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# CEDAR HILLS REGIONAL LANDFILL

## QUARTERLY ENVIRONMENTAL

## MONITORING REPORT

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Fourth Quarter 2014



Department of Natural Resources and Parks  
Solid Waste Division



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**KING COUNTY SOLID WASTE  
CEDAR HILLS REGIONAL LANDFILL  
QUARTERLY ENVIRONMENTAL MONITORING REPORT**

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## **Cedar Hills Regional Landfill Summary of Quarterly Environmental Monitoring Fourth Quarter of 2014**

This summary contains a discussion of quarterly environmental monitoring results for groundwater and surface water quality and landfill gas migration monitoring for Cedar Hills Regional Landfill.

Environmental samples were collected and analyzed in accordance with the Quality Assurance Project Plan for Environmental Monitoring at King County Solid Waste Facilities (QAPP). This document contains procedures to ensure data quality, consistency and documentation.

### **1.0           Quarterly Results and Analysis**

This Section discusses the monitoring results and how they compare to previously collected data at the site.

#### **1.1       Groundwater**

Groundwater monitoring well details and locations are presented in Table 1 and Figure 1. Monitoring activities for the third quarter are listed in Table 2.

1.11           Regional Aquifer

Regional aquifer analysis results for this quarter are consistent with past results.

For discussion and graphical presentation, monitoring wells are grouped together according to the flow path analysis for the regional aquifer, which was developed in the *Cedar Hills Regional Landfill Technical Memorandum Phase I Investigations Groundwater Monitoring Well System Enhancements*, 2007, and refined in the *Cedar Hills Regional Landfill Regional Aquifer Technical Memorandum*, 2011.

Groundwater elevations and potentiometric surfaces are within historical ranges and reflect seasonal responses to precipitation. Potentiometric Surface Map and Groundwater Flow Analysis can be found in Appendix A. Elevations measured this quarter conform to the current hydrogeologic model.

Exceedances of regulatory standards are tabulated and presented in Table 3.

Groundwater samples were analyzed for both dissolved and total metal fractions per WAC 173-351-430(2)(b)(ii) as revised. Results for metals listed in WAC 173-351-990 Appendix I were compared to water quality standards. This has resulted in more exceedances for arsenic but does not indicate a change in water quality as the dissolved concentrations remained similar. These results reflect the change in analytical procedure.

Primary Ground Water Quality Criteria were exceeded for total arsenic in upgradient and crossgradient wells MW-93, and MW-99. Primary ground Water Quality Criteria for arsenic were also exceeded in wells interior, vertical to facilities (MW-64, MW-68, MW-77 and MW-100); and in downgradient wells (MW-69, MW-80, MW-86, MW-87, MW-88, MW-89 and MW-91). Trichloroethene exceeded the groundwater criterion in upgradient wells MW-76 and MW-82; and vinyl chloride exceeded criteria in MW-65.

Secondary standards (dissolved iron and dissolved manganese) were exceeded in numerous regional wells. These results are consistent with past analyses.

The change to a comparison of Appendix I metals to standards using the total fraction leads to concentration increases as a result of dissolving particulates in the sample rather than filtering them out. This was an expected result of the methodology change.

Trilinear Diagrams (Figures 2 through 6) indicate water quality type (hydrochemical facie) based on dissolved ion distribution. The diagrams are useful to recognize spatial variability, potential analytical error or change in hydrochemical facie over time. All regional samples are within the calcium-magnesium-bicarbonate hydrochemical facie. Data are consistent with previous quarters. Ion balance calculations (Table 4) indicate no analytical error in regional aquifer samples as all samples are within 10% on the ion balance.

Intra-well prediction limits are calculated annually using data collected through the end of the previous calendar year (2013). Comparison to calculated prediction limits provides an indication of whether a change in concentration represents normal variability or a change in water quality. This quarter, *cis*-1,2-dichloroethene in upgradient MW-59, barium in upgradient MW-83, and dissolved arsenic in interior MW-68 exceeded prediction limits (Table 5). Dissolved rather than total metals have been used in this quarter's prediction evaluation because an adequate data set (8 or more samples) for total metals has not yet been collected. Adequate data will be available to perform a prediction limit evaluation for total metals after the first quarter 2015 samples have been collected.

Volatile Organic Compound (VOC) detections are presented in Table 6. Present are regularly occurring detections of chlorinated VOCs and their breakdown products from the upgradient Queen City Farms (QCF) Site, which include trichloroethene (TCE) in monitoring wells MW-76, MW-78, MW-82, MW-83, and MW-94; *cis*-1,2-dichloroethene was detected in MW-24, MW-56, MW-59 and MW-76; tetrachloroethene (PCE) in MW-76 and vinyl chloride (VC) in MW-65. These upgradient well detections are consistent with past data and indicate continuing migration from QCF.

Acetone was detected in Trip Blanks and Method Blanks as well as several groundwater samples, methylene chloride was detected in method and trip blanks. All of these detections in blanks are probable laboratory artifacts. Quality Assurance /Quality Control (QA/QC) samples (field blanks, trip blanks, and method blanks) detections appear in Table 13.

## 1.12 Perched Zones

Analysis results for the perched zones this quarter are consistent with past results.

Groundwater elevations measured during the quarter are within historical ranges. Samples were collected from nine perched wells, four in the north and west areas of the

landfill (MW-27A, MW-28, MW-29, and MW-55), four in the east perched zone (MW-30A, MW-47, MW-62 and EB-6); and MW-101 near the South Solid Waste Area. Groundwater quality data for the regularly sampled Perched Zone wells collected during the fourth quarter of 2014 are consistent with previous samples.

Exceedances of regulatory standards are tabulated and presented in Table 7. All are consistent with past analyses and known impacts.

Trilinear plots for perched zones samples are all within the calcium-magnesium-bicarbonate hydrochemical facie, as in past samples (Table 8 and Figures 7-9). Cation/Anion balances indicate no potential analytical error (greater than 10% ion imbalance) in perched zones samples.

As with the regional data, perched zone prediction limits are derived from cumulative data collected through the end of 2013 and any exceedances of these limits by current results are tabulated (Table 9). There were no prediction limits exceedances in the perched zone.

Volatile Organic Compound detections in the perched zones are presented in Table 10. All are consistent with previous analyses.

## **1.2 Surface Water**

Surface water sampling is attempted monthly at stations located along the drainage courses around the landfill. Samples were collected at 13 surface water stations having adequate flow during the quarter. Monitoring activities are listed in Table 11.

Cedar Hills Regional Landfill is covered by an Industrial Stormwater General Permit issued by the Washington State Department of Ecology. The permit defines discharge Benchmarks, applicable to all facilities and Effluent Limits, applicable specifically to landfills. These values are reproduced in Table 15. Stations SW-N4, SW-SL3 and SW-GS1 are the designated points for comparison to permit benchmarks and effluent limits. Samples were obtained from each designated compliance station monthly this quarter. Compliance sample exceedances are presented in Table 12. The Benchmark for quarterly average turbidity was exceeded at SW-GS1. The effluent limits for daily maximum and monthly average TSS were exceeded at SW-GS1.

During December landfill gas inspection, it was noted that the redirection of truck haul traffic past the North Flare Station (NFS) coincided with increased turbidity in the NW Sedimentation Pond. The recommended BMP to resolve this issue was increased sweeping along the route.

## **1.3 Landfill Gas**

A network of compliance probes are monitored for landfill gas migration around the perimeter of the landfill. Probes are monitored by the landfill gas crew monthly to monitor system performance and quarterly for compliance. No compliance probes exceeded the 5% criteria this quarter.

Detections above the regulatory limit in landfill gas probe GP-33C in September of 2011 prompted actions including: monitoring frequency increases, operational adjustments to increase LFG recovery rates, off-site structure monitoring and preparation of a response plan.

Operational review resulted in modifications to enhance extraction from unlined areas and under liner spaces that could potentially act as gas conveyance pathways.

The plan resulted in installation of 13 borings targeting the potential zone of LFG migration in the native sediments. Eight borings serve as LFG extraction wells and five as monitoring probes. The extraction wells and probes are currently monitored bimonthly. Methane detections in the fourth quarter have not exceeded 0.1% by volume in any migration monitoring probe.

Data indicate the system has been effective in controlling LFG migration to the perimeter probes with no methane detections this quarter.

Compliance Probe, On-site Buildings and supplemental Monitoring Probe results are presented in Appendix B.

## **2.0 Analytical Methods**

Groundwater quality is evaluated by comparison of analysis results to regulatory standards, geochemical analysis and statistical evaluation. Water quality analytical results for surface water runoff discharged from the landfill site are compared to the limits set in the Industrial Stormwater General Permit. Following is a brief description of each.

### **2.1 Regulatory Standards**

Groundwater monitoring results are compared to Washington State Groundwater Quality Criteria, WAC 173-200 (Table 14). Surface water monitoring results are compared to the *Industrial Stormwater General Permit* Benchmark Criteria or WAC 173-201A Water Quality Standards for Surface Waters of the State of Washington.

### **2.2 Trilinear Diagrams and Major Ion Balance**

Geochemical data are presented on trilinear diagrams. Major cations and anions are plotted on individual triangles as percentages of total milliequivalents per liter (meq/L). These diagrams illustrate differences in major ion chemistry between groundwater samples and can be used to categorize water composition into identifiable groups or hydrochemical facies. These hydrochemical facies reflect distinct compositions of cation and anion concentrations. The value of the diagram lies in pointing out relationships that exist among individual samples. Trilinear

Diagrams are included with ionic balance calculations in this report. Ion balance calculations are useful for determining analytical correctness and can be of value in detecting laboratory error or variation in field sampling procedures.

### **2.3 Prediction Limits**

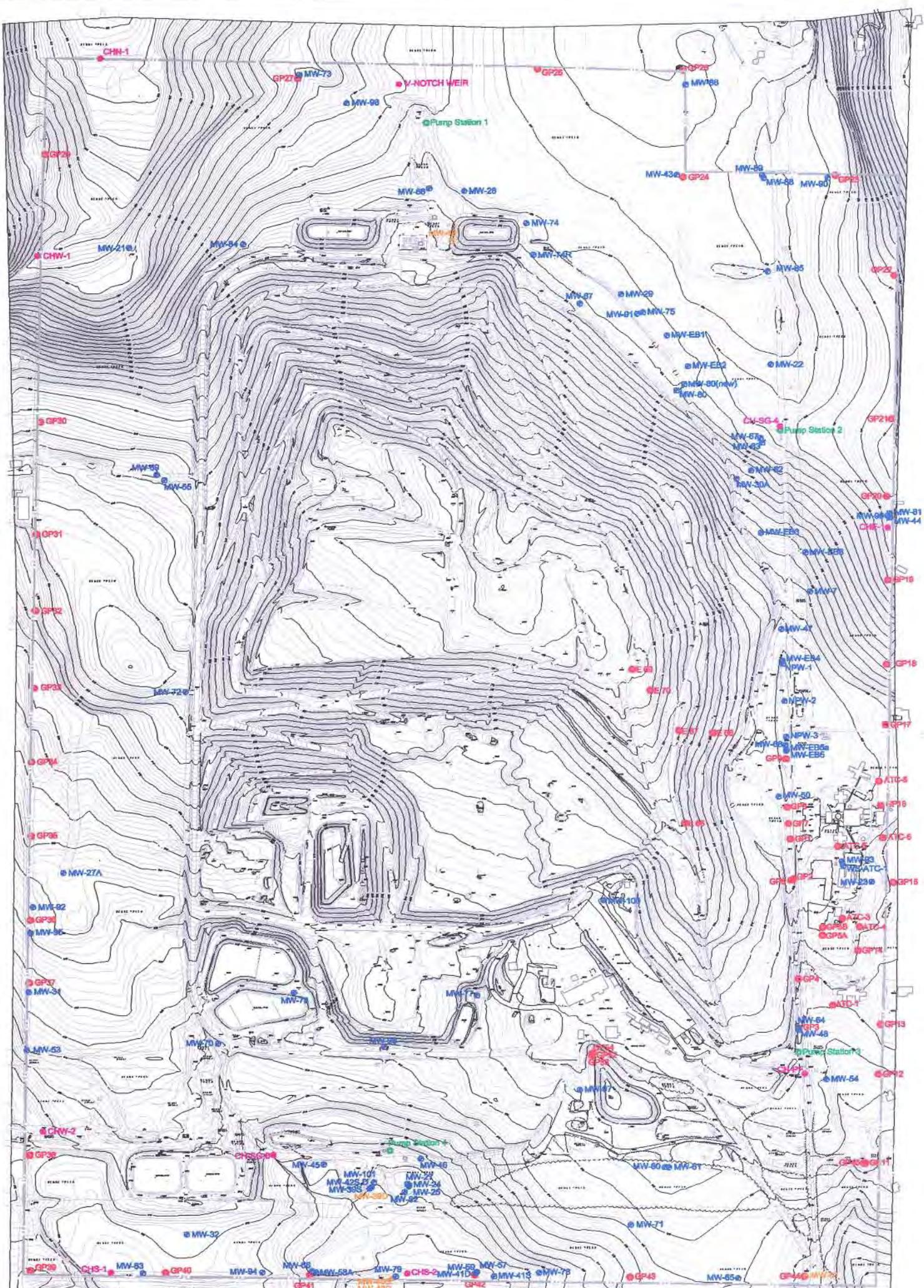
The Prediction Limit is an intra-well statistical test that compares an analytical result to a computed limit value. The limit value is derived from past analytical results from the same well, and is considered to be representative historical well data. A value outside of this limiting value is considered evidence that the result is not drawn from the same sample population distribution. The prediction limits generated in this report are based on a 1% false positive rate (type I error) and depend on the background distribution. For each parameter tested, an appropriate background data set is chosen. This background set is updated annually to include recent data that more accurately defines background water quality. The data set is tested for normality by application of the Shapiro-Wilk Test for Normality. If the data fail the test for normality, log transformed data are tested. When normal or transformed normal data sets are determined, a parametric prediction limit is calculated and future results compared to this value. When transformations fail the test for normality, a non-parametric method is applied and future results are compared to this limit.

This test is performed on parameters listed in WAC 173-351-990 Appendix I and is used to detect a change in the population distribution of the individual well. Exceedances detected in Appendix I parameters for the quarter are presented in Table 5 (Regional Aquifer Wells) and Table 9 (Perched Zones Wells).

### **2.4 Laboratory Data Quality**

Laboratory analytical data is reviewed to verify meeting data quality objectives (DQOs) as defined in the Quality Assurance Project Plan for Environmental Monitoring at King County Solid Waste Facilities (QAPP). Occasionally, results identified during this process are deemed to be unsuitable for evaluation purposes. A summary of suspect results can be found in Table 16.




**LEGEND**

MW-9 Monitoring Well

MW-9 Surface Water Stations

GP-19 Gas Probe

MW-8 Decommissioned Monitoring Well

GP-13 Decommissioned Gas Probe

○ Pump Station NO.



