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December 1, 2013

Daniel R. Gravatt
Remedial Project Manager
Missouri/Kansas Remedial Branch - Superfund Division
U.S. Environmental Protection Agency – Region 7
11201 Renner Boulevard
Lenexa, KS 66129

SUBJECT: Groundwater Monitoring Report
July 2013 Additional Groundwater Sampling Event
West Lake Landfill Operable Unit 1, Bridgeton, Missouri

Dear Mr. Gravatt,

On behalf of Cotter Corporation (N.S.L.), Laidlaw Waste Systems (Bridgeton), Inc., Rock Road Industries, Inc., and the United Sates Department of Energy (the "Respondents"), enclosed please find two copies of the Groundwater Monitoring Report for the July 2013 Additional Groundwater Sampling Event. We have also transmitted one copy of the report to the Shawn Muenks of the Missouri Department of Natural Resources. If you have any questions or need additional copies, please do not hesitate to contact me.

Sincerely,
ENGINEERING MANAGEMENT SUPPORT, Inc.

Paul V. Rosasco, P.E.

Enclosure

Distribution:

Audrey Asher – USEPA (via electronic mail only)
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Groundwater Monitoring Report

July 2013 Additional Groundwater Sampling Event

West Lake Landfill Operable Unit-1

Prepared for

The United States Environmental Protection Agency Region VII

Prepared on behalf of

The West Lake Landfill OU-1 Respondents

Prepared by

Engineering Management Support, Inc.
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December 1, 2013

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1. INTRODUCTION

In January 2013 the U.S. Environmental Protection Agency, Region VII (EPA) directed the West Lake Landfill Operable Unit-1 (OU-1) Respondents to perform additional groundwater sampling at the West Lake Landfill Superfund Site. Discussions with EPA resulted in a decision to perform three additional rounds of groundwater sampling in April, July and October 2013. Engineering Management Support Inc. (EMSI), on behalf of Cotter Corporation (N.S.L.), Bridgeton Landfill, LLC and Rock Road Industries, Inc., and with funding provided by the United States Department of Energy (collectively, the OU-1 Respondents), prepared this report presenting the results of the July 2013 groundwater sampling.

EPA requested that, similar to the July/August 2012 additional groundwater monitoring event, all available groundwater monitoring wells at the West Lake Landfill Superfund Site property be included in the July 2013 groundwater sampling event. This includes:

- Those wells still in existence from the group of 30 wells that had previously been sampled as part of the OU-1 RI/FS;
- The group of 24 wells that had previously been sampled as part of the OU-2 RI investigation but which, prior to the July/August 2012 event, had not been sampled since 1997 and never for Radium-228; and
- Additional wells associated with the former Bridgeton Sanitary Landfill (a/k/a the Permitted Landfill) which, prior to the July/August 2012 sampling event, had never been sampled for radioisotopes.

As a reminder, OU-1 consists of Radiological Areas 1 and 2 which contain radiologically-impacted materials (RIM). OU-2 consists of the remainder of the Site which did not receive RIM, including the Inactive Sanitary Landfill, the Closed Demolition Landfill, and the former Permitted Landfill's North and South Quarry units. EPA further directed that the samples obtained from these wells be analyzed for uranium, thorium, and radium radioisotopes (including Radium-226 and Radium-228), with all radioisotopes analyzed for both total (unfiltered samples) and dissolved (filtered samples) phases; plus total and dissolved phase trace metals; and volatile organic compounds (VOCs). EPA determined that analyses of the samples for semi-volatile organic compounds (SVOCs), which was performed as part of the July/August 2012 monitoring event, did not need to be included as part of the additional 2013 groundwater monitoring events.

This report presents the results of the July 2013 additional groundwater monitoring activities. Specifically, this report includes a description of the field and sample collection activities and summaries of the results of the laboratory analyses of the groundwater samples. This report also contains copies of the various field data sheets (Appendix A), the analytical laboratory reports (Appendix B), and the data validation reports and resultant database (Appendix C). Due to the size of these documents, the appendices are contained on the included compact disk.

