17	ND	0.11	2.5	0.44	0.053	3	ND	ND	ND	140	230	S	7.3	
SR0265662	9/30/2021	ND	ND	20	0.028	ND	9.5	ND	1.9	9.8	ND	ND	0.071	0.029	ND	2.9	ND	ND	ND	120	220	S	7.6	

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 2021 Water Quality Result VOC Results

	MCL	SR0117339	SR0117449	SR0117451	SR0117459	SR0117478	SR0117479	SR0117480	SR0120529	SR0120540	SR0120566	SR0120633	SR0120634	SR0120637	SR0120647	SR0126809	SR0133428	SR0138417	SR0154486	SR0169553	SR0170781	SR0192658	SR0217737	SR0265662
1,1,1,2-Tetrachloroethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acetone	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorobromomethane	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	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	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	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	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	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	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	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethene	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	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	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	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 2021 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	Conductivity	Bacteria	pH
MCL		0.1	2		1.3							5	0.3	0.05		250	10	1	250	500			
SR0117449	9/29/2021	ND	ND	20	ND	0.14	7.5	0.15	ND	13	ND	ND	0.32	0.16	ND	2.4	ND	ND	ND	130	220	S	7.9
SR0126807	9/27/2021	0.003	0.025	13	0.01	0.056	8.9	0.018	1.3	8.3	0.01	0.03	0.36	0.27	0.05	4	0.51	0.02	7.6	100	180	U	7
SR0154486	9/30/2021	0.003	ND	13	ND	0.082	6	0.24	ND	8.3	ND	0.04	0.088	0.23	ND	ND	ND	ND	ND	81	150	S	7.9
SR0198408	9/28/2021	ND	ND	19	ND	0.55	10	0.69	ND	16	ND	ND	1.5	0.7	ND	2.7	ND	ND	ND	120	250	S	7.3

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 2021 Water Quality VOC Duplicate Results

	MCL	SR0117449	SR0154486
1,1,1,2-Tetrachloroethane	---	ND	ND
1,1,1-Trichloroethane	0.2	ND	ND
1,1,2,2-Tetrachloroethane	---	ND	ND
1,1,2-Trichloroethane	---	ND	ND
1,1-Dichloroethane	1	ND	ND
1,1-Dichloroethene	---	ND	ND
1,1-Dichloropropene	---	ND	ND
1,2,3-Trichlorobenzene	---	ND	ND
1,2,3-Trichloropropane	---	ND	ND
1,2,4-Trichlorobenzene	---	ND	ND
1,2,4-Trimethylbenzene	---	ND	ND
1,2-Dibromo-3-chloropropane	---	ND	ND
1,2-Dichlorobenzene	---	ND	ND
1,2-Dichloroethane	0.5	ND	ND
1,2-Dichloropropane	0.6	ND	ND
1,3,5-Trimethylbenzene	---	ND	ND
1,3-Dichlorobenzene	---	ND	ND
1,3-Dichloropropane	---	ND	ND
1,4-Dichlorobenzene	4	ND	ND
2,2-Dichloropropane	---	ND	ND
2-Butanone	---	ND	ND
2-Chlorotoluene	---	ND	ND
2-Hexanone	---	ND	ND
4-Chlorotoluene	---	ND	ND
Acetone	---	ND	ND
Benzene	1	ND	ND
Bromobenzene	---	ND	ND
Bromochloromethane	0.3	ND	ND
Bromoform	5	ND	ND
Bromomethane	---	ND	ND
Carbon Disulfide	---	ND	ND
Carbon Tetrachloride	0.3	ND	ND
CFC-11	---	ND	ND
CFC-12	---	ND	ND
Chlorobenzene	---	ND	ND
Chloroethane	---	ND	ND
Chloroform	7	ND	ND
Chloromethane	---	ND	ND
Cis-1,2-Dichloroethene	---	ND	ND
Cis-1,3-Dichloropropene	---	ND	ND
Dibromochloromethane	---	ND	ND
Dibromomethane	---	ND	ND
Dichlorobromomethane	---	ND	ND
Ethylbenzene	---	ND	ND
Ethylene dibromide	---	ND	ND
Hexachlorobutadiene	---	ND	ND
Isopropylbenzene	---	ND	ND
m, p-Xylene	---	ND	ND
Methyl Iodide	---	ND	ND
Methyl Isobutyl Ketone	---	ND	ND
Methyl t-Butyl Ether	---	ND	ND
Methylene Chloride	5	ND	ND
Naphthalene	---	ND	ND
n-Butylbenzene	---	ND	ND
n-Propylbenzene	---	ND	ND
o-Xylene	---	ND	ND
p-Isopropyltoluene	---	ND	ND
sec-Butylbenzene	---	ND	ND
Styrene	---	ND	ND
tert-Butylbenzene	---	ND	ND
Tetrachloroethene	---	ND	ND
Toluene	---	ND	ND
Trans-1,2-Dichloroethene	---	ND	ND
Trans-1,3-Dichloropropene	---	ND	ND
Trichloroethene	---	ND	ND
Vinyl Acetate	---	ND	ND
Vinyl Chloride	0.02	ND	ND

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

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.

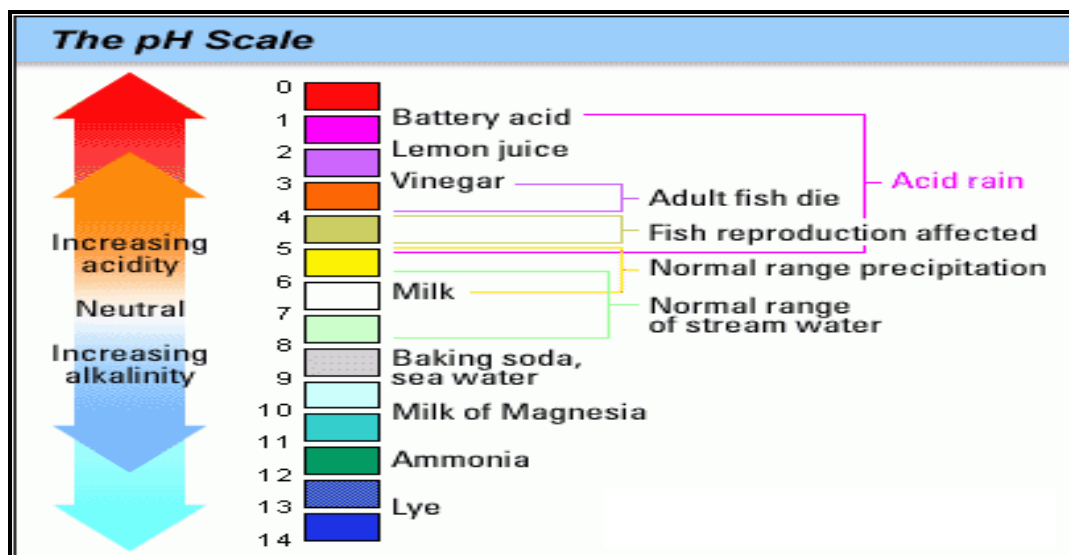
MCL: "Maximum Contaminant Level". The water quality standard established by state or federal regulation.

#/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.