King County Solid Waste Division

 DATE: Oct. 2007  
DESIGNED/DRAWN:

 SITE MAP  
Cedar Hills Landfill  
Maple Valley, Washington

 Aero-Metric  
Aerial Photo taken  
August 24, 2007

 PROJECT NO.  
FIGURE NO.  
1



**TABLE 1**  
**SUMMARY OF CEDAR HILLS REGIONAL LANDFILL GROUNDWATER WELLS**

Well Number	Date Constructed	Aquifer	Zone <sup>1</sup>	Purpose <sup>2</sup>	Ground Surface Elevation	Top of Well Casing Elevation	Total Well				Coordinates		
							Depth	Screened Interval Depth	Screened Interval Elevation	Northing	Easting		
MW-24	6/1/1983	Regional	US	WL/WQ	473.8	475.99	193.0	187	192	286.8	281.8	167767.76	1702441.65
MW-54	9/26/1986	Regional	US	WL	579.3	580.43	360.0	329	351	250.3	228.3	168435.53	1702154.28
MW-56	10/12/1988	Regional	US	WL/WQ	479.2	480.33	170.5	156	166	323.2	313.2	167214.82	1698980.77
MW-57	8/22/1988	Regional	US	WL/WQ	455.7	456.64	145.5	129	144	326.7	311.7	167201.99	1699993.32
MW-58A	9/26/1988	Regional	US	WL/WQ	478.6	479.27	220.5	208.5	218.5	270.1	260.1	167207.16	1699006.59
MW-59	8/16/1988	Regional	US	WL/WQ	455.6	457.13	185.5	170.5	180.5	285.1	275.1	167193.44	1699983.91
MW-60	9/13/1991	Regional	US	WL/WQ	564.8	567.15	266.4	230	239	334.8	325.8	167873.2	1701154.47
MW-65	3/29/1993	Regional	US	WL/WQ	543.2	545.83	236.9	225.5	234.3	317.7	308.9	167146.55	1701602.10
MW-76	10/25/1999	Regional	US	WL/WQ	489.8	491.71	155.9	138.7	148.2	351.1	341.6	167193.13	1700376.23
MW-82	11/2/2000	Regional	US	WL/WQ	472.8	474.85	139.5	123.9	133.4	348.9	339.4	167725.31	1699553.72
MW-83	10/27/2000	Regional	US	WL/WQ	494.5	496.81	160.0	144.3	153.8	350.2	340.7	167212.27	1697939.89
MW-94	7/2/2002	Regional	US	WL/WQ	493.2	495.51	168.0	136	144.7	357.2	348.5	167210.22	1698674.21
MW-21	5/17/1983	Regional	UNW	WL/WQ	418.2	420.66	180.0	155	163	263.2	255.2	173876.38	1697901.86
MW-73	7/3/1999	Regional	UNW	WL/WQ	484.3	485.70	218.0	196.2	205.5	288.1	278.8	174995.59	1698954.95
MW-84	10/20/2000	Regional	UNW	WL/WQ	528.7	530.80	250.5	236.2	245.7	292.5	283.0	173894.54	1698602.89
MW-81	10/3/2002	Regional	UNE	WL/WQ	492.2	493.66	199.0	183	192	309.2	300.2	172113.99	1702568.87
MW-99	8/30/2002	Regional	UNE	WL/WQ	491.8	493.64	287.0	270	279	221.8	212.8	172098.73	1702556.06
MW-93	6/24/2002	Regional	CG	WL/WQ	630.2	632.15	350.0	310.3	320.1	319.9	310.1	169851.24	1702259.35
MW-95	7/22/2002	Regional	CG	WL/WQ	568.6	571.54	311.0	254	262.7	314.6	305.9	169426.92	1697265.32
MW-106	2/19/2009	Regional	CG	WL	473.0	475.47	270.0	193	203	280.0	270.0	173461.69	1702536.99
MW-70	5/11/1993	Regional	I	WL/WQ	527.9	530.57	221.5	205.1	218.8	322.8	309.1	168699.89	1698412.97
MW-77	10/12/1999	Regional	I	WL/WQ	550.5	552.67	251.5	230	239.5	320.5	311.0	168999.71	1700007.63
MW-78	10/8/1999	Regional	I	WL/WQ	535.3	537.35	229.5	213	225.5	322.3	309.8	169027.58	1698881.94
MW-100	8/26/2002	Regional	I	WL/WQ	618.4	620.32	124.7	299.3	309.3	319.1	309.1	169610.46	1700791.72
MW-22	5/25/1983	Regional	V	WL	515.0	517.09	284.0	279	283.8	236.0	231.2	173088.17	1701844.34
MW-64	3/22/1993	Regional	V	WL/WQ	594.3	596.55	276.3	260.3	274.1	334.0	320.2	168772.19	1701980.27
MW-66	4/5/1993	Regional	V	WL/WQ	528.6	531.28	250.7	234.2	248	294.4	280.6	174250.32	1699750.19
MW-67	4/28/1993	Regional	V	WL/WQ	514.1	516.43	232.4	216.3	230.1	297.8	284.0	172610.65	1701776.69
MW-68	4/15/1993	Regional	V	WL/WQ	644.8	647.07	354.6	333.5	352.5	311.3	292.3	170609.35	1701917.32
MW-69	4/23/1993	Regional	DW	WL/WQ	651.0	653.69	368.8	357.4	371	293.6	280.0	172400.20	1698061.86
MW-72	8/7/1998	Regional	DW	WL/WQ	669.8	671.87	389.0	366.2	375.8	303.6	294.0	170987.71	1698229.92
MW-74	11/1/2000	Regional	DG	WL/WQ	529.2	531.26	270.0	239.3	248.8	289.9	280.4	173813.79	1700386.85
MW-75	9/24/1999	Regional	DG	WL/WQ	529.8	532.40	287.0	258.7	268.8	271.1	261.0	173432.42	1701059.70
MW-80	2/27/2001	Regional	DG	WL/WQ	528.5	530.41	270.0	249.3	258.8	279.2	269.7	172964.99	1701309.78
MW-85	12/1/2000	Regional	DG	WL/WQ	529.8	531.76	270.0	247.2	256.7	282.6	273.1	173694.52	1701828.95
MW-86	12/12/2000	Regional	DG	WL/WQ	533.9	536.04	282.0	250.5	259.3	283.4	274.6	174917.90	1701331.25
MW-87	11/21/2000	Regional	DG	WL/WQ	535.2	537.31	272.5	251.5	260.8	283.7	274.4	173493.76	1700670.27
MW-88	9/13/2001	Regional	DG	WL/WQ	511.2	513.68	248.5	229.7	239	281.5	272.2	174303.06	1701807.87
MW-89	11/12/2001	Regional	DG	WL/WQ	510.7	512.82	328.0	281.5	290.8	229.2	219.9	174319.44	1701799.57
MW-90	8/14/2002	Regional	DG	WL/WQ	500.2	502.22	300.0	265	274	235.2	226.2	174300.67	1702203.13
MW-91	10/26/2001	Regional	DG	WL/WQ	529.7	532.02	331.0	268.9	289	260.8	240.7	173423.94	1701023.09
MW-43	4/30/1985	Regional	DNF	WL/WQ	544.6	547.06	325.0	299	309	245.6	235.6	174327.14	1701274.23
WS-ATC-1	2/7/1972	Regional	--	WL	624.9	625.51	535.0	325	340	299.9	284.9	169823.34	1702268.95
WS-NPW-1	8/22/1990	Regional	--	WL	644.6	646.33	382.0	365.7	375.7	278.9	268.9	171138.99	1701906.96
WS-NPW-3	6/5/1990	Regional	--	WL	644.3	645.81	376.0	359.4	367.4	284.9	276.9	170663.28	1701922.88

**TABLE 1**  
**SUMMARY OF CEDAR HILLS REGIONAL LANDFILL GROUNDWATER WELLS**

Well Number	Date Constructed	Aquifer	Zone <sup>1</sup>	Purpose <sup>2</sup>	Ground Surface Elevation	Top of Well Casing Elevation	Total Well		Coordinates		
							Depth	Screened Interval Depth	Screened Interval Elevation	Northing	Easting
MW-30A	9/6/1989	Perched	EPZ	WL/WQ	567.7	568.43	40.0	25	35	542.7	532.7
MW-47	6/31/1985	Perched	EPZ	WL/WQ	633.6	634.60	50.0	23.5	43.5	610.1	590.1
MW-48	5/24/1985	Perched	EPZ	WL	593.6	594.49	63.0	37	47	556.6	546.6
MW-50	6/3/1985	Perched	EPZ	WL	636.2	637.02	39.5	27.5	37.5	608.7	598.7
MW-62	2/1/1990	Perched	EPZ	WL/WQ	555.3	556.21	65.5	44	54	511.3	501.3
MW-63	2/12/1990	Perched	EPZ	WL	513.8	515.88	22.0	12	17	501.8	496.8
MW-102	1/27/2009	Perched	EPZ	WL	549.7	552.48	50	35	50	515.2	500.2
MW-103	1/28/2009	Perched	EPZ	WL	636.8	639.08	40.00	25	35	611.8	601.8
MW-104	1/29/2009	Perched	EPZ	WL	626.9	629.68	35.00	22	32	604.9	594.9
MW-EB6	11/28/1990	Perched	EPZ	WL/WQ	587.9	589.61	50.0	20	30	567.9	557.9
MW-27A	10/3/1985	Perched	NW	WL/WQ	583.2	584.23	80.0	59	69	524.2	514.2
MW-28	6/21/1983	Perched	NW	WL/WQ	526.2	527.75	39.0	27	37	499.2	489.2
MW-29	6/23/1983	Perched	NW	WL/WQ	531.7	532.92	60.0	17	27	514.7	504.7
MW-55	10/2/1986	Perched	NW	WL/WQ	651.1	652.29	67.0	37.5	47.5	613.6	603.6
MW-98	3/9/2001	Perched	NW	WL	501.6	503.73	22.5	10.7	20	490.9	481.6
MW-25	6/3/1983	Perched	SSWA	WL	473.2	474.41	43.0	18	38	455.2	435.2
MW-41S	7/12/1983	Perched	SSWA	WL	460.7	462.44	51.0	8	18	452.7	442.7
MW-41D	7/12/1983	Perched	SSWA	WL	460.7	462.32	51.0	30	50	430.7	410.7
MW-45	5/17/1985	Perched	SSWA	WL	487.7	488.40	64.0	31	41	447.6	457.6
MW-79	11/5/1999	Perched	SSWA	WL	456.9	459.17	56.0	40.5	50	416.4	406.9
MW-96	12/18/2001	Perched	SSWA	WL	545.4	547.74	102.9	88.8	97.5	456.6	447.9
MW-97	9/5/2001	Perched	SSWA	WL	562.5	564.54	124.7	101	110	461.5	452.5
MW-101	6/2/2006	Perched	SSWA	WL/WQ	472.1	474.72	57.50	44	54	428.1	418.1
MW-105	1/30/2009	Perched	SSWA	WL	518.7	521.23	30.00	18	28	500.7	490.7

Notes

<sup>1</sup>Position of the well screen in the regional aquifer flow path analysis relative to waste placement and site utilities..

Zone Designations

US = Upgradient South Site Wells

UNW = Upgradient Northwest

UNE = Upgradient Northeast

CG = Cross Gradient

DW = Westside Downgradient

V = Vertical Key Facilities

I = Interior

DNF = Downgradient of North End Facilities outside Refuse Cells

DG = Downgradient Groundwater Flow

<sup>2</sup>WL = Water Level WQ = Water Quality

**TABLE 2**  
**GROUNDWATER MONITORING ACTIVITIES 4th QUARTER 2014**

Well ID	Zone	Date	Planned Activity	Sample ID	Comment
MW-21	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-21	Regional	10/6/14	Groundwater Sampling	W21-141006-	
MW-22	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-24	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-24	Regional	10/3/14	Groundwater Sampling	W24-141003-	
MW-25	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-27A	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-27A	Perched	10/3/14	Groundwater Sampling	W27A141003-	
MW-27A	Perched	10/3/14	QA/QC Sample	W27A141003D	Field Duplicate
MW-28	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-28	Perched	10/9/14	Groundwater Sampling	NA	No Sample Low Water Level
MW-29	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-29	Perched	10/14/14	Groundwater Sampling	W29-141014-	
MW-30A	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-30A	Perched	10/28/14	Groundwater Sampling	W30A141028-	
MW-41D	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-41S	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-43	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-43	Regional	10/3/14	Groundwater Sampling	NA	No Sample Pump Malfunction
MW-45	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-47	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-47	Perched	10/28/14	Groundwater Sampling	W47-141028-	
MW-48	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-50	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-54	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-55	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-55	Perched	10/28/14	Groundwater Sampling	W55-141028-	
MW-56	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-56	Regional	10/6/14	Groundwater Sampling	W56-141006-	
MW-57	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-57	Regional	10/3/14	Groundwater Sampling	W57-141003-	
MW-58A	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-59	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-59	Regional	10/6/14	Groundwater Sampling	W59-141006-	
MW-60	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-60	Regional	10/6/14	Groundwater Sampling	W60-141006-	
MW-62	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-62	Perched	10/23/14	Groundwater Sampling	NA	No Sample Low Water Level
MW-63	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-64	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-64	Regional	10/7/14	Groundwater Sampling	W64-141007-	
MW-65	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-65	Regional	10/9/14	Groundwater Sampling	W65-141009-	
MW-66	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-66	Regional	10/9/14	Groundwater Sampling	W66-141009-	
MW-67	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-67	Regional	10/10/14	Groundwater Sampling	NA	No Sample Pump Malfunction
MW-67	Regional	10/23/14	Groundwater Sampling	W67-141023-	
MW-68	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-68	Regional	10/13/14	Groundwater Sampling	W68-141013-	
MW-69	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-69	Regional	10/31/14	Groundwater Sampling	W69-141031-	
MW-70	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-70	Regional	10/21/14	Groundwater Sampling	W70-141021-	
MW-72	Regional	10/1/14	Groundwater Elevation Measurement	NA	

**TABLE 2**  
**GROUNDWATER MONITORING ACTIVITIES 4th QUARTER 2014**

Well ID	Zone	Date	Planned Activity	Sample ID	Comment
MW-72	Regional	10/16/14	Groundwater Sampling	W72-141016-	
MW-73	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-73	Regional	10/14/14	Groundwater Sampling	W73-141014-	
MW-74	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-74	Regional	10/17/14	Groundwater Sampling	W74R1017-	
MW-74	Regional	11/21/14	Groundwater Sampling	W74R141121-	
MW-74	Regional	12/19/15	Groundwater Sampling	W74R141219-	
MW-75	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-75	Regional	10/17/14	Groundwater Sampling	W75-141017-	
MW-75	Regional	11/21/14	Groundwater Sampling	W75-141121-	
MW-75	Regional	12/19/15	Groundwater Sampling	W75-141219-	
MW-76	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-76	Regional	10/21/14	Groundwater Sampling	W76-141021-	
MW-77	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-77	Regional	10/27/14	Groundwater Sampling	W77-141027-	
MW-78	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-78	Regional	10/22/14	Groundwater Sampling	W78-141022-	
MW-79	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-80	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-80	Regional	10/24/14	Groundwater Sampling	W80-141024-	
MW-81	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-81	Regional	10/14/14	Groundwater Sampling	W81-141014-	
MW-82	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-82	Regional	10/3/14	Groundwater Sampling	W82-141003-	
MW-83	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-83	Regional	10/6/14	Groundwater Sampling	W83-141006	
MW-84	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-84	Regional	10/24/14	Groundwater Sampling	W84-141024-	
MW-85	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-85	Regional	10/16/14	Groundwater Sampling	W85-141016-	
MW-86	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-86	Regional	10/27/14	Groundwater Sampling	W86-141027-	
MW-87	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-87	Regional	10/17/14	Groundwater Sampling	W87-141017-	
MW-87	Regional	11/21/14	Groundwater Sampling	W87-141121-	
MW-87	Regional	12/19/15	Groundwater Sampling	W87-141219-	
MW-88	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-88	Regional	10/30/14	Groundwater Sampling	W88-141030-	
MW-88	Regional	10/30/14	QA/QC Sample	W88-141030D	Field Duplicate
MW-89	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-89	Regional	10/9/14	Groundwater Sampling	W89-141009-	
MW-90	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-90	Regional	10/9/14	Groundwater Sampling	W90-141009-	
MW-91	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-91	Regional	10/22/14	Groundwater Sampling	W91-141022-	
MW-93	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-93	Regional	10/16/14	Groundwater Sampling	W93-141016-	
MW-94	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-94	Regional	10/10/14	Groundwater Sampling	W94-141010-	
MW-94	Regional	10/10/14	QA/QC Sample	W94-141010D	Field Duplicate
MW-95	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-95	Regional	10/10/14	Groundwater Sampling	W95-141010-	
MW-96	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-97	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-98	Perched	10/1/14	Groundwater Elevation Measurement	NA	

**TABLE 2**  
**GROUNDWATER MONITORING ACTIVITIES 4th QUARTER 2014**

Well ID	Zone	Date	Planned Activity	Sample ID	Comment
MW-99	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-99	Regional	10/17/14	Groundwater Sampling	W99-141017-	
MW-99	Regional	11/21/14	Groundwater Sampling	W99-141121-	
MW-99	Regional	12/19/15	Groundwater Sampling	W99-141219-	
MW-100	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-100	Regional	10/13/14	Groundwater Sampling	W100141013-	
MW-101	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-101	Perched	10/28/14	Groundwater Sampling	W101141028-	
MW-102	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-103	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-104	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-105	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-106	Regional	10/1/14	Groundwater Elevation Measurement	NA	
MW-EB6	Perched	10/1/14	Groundwater Elevation Measurement	NA	
MW-EB6	Perched	10/21/14	Groundwater Sampling	NA	No Sample Low Water Level
Equipment Blank	NA	10/10/14	QA/QC Sample	WU1S141010E	
Equipment Blank	NA	10/10/14	QA/QC Sample	WU1H141010E	
Equipment Blank	NA	10/10/14	QA/QC Sample	WU1M141010E	
Field Blank	NA	10/16/14	QA/QC Sample	W85-14016F	
WS-NPW-1	Regional	10/1/14	Groundwater Elevation Measurement	NA	
WS-NPW-3	Regional	10/1/14	Groundwater Elevation Measurement	NA	
WS-NPW	Regional	10/16/14	Water Supply Charactrization	WNPW141016-	
WS-OS3	Regional	10/2/14	Water Supply Charactrization	WOS3141002-	
WS-OS4	Regional	10/2/14	Water Supply Charactrization	WOS4141002-	

NA = No sample ID assigned, No sample collected.



**TABLE 3**  
**SUMMARY OF EXCEEDANCES OF WAC 173-200-040**  
**WATER QUALITY STANDARDS FOR GROUND WATERS OF THE STATE OF WASHINGTON**

**CEDAR HILLS REGIONAL LANDFILL REGIONAL AQUIFER**  
**(Data Collected from October 1, 2014 to December 31, 2014)**

Parameter	Units	Well ID	Sample Date	Sample ID	Sample Value
<b>South, Northeast and Northwest Upgradient and Crossgradient Wells</b>					
Arsenic (Total)	(mg/L)	MW-93	10/16/2014	W93-141016-	0.00122
		MW-99	10/17/2014	W99-141017-	0.00183
Iron (Dissolved)	(mg/L)	MW-21	10/6/2014	W21-141006-	2.17
		MW-24	10/3/2014	W24-141003-	3.16
		MW-57	10/3/2014	W57-141003-	8.04
		MW-59	10/6/2014	W59-141006-	4.65
		MW-65	10/9/2014	W65-141009-	4.47
Manganese (Dissolved)	(mg/L)	MW-21	10/6/2014	W21-141006-	0.0795
		MW-24	10/3/2014	W24-141003-	0.114
		MW-56	10/6/2014	W56-141006-	0.168
		MW-57	10/3/2014	W57-141003-	0.243
		MW-59	10/6/2014	W59-141006-	0.107
		MW-65	10/9/2014	W65-141009-	0.18
		MW-93	10/16/2014	W93-141016-	0.268
		MW-95	10/10/2014	W95-141010-	0.137
		MW-99	10/17/2014	W99-141017-	0.0956
Trichloroethene	(ug/L)	MW-76	10/21/2014	W76-141021-	9.65
		MW-82	10/3/2014	W82-141003-	5.17
Vinyl Chloride	(ug/L)	MW-65	10/9/2014	W65-141009-	0.0395
<b>Interior and Vertical to Facilities Wells</b>					
Arsenic (Total)	(mg/L)	MW-64	10/7/2014	W64-141007-	0.0014
		MW-68	10/13/2014	W68-141013-	0.0693
		MW-77	10/27/2014	W77-141027-	0.00124
		MW-100	10/13/2014	W100141013-	0.00248
Iron (Dissolved)	(mg/L)	MW-68	10/13/2014	W68-141013-	0.807
		MW-100	10/13/2014	W100141013-	1.2
Manganese (Dissolved)	(mg/L)	MW-67	10/23/2014	W67-141023-	0.135
		MW-68	10/13/2014	W68-141013-	0.264
		MW-100	10/13/2014	W100141013-	0.222

**TABLE 3**  
**SUMMARY OF EXCEEDANCES OF WAC 173-200-040**  
**WATER QUALITY STANDARDS FOR GROUND WATERS OF THE STATE OF WASHINGTON**

**CEDAR HILLS REGIONAL LANDFILL REGIONAL AQUIFER**  
**(Data Collected from October 1, 2014 to December 31, 2014)**

Parameter	Units	Well ID	Sample Date	Sample ID	Sample Value
<b>Wells Downgradient to Waste Cells and North end Facilities</b>					
Arsenic (Total)	(mg/L)	MW-69	10/31/2014	W69-141031-	0.00221
		MW-80	10/24/2014	W80-141024-	0.00533
		MW-86	10/27/2014	W86-141027-	0.00124
		MW-87	10/17/2014	W87-141017-	0.00196
		MW-88	10/30/2014	W88-141030-	0.00104
		MW-89	10/9/2014	W89-141009-	0.014
		MW-91	10/22/2014	W91-141022-	0.0776
Iron (Dissolved)	(mg/L)	MW-69	10/31/2014	W69-141031-	1.05 D
		MW-75	10/17/2014	W75-141017-	2
		MW-80	10/24/2014	W80-141024-	1.73
		MW-87	10/17/2014	W87-141017-	3.75
		MW-89	10/9/2014	W89-141009-	0.875
		MW-90	10/9/2014	W90-141009-	1.3
		MW-91	10/22/2014	W91-141022-	2.2
Manganese (Dissolved)	(mg/L)	MW-69	10/31/2014	W69-141031-	0.241
		MW-75	10/17/2014	W75-141017-	0.161
		MW-80	10/24/2014	W80-141024-	0.255
		MW-87	10/17/2014	W87-141017-	0.373
		MW-89	10/9/2014	W89-141009-	0.213
		MW-90	10/9/2014	W90-141009-	0.259
		MW-91	10/22/2014	W91-141022-	0.265

**Table 4**  
**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Groundwater Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

Site ID	Upgradient South																
	MW-24 10/3/14			MW-56 10/6/14			MW-57 10/3/14			MW-58A No Sample			MW-59 10/6/14			MW-60 10/6/14	
Cations	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
Calcium	40.1	2	14.8	0.738523	38.4	14.8	0.738523	44.5	15.8	0.7884232	36.7	14.8	0.738523	37.6	16.8	0.8383234	45.3
Magnesium	24.3	2	9.6	0.7924295	41.2	8.1	0.6673524	40.2	9.1	0.7521086	35.0	9.6	0.789138	40.2	9.1	0.74964	40.5
Potassium	39.1	1	0.8	0.0214076	1.1	1.1	0.0289015	1.7	0.8	0.0204868	1.0	1.1	0.0273669	1.4	1.1	0.0286457	1.5
Sodium	23.0	1	5.8	0.2518511	13.1	5.0	0.2157481	13.0	6.7	0.2892591	13.5	5.5	0.2383669	12.1	5.4	0.2331472	12.6
Iron	55.8	2	3.16	0.1131663	5.9	0.04	0.0012892	0.1	8.04	0.2879295	13.4	4.65	0.1665264	8.5	0.05	0.0016474	0.1
Manganese	54.9	2	0.11	0.0041501	0.2	0.17	0.006116	0.4	0.24	0.0088463	0.4	0.11	0.0038953	0.2	0.00	5.57E-05	0.0
Ammonia-N	14.0	1	0.04	0.0026987	0.1	0.01	0.0007139	0.0	0.02	0.0014279	0.1	0.01	0.0007139	0.0	0.01	0.0007139	0.0
<b>Total Cations (meq/L)</b>			<b>1.9</b>			<b>1.7</b>			<b>2.1</b>				<b>2.0</b>			<b>1.9</b>	
Anions																	
Alkalinity, Total			61			58			64			62			77		
Carbonate	60.0	2	0.05645	0.0018818	0.1	0.04196	0.0013987	0.1	0.03036	0.001012	0.1	0.03245	0.0010816	0.1	0.02007	0.0006692	0.0
Bicarbonate	61.0	1	73.94	1.2119354	73.31	70.80	1.1604263	69.7	77.53	1.2707964	68.2	75.57	1.2387316	70.3	93.29	1.5291002	82.0
Chloride	35.5	1	3.7	0.1043635	6.3	4.0	0.1131075	6.8	5.8	0.1638789	8.8	4.3	0.1210053	6.9	4.0	0.1128254	6.0
Nitrate-N	14.0	1	0.01	0.0007139	0.0	0.01	0.0007139	0.0	0.02	0.0010709	0.1	0.01	0.0007139	0.0	1.34	0.0956665	5.1
Sulfate	96.1	2	16.1	0.3352155	20.3	18.7	0.3893497	23.4	20.5	0.4268272	22.9	19.2	0.3997601	22.7	6.1	0.1272153	6.8
<b>Total Anions (meq/L)</b>			<b>1.7</b>			<b>1.7</b>			<b>1.9</b>				<b>1.8</b>			<b>1.9</b>	
<b>Total Ions (meq/L)</b>			<b>3.6</b>			<b>3.3</b>			<b>4.0</b>				<b>3.7</b>			<b>3.7</b>	
<b>Cation/Anion Ratio</b>			<b>1.16</b>			<b>1.00</b>			<b>1.15</b>				<b>1.12</b>			<b>0.99</b>	
<b>Percent Difference</b>			<b>7.5</b>			<b>-0.2</b>			<b>7.1</b>				<b>5.5</b>			<b>-0.4</b>	
<b>Trilinear Diagram Data</b>																	
sum (Ca, Mg, Na+K)			1.80			1.65			1.85				1.79			1.85	
Calcium				40.93			44.74			42.61				41.18			45.32
Magnesium				43.92			40.43			40.65				44.00			40.53
Sodium + Potassium				15.15			14.82			16.74				14.82			14.15
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )			1.65			1.66			1.86				1.76			1.77	
Sulfate				20.274			23.394			22.917				22.706			7.188
Chloride				6.312			6.796			8.799				6.873			6.375
Bicarbonate + Carbonate				73.414			69.809			68.284				70.421			86.437

**Table 4**  
**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Groundwater Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

Site ID	Upgradient South																
	MW-65 10/9/14			MW-76 10/21/14			MW-82 10/3/14			MW-83 10/6/14			MW-94 10/10/14				
	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
Cations																	
Calcium	40.1	2	12.1	0.6037924	36.8	22.3	1.1127745	47.1	27.4	1.3672655	45.4	42.4	2.1157685	52.3	25.2	1.257485	48.5
Magnesium	24.3	2	7.7	0.6327916	38.6	10.1	0.8311047	35.2	15.5	1.2754577	42.3	18.2	1.4976342	37.1	12.2	1.0039087	38.7
Potassium	39.1	1	0.9	0.0234793	1.4	1.4	0.0360629	1.5	1.8	0.0452705	1.5	2.8	0.0716144	1.8	2.0	0.0516647	2.0
Sodium	23.0	1	4.9	0.2131383	13.0	8.8	0.381909	16.2	7.4	0.3227523	10.7	8.2	0.3558104	8.8	6.5	0.2809945	10.8
Iron	55.8	2	4.47	0.1600802	9.8	0.01	0.0003581	0.0	0.01	0.0003581	0.0	0.01	0.0003581	0.0	0.01	0.0003581	0.0
Manganese	54.9	2	0.18	0.0065528	0.4	0.00	3.64E-05	0.0	0.00	3.64E-05	0.0	0.00	3.64E-05	0.0	0.00	3.64E-05	0.0
Ammonia-N	14.0	1	0.01	0.0007139	0.0	0.01	0.0007139	0.0	0.01	0.0007139	0.0	0.01	0.0007139	0.0	0.01	0.0007139	0.0
<b>Total Cations (meq/L)</b>					<b>1.6</b>			<b>2.4</b>			<b>3.0</b>	<b>100.0</b>		<b>4.0</b>			<b>2.6</b>
Anions																	
Alkalinity, Total			54			71			120			136			95		
Carbonate	60.0	2	0.04788	0.0015959	0.1	0.01444	0.0004815	0.0	0.06729	0.0022431	0.1	0.06344	0.0021148	0.1	0.04977	0.0016591	0.1
Bicarbonate	61.0	1	65.66	1.0762418	71.5	86.47	1.4173048	58.7	146.26	2.3973954	79.4	165.79	2.7174754	68.7	115.92	1.9000544	73.6
Chloride	35.5	1	3.7	0.1032353	6.9	14.6	0.4118128	17.1	7.7	0.2160607	7.2	34.0	0.9590162	24.3	15.9	0.4484811	17.4
Nitrate-N	14.0	1	0.01	0.0007139	0.0	0.65	0.0462626	1.9	0.51	0.0361248	1.2	1.58	0.1128007	2.9	1.22	0.0870993	3.4
Sulfate	96.1	2	15.5	0.322723	21.5	25.8	0.5371777	22.3	17.7	0.3685289	12.2	7.8	0.1615697	4.1	6.9	0.1436638	5.6
<b>Total Anions (meq/L)</b>					<b>1.5</b>			<b>2.4</b>			<b>3.0</b>	<b>100.0</b>		<b>4.0</b>			<b>2.6</b>
<b>Total Ions (meq/L)</b>					<b>3.1</b>			<b>4.8</b>			<b>6.0</b>			<b>8.0</b>			<b>5.2</b>
<b>Cation/Anion Ratio</b>					<b>1.09</b>			<b>0.98</b>			<b>1.00</b>			<b>1.02</b>			<b>1.01</b>
<b>Percent Difference</b>					<b>4.3</b>			<b>-1.0</b>			<b>-0.1</b>			<b>1.1</b>			<b>0.3</b>
<b>Trilinear Diagram Data</b>																	
sum (Ca, Mg, Na+K)			1.47			2.36			3.01			4.04			2.59		
Calcium				40.99			47.11			45.41			52.36			48.48	
Magnesium				42.95			35.19			42.36			37.06			38.70	
Sodium + Potassium				16.06			17.70			12.22			10.58			12.82	
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )			1.50			2.37			2.98			3.84			2.49		
Sulfate				21.461			22.697			12.349			4.207			5.761	
Chloride				6.865			17.400			7.240			24.973			17.983	
Bicarbonate + Carbonate				71.674			59.904			80.411			70.819			76.256	

**Table 4**  
**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Groundwater Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

Site ID	Upgradient Northwest										Upgradient Northeast										
	MW-21 10/6/14			MW-73 10/14/14			MW-84 10/24/14			MW-81 10/14/14			MW-99 10/17/14								
	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	
Cations																					
Calcium	40.1	2	10.2	0.508982	38.3	10.7	0.5339321	41.9	11.2	0.5588822	36.3	9.9	0.492515	41.0	9.8	0.491018	36.3				
Magnesium	24.3	2	6.1	0.5003086	37.7	6.3	0.5159432	40.5	8.5	0.6994446	45.4	5.8	0.4772681	39.7	4.5	0.3694713	27.3				
Potassium	39.1	1	1.0	0.0255766	1.9	0.7	0.0167526	1.3	1.0	0.0263439	1.7	0.6	0.0154738	1.3	0.9	0.0241954	1.8				
Sodium	23.0	1	4.8	0.2105284	15.9	4.7	0.2053087	16.1	5.9	0.2557659	16.6	4.9	0.2144432	17.9	10.5	0.4567249	33.8				
Iron	55.8	2	2.17	0.0777123	5.9	0.01	0.0003581	0.0	0.01	0.0003581	0.0	0.01	0.0003581	0.0	0.03	0.0011818	0.1				
Manganese	54.9	2	0.08	0.0028942	0.2	0.00	3.64E-05	0.0	0.00	6.516E-05	0.0	0.00	3.64E-05	0.0	0.10	0.0034803	0.3				
Ammonia-N	14.0	1	0.02	0.0012637	0.1	0.01	0.0007139	0.1	0.01	0.0007139	0.0	0.01	0.0007139	0.1	0.09	0.0063825	0.5				
<b>Total Cations (meq/L)</b>				<b>1.3</b>			<b>1.3</b>			<b>1.5</b>			<b>1.2</b>			<b>1.4</b>					
Anions																					
Alkalinity, Total			53			52			61			47			55						
Carbonate	60.0	2	10.825	0.0036084	0.3	0.04319	0.0014398	0.1	0.01392	0.000464	0.0	0.06082	0.0020273	0.2	0.34527	0.0115091	0.8				
Bicarbonate	61.0	1	64.81	1.0622314	83.6	63.47	1.0404033	79.1	74.27	1.2173524	74.6	57.70	0.9458301	70.9	66.89	1.0963257	79.7				
Chloride	35.5	1	3.0	0.084337	6.6	2.5	0.0693876	5.3	3.8	0.10662	6.5	4.0	0.1125434	8.4	3.3	0.0919527	6.7				
Nitrate-N	14.0	1	0.02	0.0013565	0.1	0.25	0.0175626	1.3	0.54	0.0384094	2.4	1.59	0.1135147	8.5	0.03	0.0020704	0.2				
Sulfate	96.1	2	5.8	0.1197198	9.4	9.0	0.1867629	14.2	12.9	0.2685888	16.5	7.7	0.1599041	12.0	8.4	0.1744786	12.7				
<b>Total Anions (meq/L)</b>				<b>1.3</b>			<b>1.3</b>			<b>1.6</b>			<b>1.3</b>			<b>1.4</b>					
<b>Total Ions (meq/L)</b>				<b>2.6</b>			<b>2.6</b>			<b>3.2</b>			<b>2.5</b>			<b>2.7</b>					
<b>Cation/Anion Ratio</b>				<b>1.04</b>			<b>0.97</b>			<b>0.94</b>			<b>0.90</b>			<b>0.98</b>					
<b>Percent Difference</b>				<b>2.2</b>			<b>-1.6</b>			<b>-2.8</b>			<b>-5.2</b>			<b>-0.9</b>					
<b>Trilinear Diagram Data</b>																					
sum (Ca, Mg, Na+K)			1.25			1.27			1.54			1.20			1.34						
Calcium				40.87			41.98			36.28			41.05			36.60					
Magnesium				40.17			40.56			45.41			39.78			27.54					
Sodium + Potassium				18.96			17.46			18.31			19.16			35.85					
				100.0			100.0			100.0											
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )			1.27			1.30			1.59			1.22			1.37			12.696			
Sulfate				9.428			14.389			16.860			13.104								
Chloride				6.641			5.346			6.693			9.223			6.691					
Bicarbonate + Carbonate				83.931			80.266			76.447			77.674			80.613					

**Table 4**  
**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Groundwater Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

Site ID	Cross Gradient										Interior									
	MW-93 10/16/14					MW-95 10/10/14					MW-70 10/21/14					MW-77 10/27/14				
	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
Cations																				
Calcium	40.1	2	37.6	1.8762475	46.9	20.3	1.0129741	44.5	21.5	1.0728543	46.0	20.0	0.998004	45.3	16.7	0.8333333	46.3	27.8	1.3872255	42.9
Magnesium	24.3	2	20.0	1.6457519	41.1	12.0	0.9874511	43.4	11.4	0.9380786	40.2	10.6	0.8722485	39.6	7.8	0.6410204	35.6	16.4	1.3495166	41.8
Potassium	39.1	1	1.7	0.0427129	1.1	1.2	0.0306919	1.3	1.6	0.0411783	1.8	1.4	0.0355514	1.6	2.1	0.053455	3.0	1.9	0.0478282	1.5
Sodium	23.0	1	9.8	0.4249716	10.6	5.4	0.236627	10.4	6.5	0.2809945	12.0	6.8	0.2949138	13.4	6.2	0.2701201	15.0	9.1	0.3958282	12.2
Iron	55.8	2	0.01	0.0003581	0.0	0.01	0.0003581	0.0	0.01	0.0003581	0.0	0.01	0.0003581	0.0	0.01	0.0003581	0.0	1.20	0.0429746	1.3
Manganese	54.9	2	0.27	0.0097565	0.2	0.14	0.0049874	0.2	0.00	3.64E-05	0.0	0.00	6.298E-05	0.0	0.00	3.64E-05	0.0	0.22	0.0080818	0.3
Ammonia-N	14.0	1	0.06	0.0044406	0.1	0.02	0.0015992	0.1	0.01	0.0007139	0.0	0.01	0.0007139	0.0	0.01	0.0007139	0.0	0.01	0.0007139	0.0
<b>Total Cations (meq/L)</b>				<b>4.0</b>		<b>2.3</b>		<b>2.3</b>				<b>2.2</b>				<b>1.8</b>			<b>3.2</b>	
Anions																				
Alkalinity, Total			115		86		92		95		74		74		74		129			
Carbonate	60.0	2	0.10696	0.0035652	0.1	0.16229	0.0054096	0.2	0.17102	0.0057006	0.2	0.03003	0.0010011	0.0	0.02431	0.0008104	0.0	0.07402	0.0024674	0.1
Bicarbonate	61.0	1	140.08	2.2960885	57.1	104.10	1.7063331	77.2	112.26	1.8400219	75.8	116.08	1.902712	82.5	89.74	1.4709678	77.7	157.23	2.5771439	84.6
Chloride	35.5	1	2.9	0.0803881	2.0	5.0	0.1410318	6.4	11.4	0.3215525	13.3	5.9	0.1672637	7.3	6.8	0.1918032	10.1	2.6	0.0736186	2.4
Nitrate-N	14.0	1	0.01	0.0009995	0.0	0.01	0.0007139	0.0	0.04	0.0026415	0.1	0.74	0.0527593	2.3	0.83	0.0593989	3.1	0.01	0.0007139	0.0
Sulfate	96.1	2	78.7	1.6386002	40.8	17.2	0.3581185	16.2	12.3	0.2560963	10.6	8.8	0.1823906	7.9	8.1	0.1694816	9.0	18.9	0.3935139	12.9
<b>Total Anions (meq/L)</b>			<b>4.0</b>		<b>2.2</b>		<b>2.4</b>		<b>2.3</b>				<b>1.9</b>			<b>3.0</b>				
<b>Total Ions (meq/L)</b>			<b>8.0</b>		<b>4.5</b>		<b>4.8</b>		<b>4.5</b>				<b>3.7</b>			<b>6.3</b>				
<b>Cation/Anion Ratio</b>			<b>1.00</b>		<b>1.03</b>		<b>0.96</b>		<b>0.95</b>				<b>0.95</b>			<b>1.06</b>				
<b>Percent Difference</b>			<b>-0.2</b>		<b>1.4</b>		<b>-1.9</b>		<b>-2.3</b>				<b>-2.5</b>			<b>2.9</b>				
<b>Trilinear Diagram Data</b>																				
sum (Ca, Mg, Na+K)			3.99		2.27		2.33		2.20				1.80			3.18				
Calcium				47.03		44.67		45.98		45.35			46.35			43.62				
Magnesium				41.25		43.54		40.21		39.63			35.65			42.43				
Sodium + Potassium				11.72		11.79		13.81		15.02			18.00			13.95				
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )			4.02		2.21		2.42		2.25				1.83			3.05				
Sulfate				40.775		16.198		10.568		8.094			9.246			12.916				
Chloride				2.000		6.379		13.269		7.423			10.464			2.416				
Bicarbonate + Carbonate				57.225		77.423		76.163		84.483			80.291			84.668				

**Table 4**  
**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Groundwater Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

Site ID	Vertical to Facilities												Downgradient Northwest							
	MW	n	MW-64 10/7/14			MW-66 10/9/14			MW-67 10/23/14			MW-68 10/13/14			MW-69 10/31/14			MW-72 No Sample		
			mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
Cations																				
Calcium	40.1	2	19.4	0.9680639	36.6	20.2	1.007984	36.4	32.3	1.6117764	44.3	26.6	1.3273453	43.4	29.4	1.4670659	48.4			
Magnesium	24.3	2	16.0	1.3166015	49.7	17.1	1.4071179	50.7	19.2	1.5799218	43.4	16.0	1.3166015	43.0	13.7	1.1273401	37.2			
Potassium	39.1	1	1.6	0.0409225	1.5	1.3	0.0319707	1.2	1.6	0.041434	1.1	1.6	0.0416898	1.4	1.9	0.0473166	1.6			
Sodium	23.0	1	7.2	0.3149227	11.9	7.5	0.3244922	11.7	9.1	0.3940883	10.8	7.7	0.3349316	10.9	7.8	0.3397163	11.2			
Iron	55.8	2	0.09	0.0033341	0.1	0.01	0.0003581	0.0	0.15	0.0052286	0.1	0.81	0.0289004	0.9	1.05	0.0376027	1.2			
Manganese	54.9	2	0.04	0.001489	0.1	0.00	3.64E-05	0.0	0.14	0.0049146	0.1	0.26	0.0096108	0.3	0.24	0.0087735	0.3			
Ammonia-N	14.0	1	0.03	0.0018277	0.1	0.01	0.0007139	0.0	0.01	0.0007139	0.0	0.02	0.0013707	0.0	0.02	0.0012994	0.0			
<b>Total Cations (meq/L)</b>					<b>2.6</b>	<b>99.9</b>		<b>2.8</b>		<b>3.6</b>		<b>3.1</b>				<b>3.0</b>				
Anions																				
Alkalinity, Total			91			107			136			131			131					
Carbonate	60.0	2	0.03207	0.0010689	0.0	0.03965	0.0013218	0.0	0.1005	0.0033502	0.1	0.05084	0.0016946	0.1	0.14984	0.0049947	0.2			
Bicarbonate	61.0	1	110.47	1.810658	76.6	130.46	2.1383557	78.9	165.72	2.7162402	74.1	159.72	2.6179106	86.2	159.52	2.614611	84.6			
Chloride	35.5	1	3.5	0.097594	4.1	6.9	0.1946239	7.2	4.4	0.124108	3.4	2.8	0.079824	2.6	5.8	0.1621866	5.2			
Nitrate-N	14.0	1	0.12	0.0086385	0.4	0.77	0.0546155	2.0	0.29	0.0207753	0.6	0.01	0.0007139	0.0	0.02	0.0011423	0.0			
Sulfate	96.1	2	21.4	0.445566	18.9	15.4	0.3206409	11.8	38.4	0.7995203	21.8	16.1	0.3352155	11.0	14.8	0.3081484	10.0			
<b>Total Anions (meq/L)</b>					<b>2.4</b>	<b>100.0</b>		<b>2.7</b>		<b>3.7</b>		<b>3.0</b>			<b>3.1</b>					
<b>Total Ions (meq/L)</b>					<b>5.0</b>			<b>5.5</b>		<b>7.3</b>		<b>6.1</b>			<b>6.1</b>					
<b>Cation/Anion Ratio</b>					<b>1.12</b>			<b>1.02</b>		<b>0.99</b>		<b>1.01</b>			<b>0.98</b>					
<b>Percent Difference</b>					<b>5.7</b>			<b>1.2</b>		<b>-0.4</b>		<b>0.4</b>			<b>-1.0</b>					
<b>Trilinear Diagram Data</b>																				
sum (Ca, Mg, Na+K)			2.64			2.77			3.63			3.02			2.98					
Calcium					36.66			36.37			44.44			43.94			49.21			
Magnesium					49.86			50.77			43.56			43.59			37.81			
Sodium + Potassium					13.48			12.86			12.01			12.47			12.98			
100.0																				
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )			2.35			2.65			3.64			3.03			3.09			9.973		
Sulfate					18.921			12.077			21.945			11.046			5.249			
Chloride					4.144			7.331			3.407			2.630			84.779			
Bicarbonate + Carbonate					76.935			80.592			74.648			86.323						
100.0																				

**Table 4**  
**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Groundwater Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

Site ID	Downgradient																				
	MW-74 10/17/14			MW-75 10/17/14			MW-80 10/24/14			MW-85 10/16/14			MW-87 10/17/14			MW-91 10/22/14					
Cations	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)													
Calcium	40.1	2	42.9	2.140719	39.4	25.4	1.267465	38.4	28.3	1.412176	46.9	26.1	1.302395	43.3	38.0	1.896208	40.7	23.8	1.187625	40.1	
Magnesium	24.3	2	33.1	2.723719	50.1	18.8	1.547007	46.9	14.2	1.168484	38.8	15.8	1.300144	43.3	26.1	2.147706	46.0	15.7	1.291915	43.6	
Potassium	39.1	1	2.1	0.053455	1.0	1.8	0.046038	1.4	1.6	0.040667	1.3	1.5	0.038876	1.3	2.2	0.056268	1.2	1.7	0.044503	1.5	
Sodium	23.0	1	11.8	0.513272	9.4	8.3	0.362335	11.0	7.3	0.319272	10.6	8.3	0.3619	12.0	9.5	0.414532	8.9	8.0	0.347111	11.7	
Iron	55.8	2	0.01	0.000358	0.0	0.00	0.071624	2.2	1.73	0.061955	2.1	0.01	0.000358	0.0	3.75	0.134295	2.9	2.20	0.078787	2.7	
Manganese	54.9	2	0.00	3.64E-05	0.0	0.16	0.005861	0.2	0.26	0.009283	0.3	0.00	3.64E-05	0.0	0.37	0.013579	0.3	0.27	0.009647	0.3	
Ammonia-N	14.0	1	0.01	0.000714	0.0	0.01	0.000714	0.0	0.01	0.000714	0.0	0.01	0.000714	0.0	0.02	0.001571	0.0	0.01	0.000978	0.0	
<b>Total Cations (meq/L)</b>			<b>5.4</b>			<b>3.3</b>			<b>3.0</b>			<b>3.0</b>			<b>4.7</b>			<b>3.0</b>			
Anions																					
Alkalinity, Total			216		99				100			96			88			91			
Carbonate	60.0	2	0.10076	0.003359	0.1	0.04527	0.001509	0.0	0.05608	0.001869	0.1	0.03996	0.001332	0.0	0.04284	0.001428	0.0	0.08065	0.002688	0.1	
Bicarbonate	61.0	1	263.32	4.31599	75.4	121.05	1.984192	60.6	121.89	1.997829	63.6	117.16	1.920378	64.4	106.91	1.752308	35.6	110.61	1.813038	60.8	
Chloride	35.5	1	28.6	0.806702	14.1	9.5	0.268807	8.2	6.7	0.189547	6.0	8.7	0.244831	8.2	6.8	0.191239	3.9	8.6	0.243421	8.2	
Nitrate-N	14.0	1	0.36	0.025559	0.4	0.02	0.001142	0.0	0.02	0.001571	0.0	0.13	0.008996	0.3	0.02	0.001214	0.0	0.03	0.00207	0.1	
Sulfate	96.1	2	27.4	0.570491	10.0	48.8	1.016057	31.1	45.7	0.951512	30.3	38.7	0.805767	27.0	143.0	2.97738	60.5	44.2	0.920281	30.9	
<b>Total Anions (meq/L)</b>			<b>5.7</b>			<b>3.3</b>			<b>3.1</b>			<b>3.0</b>			<b>4.9</b>			<b>3.0</b>			
<b>Total Ions (meq/L)</b>			<b>11.2</b>			<b>6.6</b>			<b>6.2</b>			<b>6.0</b>			<b>9.6</b>			<b>5.9</b>			
<b>Cation/Anion Ratio</b>			<b>0.95</b>			<b>1.01</b>			<b>0.96</b>			<b>1.01</b>			<b>0.95</b>			<b>0.99</b>			
<b>Percent Difference</b>			<b>-2.6</b>			<b>0.4</b>			<b>-2.1</b>			<b>0.4</b>			<b>-2.7</b>			<b>-0.4</b>			
<b>Trilinear Diagram Data</b>																					
sum (Ca, Mg, Na+K)			5.43			3.22			2.94			3.00			4.51			2.87			
Calcium						39.42			39.33			48.02			43.37			42.00			41.36
Magnesium						50.15			48.00			39.74			43.29			47.57			45.00
Sodium + Potassium						10.43			12.67			12.24			13.34			10.43			13.64
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )			5.70			3.27			3.14			2.97			4.92			2.98			30.888
Sulfate						10.015			31.067			30.296			27.109			60.487			8.170
Chloride						14.161			8.219			6.035			8.237			3.885			60.942
Bicarbonate + Carbonate						75.824			60.714			63.669			64.654			35.628			

**Table 4**  
**Ion Balance Calculations**  
**Cedar Hills Landfill Regional Aquifer Groundwater Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

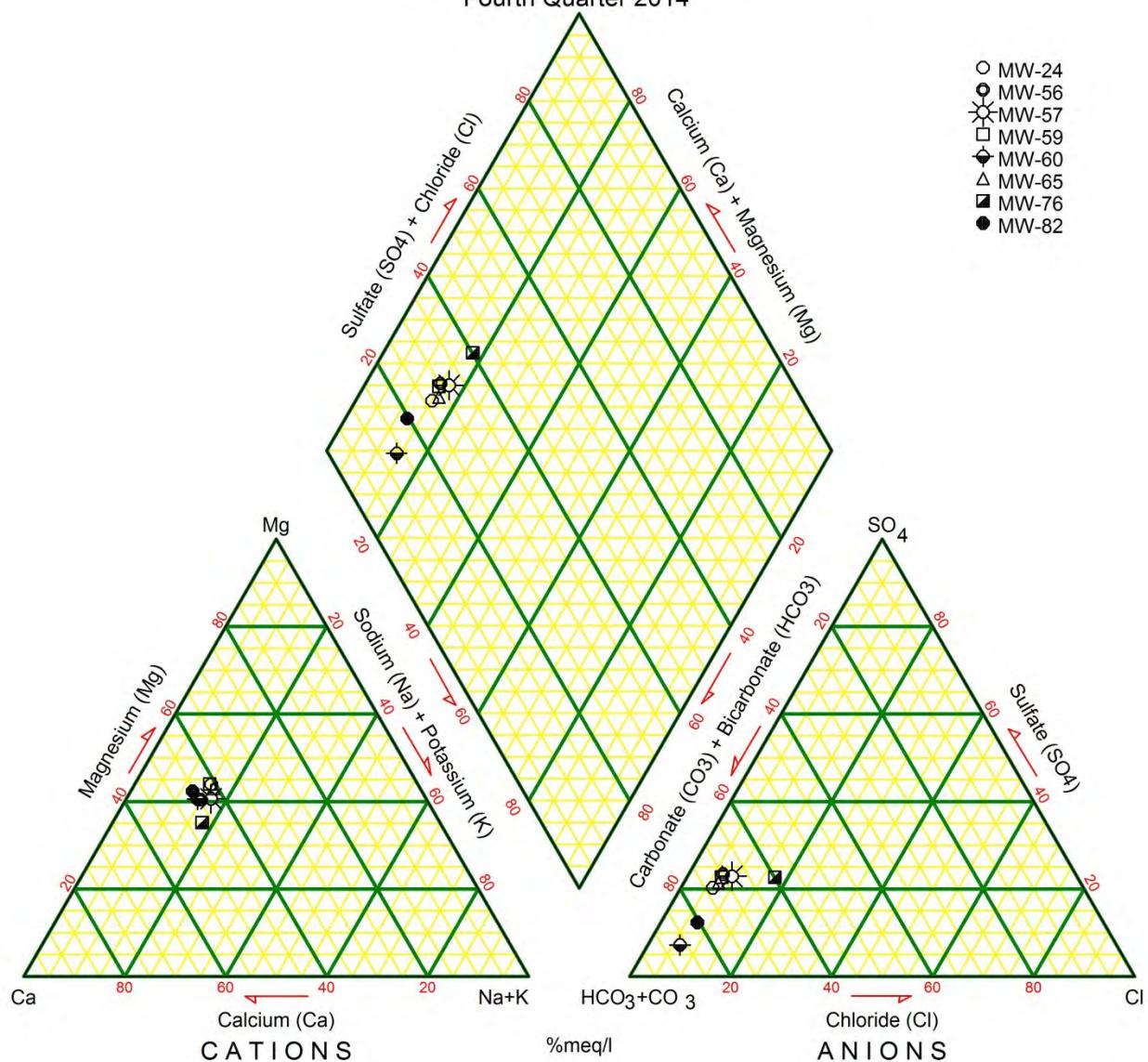
Site ID	Downgradient of North End Facilities																
	MW-86 10/27/14			MW-88 10/30/14			MW-89 10/9/14			MW-90 10/9/14			MW-43 No Sample				
Cations	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
Calcium	40.1	2	13.5	0.6736527	39.0	9.4	0.4705589	34.8	13.1	0.6536926	34.3	17.1	0.8532934	40.0			
Magnesium	24.3	2	9.1	0.7471714	43.2	7.4	0.6097511	45.1	10.6	0.8722485	45.7	11.4	0.9380786	44.0			
Potassium	39.1	1	1.2	0.0299246		1.7	1.0	0.0244512	1.8	1.5	0.0373418	2.0	1.4	0.0347841	1.6		
Sodium	23.0	1	6.2	0.2688152	15.6	5.6	0.2453265	18.2	7.0	0.3031783	15.9	5.7	0.2488063	11.7			
Iron	55.8	2	0.22	0.0078787	0.5	0.01	0.0003581	0.0	0.88	0.0313356	1.6	1.30	0.0465558	2.2			
Manganese	54.9	2	0.01	0.000249	0.0	0.00	3.64E-05	0.0	0.21	0.0077542	0.4	0.26	0.0094288	0.4			
Ammonia-N	14.0	1	0.01	0.0007139	0.0	0.01	0.0007139	0.1	0.02	0.0013565	0.1	0.02	0.0011351	0.1			
<b>Total Cations (meq/L)</b>				<b>1.7</b>			<b>1.4</b>			<b>1.9</b>			<b>2.1</b>				
Anions																	
Alkalinity, Total			65		49			74				62					
Carbonate	60.0	2	0.0179705	0.000599	0.0	0.0188986	0.00063	0.1	0.1257561	0.0041919	0.2	0.0399123	0.0013304	0.1			
Bicarbonate	61.0	1	79.75	1.3072038	72.7	59.38	0.9732233	79.8	90.51	1.48355844	75.7	75.56	1.2384828	62.5			
Chloride	35.5	1	4.5	0.1255183	7.0	2.3	0.0648746	5.3	4.4	0.1252362	6.4	5.6	0.1582377	8.0			
Nitrate-N	14.0	1	0.45	0.0322696	1.8	0.55	0.0394089	3.2	0.01	0.0007139	0.0	0.02	0.0010709	0.1			
Sulfate	96.1	2	16.0	0.3331335	18.5	6.8	0.1417899	11.6	16.6	0.345626	17.6	28.0	0.5829835	29.4			
<b>Total Anions (meq/L)</b>				<b>1.8</b>			<b>1.2</b>			<b>2.0</b>			<b>2.0</b>				
<b>Total Ions (meq/L)</b>				<b>3.5</b>			<b>2.6</b>			<b>3.9</b>			<b>4.1</b>				
<b>Cation/Anion Ratio</b>				<b>0.96</b>			<b>1.11</b>			<b>0.97</b>			<b>1.08</b>				
<b>Percent Difference</b>				<b>-2.0</b>			<b>5.1</b>			<b>-1.4</b>			<b>3.6</b>				
<b>Trilinear Diagram Data</b>																	
sum (Ca, Mg, Na+K)				1.72			1.35			1.87			2.07				
Calcium					39.18			34.85			35.02			41.12			
Magnesium					43.45			45.16			46.73			45.21			
Sodium + Potassium					17.37			19.98			18.24			13.67			
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )				1.77			1.18			1.96			1.98				
Sulfate					18.859			12.011			17.646			29.428			
Chloride					7.106			5.495			6.394			7.988			
Bicarbonate + Carbonate					74.035			82.494			75.960			62.584			



## Cedar Hills Regional Landfill

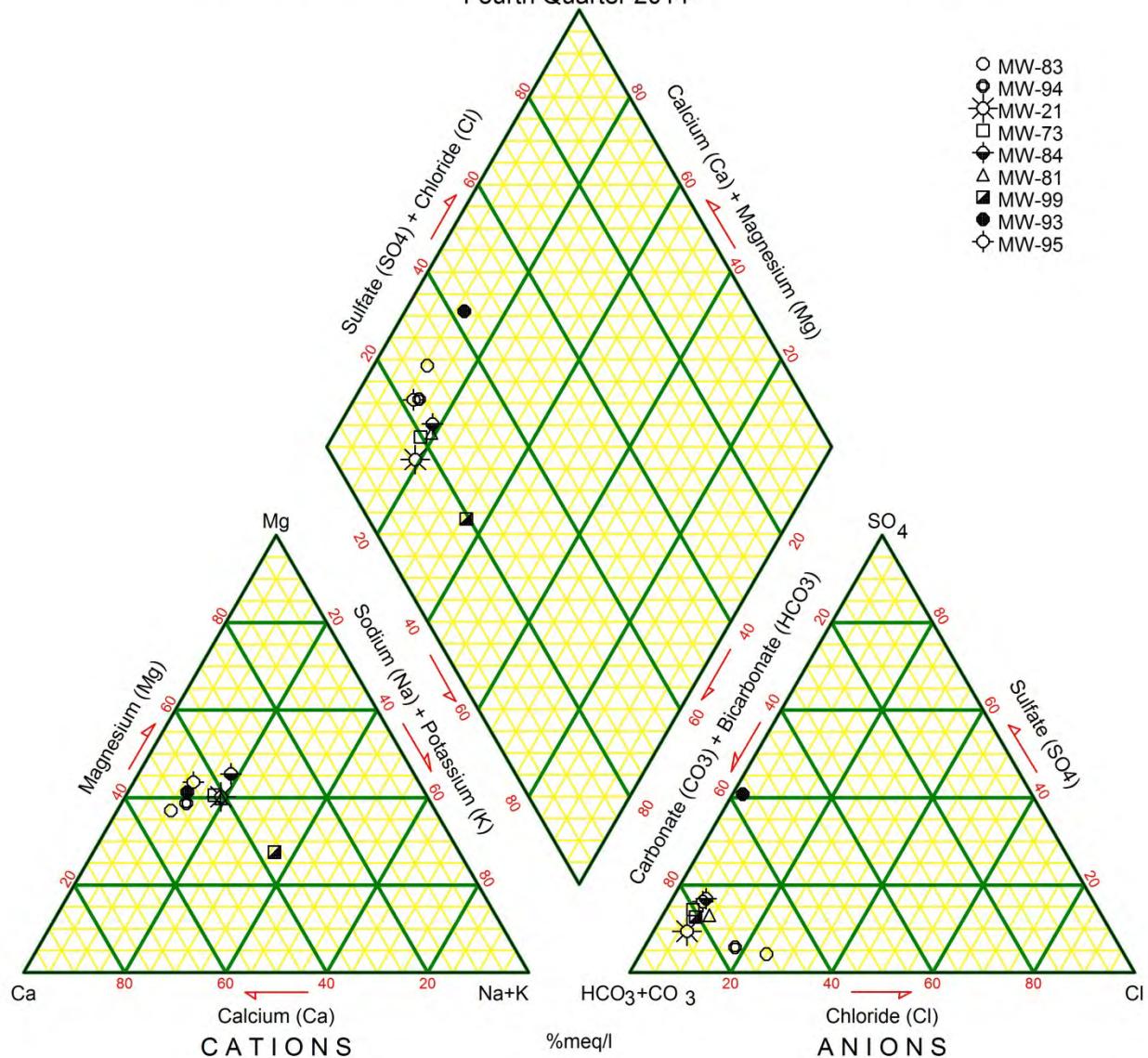
Figure 2. Regional Aquifer South Upgradient Wells

Fourth Quarter 2014



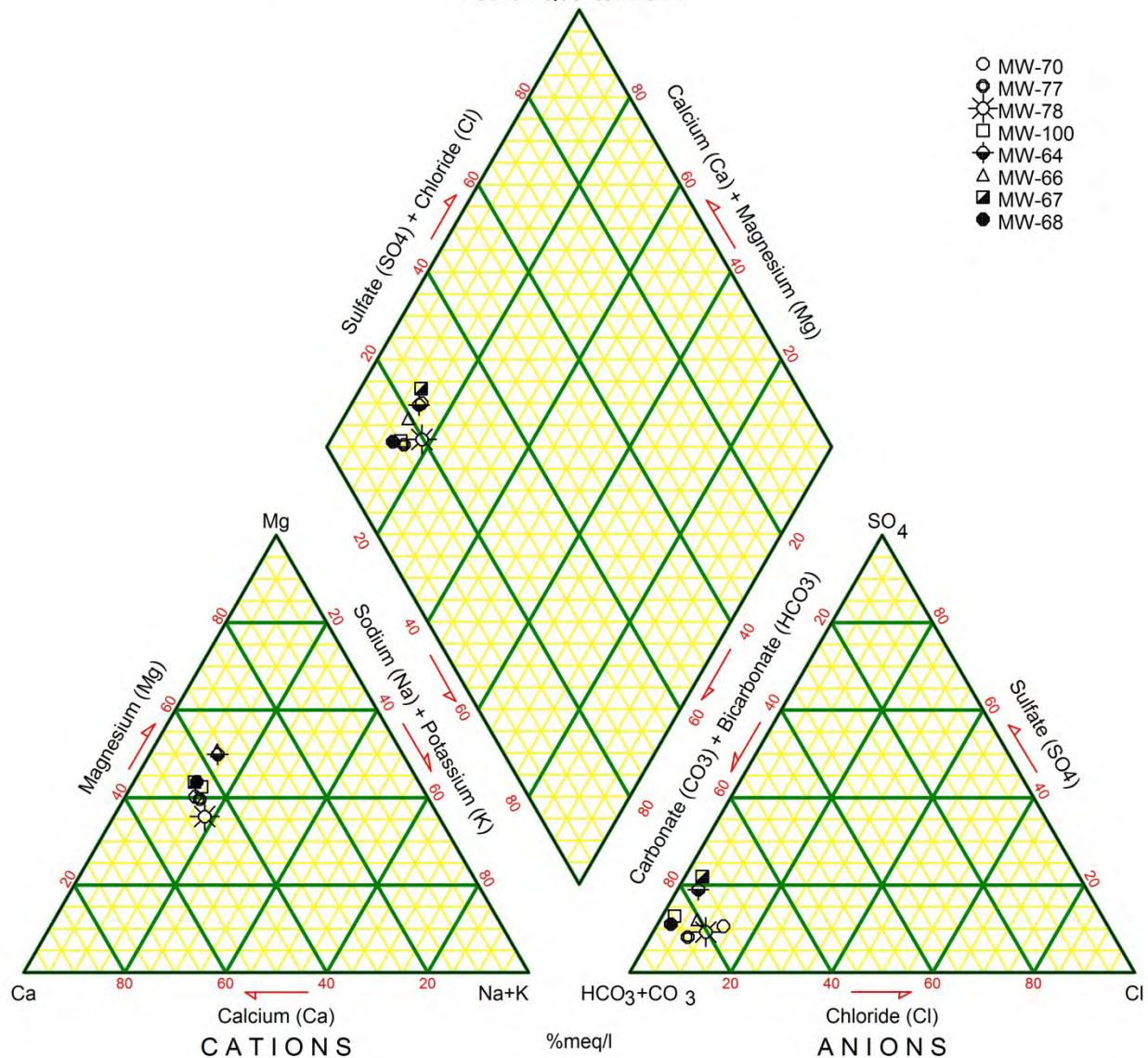
### Cedar Hills Regional Landfill

Figure 3. Regional Aquifer S Upgradient NW and NE Crossgradient Wells  
Fourth Quarter 2014

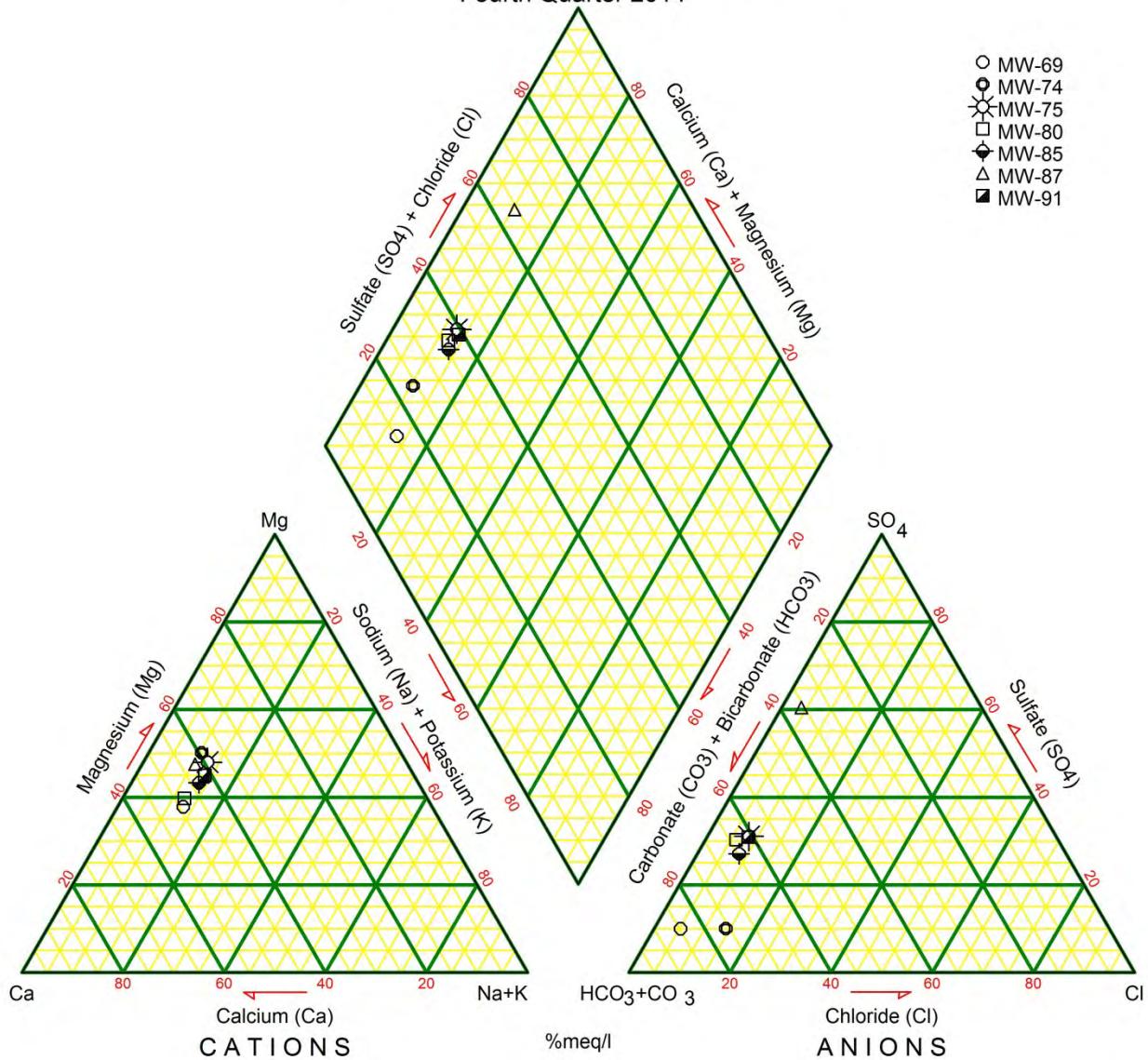


## Cedar Hills Regional Landfill

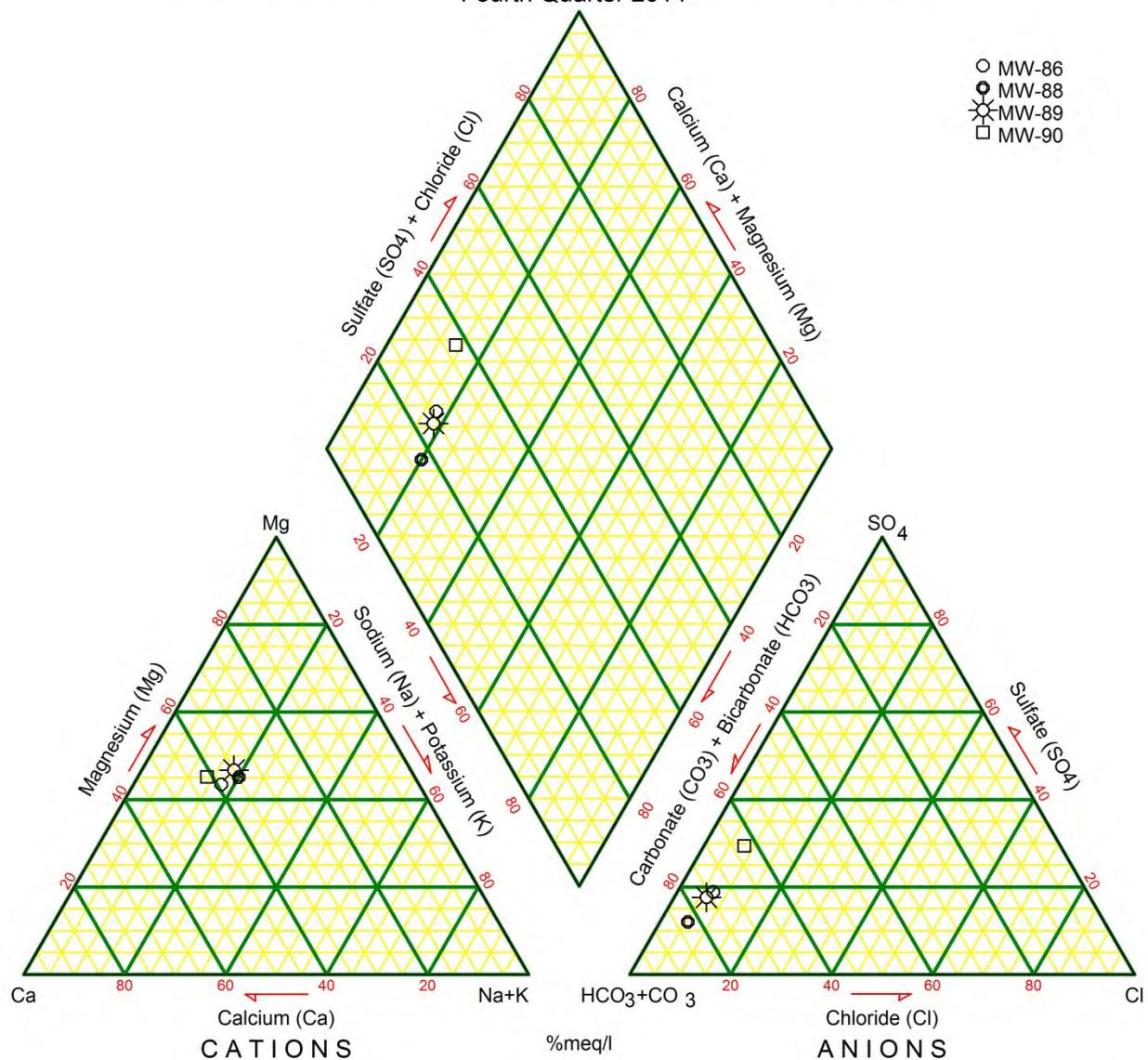
Figure 4. Regional Aquifer wells Interior and Vertical to Facilities  
Fourth Quarter 2014



**Cedar Hills Regional Landfill**  
**Figure 5. Regional Aquifer Downgradient Wells**  
**Fourth Quarter 2014**



**Cedar Hills Regional Landfill**  
**Figure 6. Regional Aquifer Wells Downgradient of Northend Facilities**  
**Fourth Quarter 2014**





**TABLE 5**  
**CEDAR HILLS REGIONAL LANDFILL REGIONAL AQUIFER**  
**SUMMARY OF WAC 173-351 APPENDIX I INTRAWELL PREDICTION LIMIT EXCEEDANCES**  
(Data Collected from October 1, 2014 to December 31, 2014)

Parameter	Units	Well ID	Sample Date	Sample Value	Intrawell Limit Value
<b>South, Northeast and Northwest Upgradient and Crossgradient Wells</b>					
cis 1,2-Dichloroethene	ug/L	MW-59	10/06/14	0.895	0.679
Barium, Dissolved	mg/L	MW-83	10/06/14	0.00696	0.00643
<b>Interior and Vertical to Facilities Wells</b>					
Arsenic, Dissolved	mg/L	MW-68	10/13/14	0.0177	0.005
<b>Wells Downgradient to Waste Cells and North end Facilities</b>					
NO PREDICTION LIMIT EXCEEDANCES THIS QUARTER					



**TABLE 6**  
**CEDAR HILLS REGIONAL LANDFILL**  
**VOLATILE ORGANIC COMPOUND DETECTIONS IN REGIONAL AQUIFER WELLS**  
(Data Collected from October 1, 2014 to December 31, 2014)

Analyte	Site ID	Date	Sample ID	ug/L
<b>South, Northeast and Northwest Upgradient and Crossgradient Wells</b>				
cis-1,2-Dichloroethene	MW-24	10/3/2014	W24-141003-	0.22 T
	MW-56	10/6/2014	W56-141006-	1.21
	MW-59	10/6/2014	W59-141006-	0.895
	MW-76	10/21/2014	W76-141021-	0.531
Tetrachloroethene	MW-76	10/21/2014	W76-141021-	0.543
Trichloroethene	MW-76	10/21/2014	W76-141021-	9.65
	MW-82	10/3/2014	W82-141003-	5.17
	MW-83	10/6/2014	W83-141006-	2.1
	MW-94	10/10/2014	W94-141010-	2.87
Vinyl Chloride	MW-65	10/9/2014	W65-141009-	0.0395
<b>Interior and Vertical to Facilities Wells</b>				
Trichloroethene	MW-78	10/22/2014	W78-141022-	0.531
<b>Downgradient Wells</b>				
Acetone	MW-74	12/19/2014	W74R141219-	7.9 T
	MW-75	12/19/2014	W75-141219-	8.1 T
	MW-87	12/19/2014	W87-141219-	10.4
	MW-88	10/30/2014	W88-141030-	4.05



**TABLE 7**  
**SUMMARY OF EXCEEDANCES OF WAC 173-200-040**  
**WATER QUALITY STANDARDS FOR GROUND WATERS OF THE STATE OF WASHINGTON**

**CEDAR HILLS REGIONAL LANDFILL PERCHED ZONES**  
**(Data Collected from October 1, 2014 to December 31, 2014)**

Parameter	Units	Well ID	Sample Date	Sample ID	Sample Value
<b>North and West Perched Wells</b>					
pH (field)	(pH units)	MW-28	12/23/14	W28-141223-	5.92
		MW-29	10/21/14	W29-141014-	5.79
Arsenic (Total)	(mg/L)	MW-27A	10/3/2014	W27A141003-	0.0147
		MW-28	12/23/2014	W28-141223-	0.0137
Manganese (Dissolved)	(mg/L)	MW-27A	10/3/2014	W27A141003-	0.0811
		MW-55	10/28/2014	W55-141028-	0.149
<b>East Perched Zone Wells</b>					
pH (field)	(pH units)	MW-30A	10/28/14	W30A141028-	6.03
		MW-EB6	12/23/14	WB6-141223-	6.01
Arsenic (Total)	(mg/L)	MW-EB6	12/23/14	WB6-141223-	0.00451
Iron (Dissolved)	(mg/L)	MW-47	10/28/14	W47-141028-	0.519 D
		MW-EB6	12/23/14	WB6-141223-	0.771
Manganese (Dissolved)	(mg/L)	MW-47	10/28/14	W47-141028-	2.05
		MW-EB6	12/23/14	WB6-141223-	0.0753
1,1-Dichloroethane	(ug/L)	MW-30A	10/28/14	W30A141028-	1.96
Total Dissolved Solids	(mg/L)	MW-47	10/28/14	W47-141028-	717
Vinyl Chloride	(ug/L)	MW-47	10/28/14	W47-141028-	5.16
<b>South Solid Waste Area Perched Wells</b>					
Arsenic (Total)	(mg/L)	MW-101	10/28/2014	W101141028-	0.00334
Manganese (Dissolved)	(mg/L)	MW-101	10/28/2014	W101141028-	0.154
Vinyl Chloride	(ug/L)	MW-101	10/28/2014	W101141028-	0.0667

See Data Qualifier List for Qualifier Information.



**Table 8****Ion Balance Calculations****Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

North and West Perched Wells													
Site ID	Date	MW-27A			MW-28			MW-29			MW-55		
		MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	
Cations													
Calcium		40.1	2	22.1	1.10279	56.5	7.9	0.39222	48.2	6.7	0.33283	49.3	
Magnesium		24.3	2	5.6	0.45834	23.5	2.0	0.16458	20.2	1.9	0.15717	23.3	
Potassium		39.1	1	3.4	0.0867	4.4	1.0	0.02443	3.0	0.4	0.01049	1.6	
Sodium		23.0	1	6.6	0.28708	14.7	5.3	0.23097	28.4	3.9	0.17138	25.4	
Iron		55.8	2	0.0	0.00036	0.0	0.0	0.00036	0.0	0.1	0.00246	0.4	
Manganese		54.9	2	0.1	0.00295	0.2	0.0	3.6E-05	0.0	0.0	4.2E-05	0.0	
Ammonia-N		14.0	1	0.2	0.01314	0.7	0.0	0.00071	0.1	0.0	0.00071	0.1	
<b>Total Cations (meq/L)</b>				<b>2.0</b>			<b>0.8</b>			<b>0.7</b>		<b>1.5</b>	
Anions													
Alkalinity, Total				75			25.6			25.6		66.6	
Carbonate		60.0	2	0.17061	0.00569	0.3	0.00128	4.3E-05	0.0	0.00095	3.2E-05	0.0	
Bicarbonate		61.0	1	91.03	1.49209	84.2	31.23	0.51188	57.3	31.23	0.51189	64.7	
Chloride		35.5	1	3.3	0.09252	5.2	2.8	0.0787	8.8	3.2	0.08941	11.3	
Nitrate-N		14.0	1	0.0	0.00348	0.2	0.6	0.04505	5.0	2.1	0.14921	18.9	
Sulfate		96.1	2	8.5	0.17739	10.0	12.4	0.25818	28.9	1.9	0.04018	5.1	
<b>Total Anions (meq/L)</b>				<b>1.8</b>			<b>0.9</b>			<b>0.8</b>		<b>1.6</b>	
<b>Total Ions (meq/L)</b>				<b>3.7</b>			<b>1.7</b>			<b>1.5</b>		<b>3.1</b>	
<b>Cation/Anion Ratio</b>				<b>1.10</b>			<b>0.91</b>			<b>0.85</b>		<b>0.92</b>	
<b>Percent Difference</b>				<b>4.8</b>			<b>-4.7</b>			<b>-7.9</b>		<b>-4.0</b>	
<b>TRILINEAR DIAGRAM DATA</b>													
sum (Ca, Mg, Na+K)				1.93			0.81			0.67		1.47	
Calcium					57.0			48.3			49.5		
Magnesium					23.7			20.3			23.4		
Sodium + Potassium					19.3			31.4			27.1		
							100.0			100.0			
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )				1.77			0.85			0.64		1.61	
Sulfate					10.0			30.4			6.3		
Chloride					5.2			9.3			13.9		
Bicarbonate + Carbonate					84.7			60.3			79.8		
												82.7	

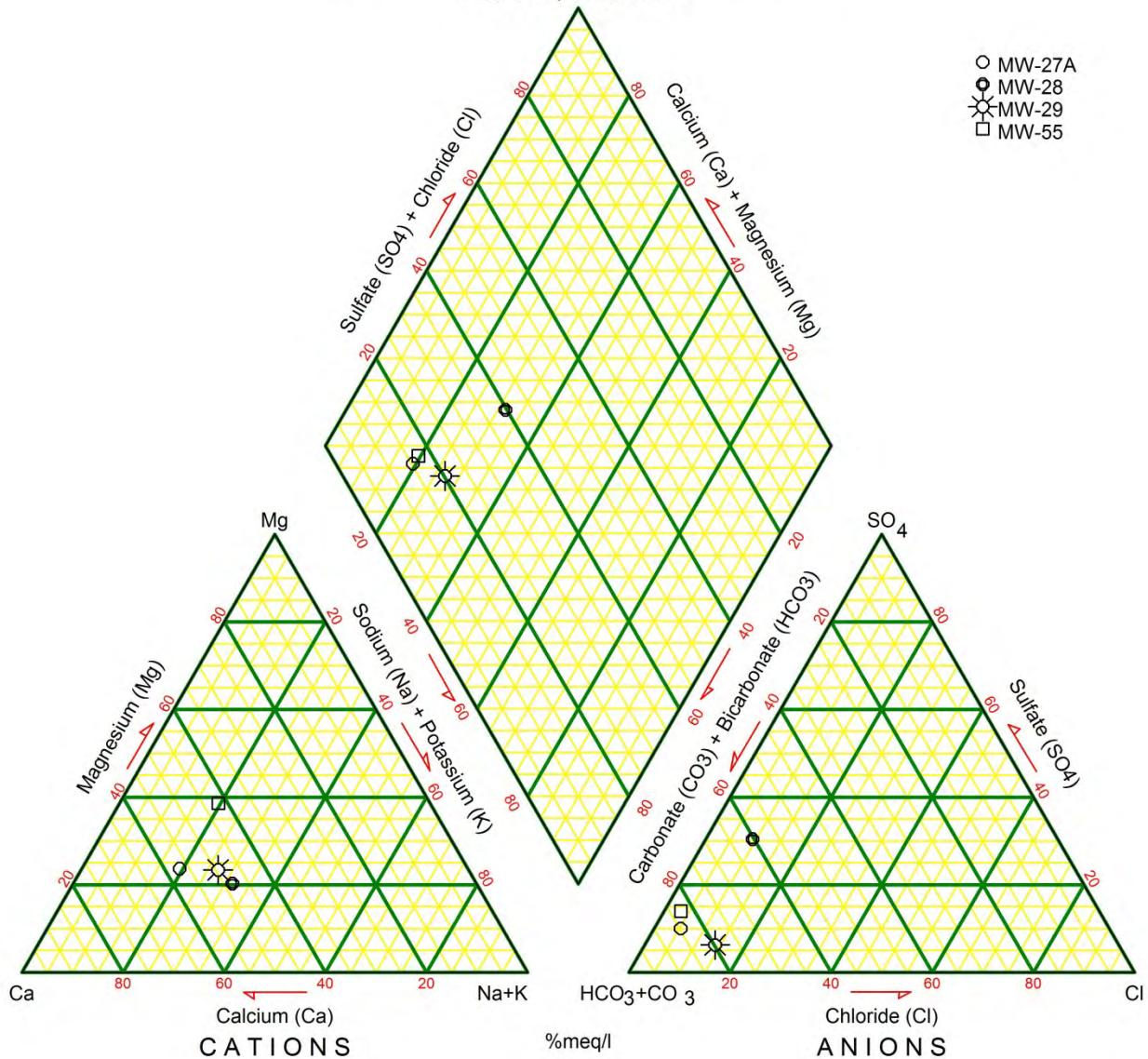
**Table 8****Ion Balance Calculations****Cedar Hills Landfill Perched Zones GW Monitoring Wells**

Data Collected from October 1, 2014 to December 31, 2014

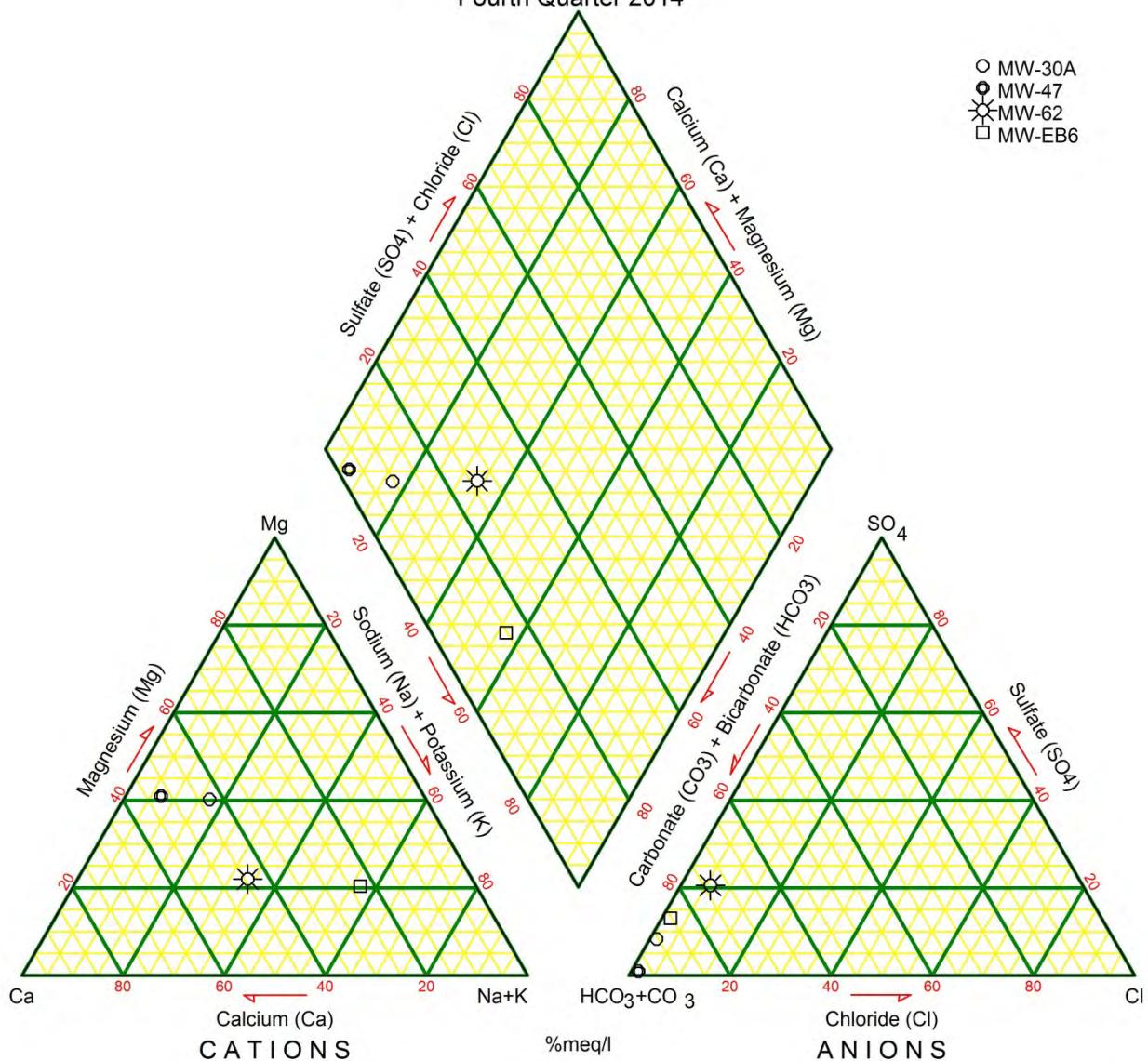
Site ID	Date	East Perched Zone												SSWA			
		MW-30A 10/28/14			MW-47 10/28/14			MW-62 No Sample			MW-EB6 No Sample			MW-101 10/28/14			
Cations	MW	n	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)	mg/L	meq/L	%(meq)
Calcium	40.1	2	31.1	1.5519	42.8	138.0	6.88623	51.6	14.9	0.74351	44.3	5.4	0.26996	21.4	45.8	2.28543	44.2
Magnesium	24.3	2	17.7	1.45649	40.2	66.0	5.43098	40.7	4.5	0.36865	22.0	2.9	0.24028	19.0	25.1	2.06542	40.0
Potassium	39.1	1	1.8	0.04527	1.2	5.1	0.13146	1.0	0.9	0.02384	1.4	1.1	0.02839	2.2	2.6	0.06675	1.3
Sodium	23.0	1	13.1	0.56982	15.7	18.2	0.79166	5.9	12.4	0.53937	32.2	14.7	0.63941	50.7	17.0	0.73946	14.3
Iron	55.8	2	0.0	0.00036	0.0	0.5	0.01859	0.1	0.0	0.00036	0.0	0.8	0.02761	2.2	0.2	0.00659	0.1
Manganese	54.9	2	0.0	5.8E-05	0.0	2.1	0.07463	0.6	0.0	3.6E-05	0.0	0.1	0.00274	0.2	0.2	0.00561	0.1
Ammonia-N	14.0	1	0.0	0.00071	0.0	0.1	0.0063	0.0	0.0	0.00071	0.0	0.8	0.05376	4.3	0.0	0.00071	0.0
<b>Total Cations (meq/L)</b>				<b>3.6</b>			<b>13.3</b>			<b>1.7</b>			<b>1.3</b>			<b>5.2</b>	
Anions																	
Alkalinity, Total			157			630			55.9			58.2			275		
Carbonate	60.0	2	0.01012	0.00034	0.0	0.26805	0.00894	0.1	0.01307	0.00044	0.0	0.00358	0.00012	0.0	0.15421	0.00514	0.1
Bicarbonate	61.0	1	191.52	3.13919	85.0	768.05	12.5892	97.5	68.17	1.1174	63.6	71.00	1.16371	82.5	335.19	5.49403	97.3
Chloride	35.5	1	1.6	0.04541	1.2	6.6	0.1856	1.4	3.2	0.08885	5.1	0.8	0.02327	1.6	2.3	0.066	1.2
Nitrate-N	14.0	1	3.1	0.21918	5.9	0.0	0.00093	0.0	3.4	0.23917	13.6	0.6	0.04598	3.3	0.0	0.00257	0.0
Sulfate	96.1	2	13.9	0.28941	7.8	5.8	0.12118	0.9	15.0	0.31231	17.8	8.6	0.17823	12.6	3.7	0.07787	1.4
<b>Total Anions (meq/L)</b>				<b>3.7</b>			<b>12.9</b>			<b>1.8</b>			<b>1.4</b>			<b>5.6</b>	
<b>Total Ions (meq/L)</b>				<b>7.3</b>			<b>26.2</b>			<b>3.4</b>			<b>2.7</b>			<b>10.8</b>	
<b>Cation/Anion Ratio</b>				<b>0.98</b>			<b>1.03</b>			<b>0.95</b>			<b>0.89</b>			<b>0.92</b>	
<b>Percent Difference</b>				<b>-0.9</b>			<b>1.7</b>			<b>-2.4</b>			<b>-5.6</b>			<b>-4</b>	
<b>TRILINEAR DIAGRAM DATA</b>																	
sum (Ca, Mg, Na+K)			3.62			13.24			1.68			1.18			5.16		
Calcium				42.8			52.0			44.38			22.92			44.32	
Magnesium				40.2			41.0			22.00			20.40			40.05	
Sodium + Potassium				17.0			7.0			33.62			56.69			15.63	
									100.0				100.0				
sum (SO <sub>4</sub> , Cl, HCO <sub>3</sub> +CO <sub>3</sub> )			3.47			12.90			1.52			1.37			5.64		
Sulfate				8.3			0.9			20.6			13.1			1.4	
Chloride				1.3			1.4			5.8			1.7			1.2	
Bicarbonate + Carbonate				90.4			97.6			73.6			85.2			97.5	
									100.0			100.0					

## Cedar Hills Regional Landfill

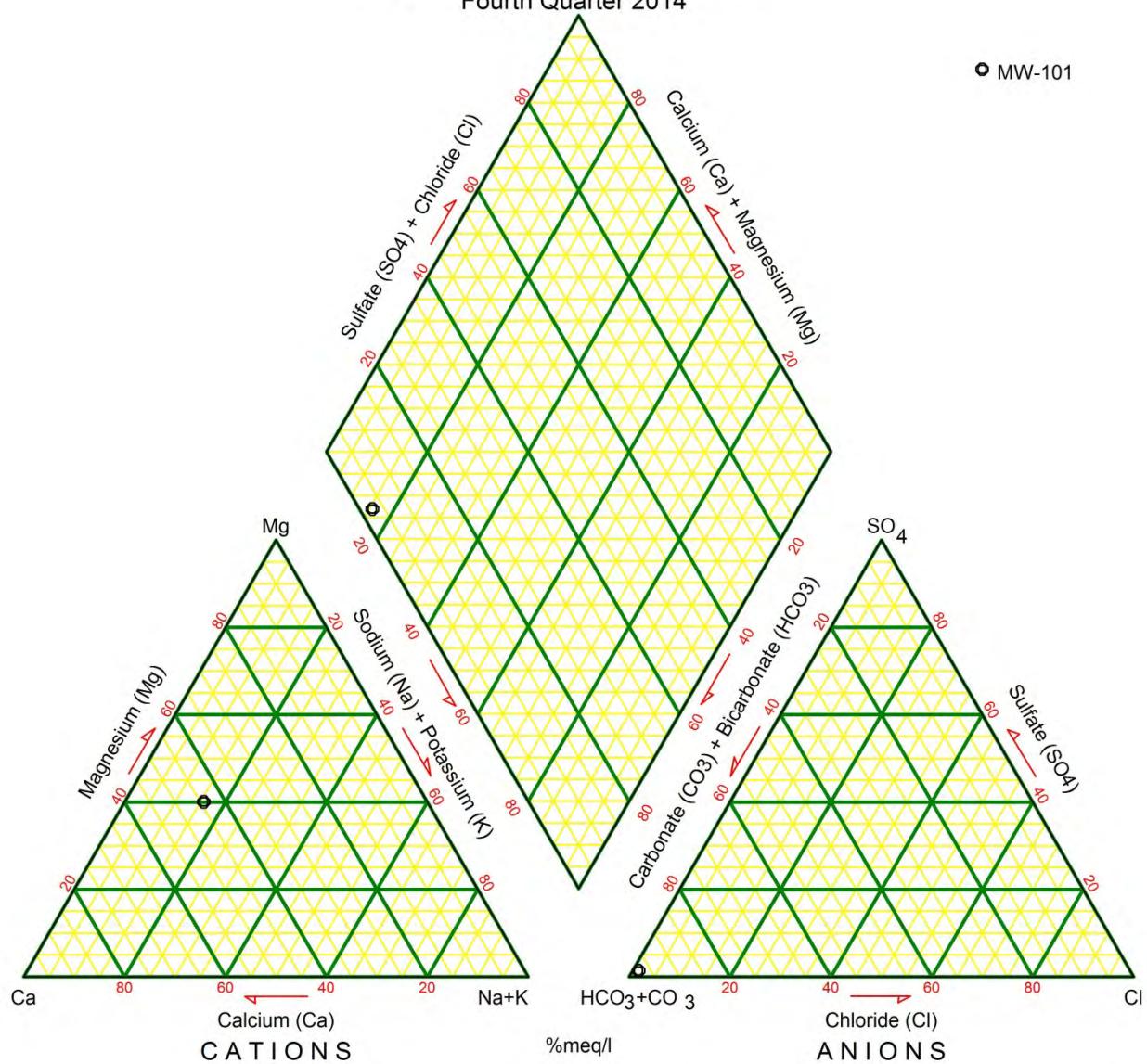
Figure 7. North and West Perched Zones Wells  
Fourth Quarter 2014



Cedar Hills Regional Landfill  
 Figure 8. East Perched Zone Wells  
 Fourth Quarter 2014



Cedar Hills Regional Landfill  
 Figure 9. SSWA Perched Zone Wells  
 Fourth Quarter 2014





**TABLE 9**  
**CEDAR HILLS REGIONAL LANDFILL PERCHED ZONES**  
**SUMMARY OF WAC 173-351 APPENDIX I INTRAWELL PREDICTION LIMIT EXCEEDANCES**  
(Data Collected from October 1, 2014 to December 31, 2014)

Parameter	Units	Well ID	Sample Date	Sample Value	Limit Value
NO PERCHED ZONE PREDICTION LIMIT EXCEEDANCES THIS QUARTER					



**TABLE 10**  
**CEDAR HILLS REGIONAL LANDFILL**  
**VOLATILE ORGANIC COMPOUND DETECTIONS IN PERCHED ZONE WELLS**  
(Data Collected from October 1, 2014 to December 31, 2014)

Analyte	Site ID	Date	Sample ID	ug/L
<b>North and West Perched Wells</b>				
Acetone	MW-28	12/23/2014	W28-141223-	9.6 T
<b>East Perched Zone Wells</b>				
Acetone	MW-30A	10/28/2014	W30A141028-	4.5
Chloroethane	MW-47	10/28/2014	W47-141028-	0.27 T
1,1-Dichloroethane	MW-30A	10/28/2014	W30A141028-	1.96
	MW-47	10/28/2014	W47-141028-	0.69
	MW-62	12/23/2014	W62-141223-	0.876
cis-1,2-Dichloroethene	MW-30A	10/28/2014	W30A141028-	5.44
	MW-47	10/28/2014	W47-141028-	1.92
	MW-62	12/23/2014	W62-141223-	2.02
Dichlorodifluoromethane	MW-47	10/28/2014	W47-141028-	2.91
Trichloroethene	MW-30A	10/28/2014	W30A141028-	0.935
Vinyl Chloride	MW-47	10/28/2014	W47-141028-	5.16
<b>South Solid Waste Area Perched Wells</b>				
Vinyl Chloride	MW-101	10/28/2014	W101141028-	0.0667

See Data Qualifier List for Qualifier Information.



**Table 11**  
**Surface Water Monitoring Activities 4th Quarter 2014**

Station ID	Date	Planned Activity	Sample ID	Comment
SW-E1	10/20/14	Quarterly Characterization Sample	NA	No Flow, No Sample
SW-E1	11/18/14	Monthly Characterization Sample	NA	No Flow, No Sample
SW-E1	12/16/14	Monthly Characterization Sample	SE1-141216M	
SW-GS1	10/20/14	Quarterly Characterization Sample	SGS1141020Q	
SW-GS1	11/20/14	Monthly Characterization Sample	SGS1141120M	
SW-GS1	12/9/14	NPDES Permit Sample	SGS1141209P	
SW-GS1	12/16/14	Monthly Characterization Sample	SGS1141216M	
SW-LP1	10/28/14	South Lagoon Inlet Characterization	SLP1141028P	
SW-LP1	11/17/14	South Lagoon Inlet Characterization	SLP1141117P	
SW-LP1	12/18/14	South Lagoon Inlet Characterization	SLP1141218P	
SW-LP2	10/28/14	South Lagoon Inlet Characterization	SLP2141028P	
SW-LP2	11/17/14	South Lagoon Inlet Characterization	SLP2141117P	
SW-LP2	12/18/14	South Lagoon Inlet Characterization	SLP2141218P	
SW-LP3	10/28/14	South Lagoon Inlet Characterization	NA	No Flow, No Sample
SW-LP3	11/17/14	South Lagoon Inlet Characterization	NA	No Flow, No Sample
SW-LP3	12/18/14	South Lagoon Inlet Characterization	NA	No Flow, No Sample
SW-MC	10/21/14	Quarterly Characterization Sample	SMC-141021Q	
SW-MC	11/17/14	Monthly Characterization Sample	SMC-141117M	
SW-MC	12/17/14	Monthly Characterization Sample	SMC-141217M	
SW-N1	10/20/14	Quarterly Characterization Sample	SN1-141020Q	
SW-N1	11/18/14	Monthly Characterization Sample	SN1-141118M	
SW-N1	12/16/14	Monthly Characterization Sample	SN1-141216M	
SW-N4	10/20/14	Quarterly Characterization Sample	SN4-141020Q	
SW-N4	11/18/14	Monthly Characterization Sample	SN4-141118M	
SW-N4	11/18/14	QA/QC Sample	SN4-141118D	
SW-N4	12/9/14	NPDES Permit Sample	SN4-141209P	
SW-N4	12/16/14	Monthly Characterization Sample	SN4-141216M	
SW-S1	10/20/14	Quarterly Characterization Sample	NA	
SW-S1	11/20/14	Monthly Characterization Sample	SS1-141120M	
SW-S1	12/16/14	Monthly Characterization Sample	SS1-141216M	
SW-S2	10/20/14	Quarterly Characterization Sample	SS2-141020Q	
SW-S2	11/20/14	Monthly Characterization Sample	SS2-141120M	
SW-S2	12/16/14	Monthly Characterization Sample	SS2-141216M	
SW-S3	10/20/14	Quarterly Characterization Sample	NA	No Flow, No Sample
SW-S3	11/20/14	Monthly Characterization Sample	NA	No Flow, No Sample
SW-S3	12/16/14	Monthly Characterization Sample	NA	No Flow, No Sample
SW-S3	12/16/14	QA/QC Sample	SSL3141020Q	
SW-SL3	10/20/14	Quarterly Characterization Sample	SSL3141020D	
SW-SL3	10/20/14	QA/QC Sample	SSL3141028P	
SW-SL3	10/28/14	NPDES Permit Sample	SSL3141028P	
SW-SL3	11/17/14	NPDES Permit Sample	SSL3141117P	
SW-SL3	11/20/14	Monthly Characterization Sample	SSL3141120M	
SW-SL3	12/9/14	NPDES Permit Sample	SSL3141209P	
SW-SL3	12/16/14	Monthly Characterization Sample	SSL3141216M	
SW-SL3	12/18/14	NPDES Permit Sample	SSL3141218P	
SW-V	10/20/14	Quarterly Characterization Sample	NA	No Flow, No Sample

**Table 11**  
**Surface Water Monitoring Activities 4th Quarter 2014**

Station ID	Date	Planned Activity	Sample ID	Comment
SW-V	11/18/14	Monthly Characterization Sample	NA	No Flow, No Sample
SW-V	12/16/14	Monthly Characterization Sample	NA	No Flow, No Sample
SW-W	10/21/14	Quarterly Characterization Sample	NA	No Flow, No Sample
SW-W	11/17/14	Monthly Characterization Sample	SW--141117Q	
SW-W	12/17/14	Monthly Characterization Sample	SW--141217M	
SW-W1	10/20/14	Quarterly Characterization Sample	SW1-141020Q	
SW-W1	11/18/14	Monthly Characterization Sample	SW1-141118M	
SW-W1	12/16/14	Monthly Characterization Sample	SW1-141216M	
SW-W2	10/20/14	Quarterly Characterization Sample	NA	No Flow, No Sample
SW-W2	11/20/14	Monthly Characterization Sample	SW2-141120M	
SW-W2	12/16/14	Monthly Characterization Sample	SW2-141216M	
Field Blank	10/21/14	QA/QC Sample	SMC-1410S1F	
Field Blank	12/16/14	QA/QC Sample	SS1-141216F	
Staff Gages	10/16/14	Monthly Stream Gage Levels	NA	
Staff Gages	10/20/14	Monthly Stream Gage Levels	NA	
Staff Gages	11/18/14	Monthly Stream Gage Levels	NA	
Staff Gages	11/19/14	Monthly Stream Gage Levels	NA	
Staff Gages	12/15/14	Monthly Stream Gage Levels	NA	
Staff Gages	12/16/14	Monthly Stream Gage Levels	NA	

<sup>1</sup> No sample ID assigned, No sample collected.

**TABLE 12**  
**CEDAR HILLS LANDFILL**  
**SUMMARY OF ISGP<sup>\*</sup> STORMWATER PERMIT EXCEEDANCES**  
**(Data Collected from October 1, 2014 to December 31, 2014)**

Parameter	Units	Sampling Location	Date	Value	Regulatory Limit	Type
Turbidity (Quarterly Average)	NTU	SW-GS1	4th Quarter	110.5	25	Benchmark
TSS (Daily Maximum)	mg/L	SW-GS1	12/9/14	131	88	Effluent Limit
TSS (Monthly Average)	mg/L	SW-GS1	December	68.75	27	Effluent Limit

<sup>\*</sup>ISGP - Industrial General Stormwater Permit



**TABLE 13**  
**CEDAR HILLS REGIONAL LANDFILL**  
**VOLATILE ORGANIC COMPOUND DETECTIONS IN BLANKS**  
(Data Collected from October 1, 2014 to December 31, 2014)

Analyte	Site ID	Date	Sample ID	ug/L
Acetone	FIELD BLANK	12/19/2014	W75-141219F	10.1
	METHOD BLANK	10/6/2014	WG135362-1	2.2
	VOA TRIP BLANK	10/6/2014	VTRP141003B	2.5
	VOA TRIP BLANK	12/19/2014	VTRP141219B	2.5
Methylene Chloride	METHOD BLANK	10/6/2014	WG135362-1	1.79
	VOA TRIP BLANK	10/10/2014	VTRP141009B	0.21 T
	VOA TRIP BLANK	10/10/2014	VTRP141010C	0.23 T
	VOA TRIP BLANK	10/15/2014	VTRP141014C	0.2 T
	VOA TRIP BLANK	10/20/2014	VTRP141016L	0.21 T
	VOA TRIP BLANK	11/24/2014	VTRP141121C	0.2 T
Toluene	FIELD BLANK	12/10/2014	L46N141210F	0.527

See Data Qualifier List for Qualifier Information.



**Table 14**  
**Groundwater Quality Criteria**

Analyte	CAS No.	Ground Water Quality Criteria Criterion*
<b>I. PRIMARY AND SECONDARY CONTAMINANTS AND RADIONUCLIDES</b>		
<b>A. Primary Contaminants</b>		
Barium	7440-39-3	1.0 mg/L
Cadmium	7440-43-9	0.005 mg/L
Chromium	7440-47-3	0.05 mg/L
Lead	7439-92-1	0.015 mg/L
Mercury	7439-97-6	0.002 mg/L
Selenium	7782-49-2	0.01 mg/L
Silver	7440-22-4	0.05 mg/L
Fluoride	16984-48-8	4.0 mg/L
Nitrate	14797-55-8	10.0 mg/L
Endrin	72-20-8	0.2 ug/L
Methoxychlor	72-43-5	40 ug/L
1,1,1-Trichloroethane	71-55-6	200 ug/L
2,4-D	94-75-7	70 ug/L
2,4,5-TP	93-72-1	100 ug/L
Total Coliforms		1/100 mL
<b>B. Secondary Standards</b>		
Copper	7440-50-8	1.0 mg/L
Iron	7439-89-6	0.3 mg/L
Manganese	7439-96-5	0.05 mg/L
Zinc	7440-66-6	5.0 mg/L
Chloride	16887-00-6	250 mg/L
Sulfate	14808-79-8	250 mg/L
Total Dissolved Solids		500 mg/L
Foaming Agents		0.5 mg/L
pH	12408-02-5	6.5-8.5 units
Corrosivity		non-corrosive
Color		15 units
Odor-Threshold		3 units
<b>C. Radionuclides and Radioactivity</b>		
Gross Alpha particle activity		15 pCi/L
Gross Beta particle activity		50 pCi/L
Tritium	10028-17-8	20,000 pCi/L
Strontium	7440-24-6	8 pCi/L
Radium 226 & Radium 228		5 pCi/L
Radium 226	13982-63-3	3 pCi/L
<b>II. CARCINOGENS</b>		
1,1-Dichloroethane	75-34-3	1 ug/L
1,2-Dichloroethane	107-06-2	0.5 ug/L
1,2-Dichloropropane	78-87-5	0.6 ug/L
1,2-Dimethylhydrazine	540-73-8	60 ug/L
1,2-Diphenylhydrazine	122-66-7	0.09 ug/L
1,3-Dichloropropene tot.	542-75-6	0.2 ug/L
1,4-Dichlorobenzene	106-46-7	4 ug/L
1,4-Dioxane	123-91-1	7 ug/L
2,3,7,8-Tetrachlorodibenzo-p-dioxin	1746-01-6	0.0000006 ug/L
2,4,6-Trichlorophenol	88-06-2	4.0 ug/L
2,4-Dinitrotoluene	121-14-2	0.1 ug/L
2,4-Toluenediamine	95-80-7	0.002 ug/L
2,6-Dinitrotoluene	606-20-2	0.1 ug/L
2-Methoxy-5-nitroaniline	99-59-2	2.0 ug/L
2-Methylaniline	95-53-4	0.2 ug/L
2-Methylaniline hydrochloride	636-21-5	0.5 ug/L
3,3'-Dichlorobenzidine	91-94-1	0.2 ug/L
3,3'-Dimethoxybenzidine	119-90-4	6.0 ug/L
3,3-Dimethylbenzidine	119-93-7	0.007 ug/L
4,4'-Methylene bis(N,N'-dimethyl) aniline	101-61-1	2.0 ug/L
4-Chloro-2-methyl analine	95-69-2	0.1 ug/L
4-Chloro-2-methyl analine hydrochloride	3165-93-3	0.2 ug/L
Acrylamide	79-06-1	0.02 ug/L
Acrylonitrile	107-13-1	0.07 ug/L
Aldrin	309-00-2	0.005 ug/L
Aniline	62-53-3	14 ug/L
Aramite	140-57-8	3 ug/L
Arsenic	7440-38-2	0.00005 mg/L
Azobenzene	103-33-3	0.7 ug/L
Benzene	71-43-2	1 ug/L

**Table 14**  
**Groundwater Quality Criteria**

Analyte	CAS No.	Ground Water Quality Criteria Criterion*	
Benzidine	92-87-5	0.0004	ug/L
Benzo(a)pyrene	50-32-8	0.008	ug/L
Benzotrichloride	98-07-7	0.007	ug/L
Benzyl chloride	100-44-7	0.5	ug/L
Bis(2-ethylhexyl)phthalate	117-81-7	6	ug/L
Bis(chloroethyl)ether	111-44-4	0.07	ug/L
Bis(chloromethyl)ether	542-88-1	0.0004	ug/L
Bromodichloromethane	75-27-4	0.3	ug/L
Bromoform	75-25-2	5	ug/L
Carbazole	86-74-8	5	ug/L
Carbon Tetrachloride	56-23-5	0.3	ug/L
Chlordane	5103-71-9	0.06	ug/L
Chlorodibromomethane	124-48-1	0.5	ug/L
Chloroform	67-66-3	7	ug/L
Chlorthalonil	1897-45-6	30	ug/L
DDT (includes DDE and DDD)	50-29-3, 72-55-9, 72-54-8	0.3	ug/L
Diallate	2303-16-4	1	ug/L
Dichlorovos	62-73-7	0.3	ug/L
Dieldrin	60-57-1	0.005	ug/L
Direct Black 38	1937-37-7	0.009	ug/L
Direct Blue 6	2602-46-2	0.009	ug/L
Direct Brown 95	16071-86-6	0.009	ug/L
Epichlorohydrin	106-89-8	8	ug/L
Ethyl acrylate	140-88-5	2	ug/L
Ethylene dibromide	106-93-4	0.001	ug/L
Ethylene thiourea	96-45-7	2	ug/L
Folpet	133-07-3	20	ug/L
Furazolidone	67-45-8	0.02	ug/L
Furium	531-82-8	0.002	ug/L
Furmecyclox	60568-05-0	3	ug/L
Heptachlor	76-44-8	0.02	ug/L
Heptachlor epoxide	1024-57-3	0.009	ug/L
Hexachlorobenzene	118-74-1	0.05	ug/L
Hexachlorocyclohexane (alpha)	319-84-6	0.001	ug/L
Hexachlorocyclohexane (technical)	608-73-1	0.05	ug/L
Hexachlorodibenzo-p-dioxin, mix	34465-46-8	0.000001	ug/L
Hydrazine/hydrazine sulfate	302-01-2/10034-93-2	0.03	ug/L
Lindane	58-89-9	0.06	ug/L
Methylene Chloride	75-09-2	5	ug/L
Mirex	2385-85-5	0.05	ug/L
Nitrofurazone	59-87-0	0.06	ug/L
N-Nitrosodiethanolamine	1116-54-7	0.03	ug/L
N-Nitrosodiethylamine	55-18-5	0.0005	ug/L
N-Nitrosodimethylamine	62-75-9	0.002	ug/L
N-Nitroso-di-n-butylamine	924-16-3	0.02	ug/L
N-Nitroso-di-n-propylamine	621-64-7	0.01	ug/L
N-Nitrosodiphenylamine	86-30-6	17.0	ug/L
N-Nitroso-N-methylethylamine	10595-95-6	0.004	ug/L
N-Nitrosopyrrolidine	930-55-2	0.04	ug/L
o-Chloronitrobenzene	88-73-3	3	ug/L
o-Phenylenediamine	95-54-5	0.005	ug/L
o-Toluidine	95-53-4	0.2	ug/L
p,a,a-a-Tetrachlorotoluene	5216-25-1	0.004	ug/L
PAHs [Benzo(a)pyrene]		0.01	ug/L
PBBs	59536-65-1	0.01	ug/L
PCBs c	27323-18-8	0.01	ug/L
p-Chloronitrobenzene	100-00-5	5	ug/L
Propylene oxide	75-56-9]	0.01	ug/L
Tetrachloroethylene	127-18-4	0.8	ug/L
Toxaphene c	8001-35-2	0.08	ug/L
Trichloroethylene (TCE)	79-01-6	3	ug/L
Trimethyl phosphate	512-56-1	2.0	ug/L
Vinyl chloride	75-01-4	0.02	ug/L

NOTES: pCi/L=picuries per liter

mg/L=milligrams per liter

ug/L=micrograms per liter

\*Ground Water Quality Criteria=173-200 WAC Water Quality Standards  
for Ground Waters of the State of Washington

**TABLE 15**  
**CEDAR HILLS LANDFILL**  
**INDUSTRIAL STORMWATER GENERAL PERMIT**

**BENCHMARKS and EFFLUENT LIMITS**

<b>Parameter</b>	<b>Units</b>	<b>Minimum Sampling Frequency</b>	<b>Benchmark</b>	<b>Effluent Limit</b>	
				<b>Monthly Average</b>	<b>Daily Maximum</b>
pH	Std. Units	Quarterly	5.0 to 9.0	6.0 to 9.0	
Turbidity	NTU	Quarterly	25	--	--
Oil Sheen	Yes/No	Quarterly	None Visible	--	--
Copper, Total	ug/L	Quarterly	14	--	--
Zinc, Total	ug/L	Quarterly	117	110	200
BOD	mg/L	Quarterly	--	37	140
TSS	mg/L	Quarterly	--	27	88
Ammonia-N	mg/L	Quarterly	--	4.9	10
Alpha Terpineol	ug/L	Quarterly	--	16	33
Benzoic Acid	ug/L	Quarterly	--	71	120
4-Methylphenol*	ug/L	Quarterly	--	14	25
Phenol	ug/L	Quarterly	--	15	26

\* Analytical result reported as the total of 3-Methylphenol (CAS RN 108-39-4) and 4-Methylphenol (CAS RN 106-44-5)



**TABLE 16**  
**CEDAR HILLS REGIONAL LANDFILL**  
**LABORATORY DATA REVIEW - SUSPECT DATA ALL MATRICES**  
(Data Collected from October 1, 2014 to December 31, 2014)

Parameter	Units	Well ID	Sample Date	Sample ID	Sample Value	Cause of Unuseability
Acetone	ug/L	MW-27A Duplicate	10/3/2014	W27A141003D	4.08 B	Blank Contamination
		MW-74	12/19/2014	W74R141219-	7.9 T	Blank Contamination
		MW-75	12/19/2014	W75-141219-	8.1 T	Blank Contamination
		MW-87	12/19/2014	W87-141219-	10.4	Blank Contamination
		VOA TRIP BLANK	10/2/2014	VTRP141003B	4 BT	Blank Contamination