2. FIELD AND SAMPLE COLLECTION ACTIVITIES

A Sampling and Analysis Plan (SAP) and associated planning documents were prepared to describe the proposed monitoring locations, sample collection procedures, analyte list, laboratory analyses, quality assurance/quality control samples and procedures, investigative-derived waste management, health and safety procedures, and data evaluation and management procedures for the July/August 2012 additional groundwater monitoring event (EMSI, 2012). EPA approved the SAP by letter dated July 3, 2012. This SAP and the associated planning documents were also used for the July 2013 event.

The groundwater sampling event began on July 8, 2013 with well inspections and collection of a complete set of water level measurements from 76 of the 77 total monitoring wells located on the property. A water level was not obtained from well D-14; however, a water quality sample later was obtained from this well. Table 1 presents a summary of the groundwater level measurement data obtained from all of the wells. A base map showing the locations of the monitoring wells and various Site features is presented on Figure 1. Copies of the groundwater elevation measurement and the groundwater monitoring well condition report forms are contained in Appendix A.

Collection of groundwater samples began on July 9, 2013, and continued on a daily basis five days a week until sampling activities were completed on July 23, 2013. Groundwater samples were collected by Herst & Associates personnel in accordance with the procedures set forth in the SAP. Copies of the Field Information Logs from the groundwater sampling activities are contained in Appendix A. Copies of the chain of custody forms are included in the laboratory analytical reports which are provided in Appendix B.

Groundwater samples were obtained from 75 of the 77 total monitoring wells or piezometers at the Site (Table 2). With two exceptions, the wells sampled were the same monitoring wells that were sampled during the July/August 2012 and April 2013 monitoring events. The first exception involves MW-102. In April 2013, monitoring well MW-102 (located in the Buffer Zone along the west side of Area 2, see Figure 1) dewatered during well purging activities and the water level did not recover sufficiently to allow collection of a groundwater sample during the April 2013 event; therefore this well was sampled without purging during the July 2013 event. The second exception involves well S-53. During the July 2013 event a sample was obtained from monitoring well S-53 (located to the south of the Inactive Sanitary Landfill and west of the South Quarry Landfill); however, due to the low yield of this well, the sample collected from this well was obtained over multiple days. A sample was previously obtained from S-53 in April 2013 but not in July/August 2012 because this well dewatered during well purging in 2012 and did not recover sufficiently during that event. For the two wells not sampled in the July 2013 event, a sample could not be obtained from well LR-105 (located southwest of the Inactive Sanitary Landfill) due to the presence of a bend in the well casing that made it impossible to lower the sampling equipment into the saturated interval of this well. Well PZ-302-AS (located west and south of the Inactive Sanitary Landfill) did not contain sufficient water for collection of a sample. This same condition existed during the July/August 2012 and April 2013 sampling events and therefore this well was not sampled during any of the additional groundwater sampling events. Eight field duplicate groundwater samples were also obtained during the course of the July 2013 groundwater sampling activities (Table 2).

EPA was present for sampling activities conducted on July 9 - 11, 2013. During this period EPA obtained split samples from 11 wells, as shown on Table 2. MDNR obtained split samples on July 18, 2013 from two wells, PZ-206-SS and PZ-207-AS. Presentation of the radium results from the EPA and MDNR split samples collected during the July 2013 monitoring event is provided in Section 6.

3. LABORATORY ANALYSES

Samples designated for radionuclide analyses were shipped by courier to the Eberline Services Oak Ridge, TN laboratory (Eberline). The sampling crews delivered samples designated for chemical analyses directly to the Test America St. Louis laboratory (Test America).

Eberline analyzed the samples for Radium-226 using EPA Modified Method 903.0; for Radium-228 using EPA Modified Method 904.0; for Thorium-228, -230 and -232 using EML Modified Method Th-01; and for Uranium-234, -235, and 238 using EML Modified Method U-02. The Eberline Analytical Reports are contained in Appendix B. The Eberline analytical laboratory reports include the laboratory results, the counting error, the combined standard uncertainty (included on the Electronic Data Deliverable [EDD] provided by the laboratory), the minimum detectable activity (MDA) levels, and associated laboratory documentation related to sample receipt, handling, preparation and analysis.

EPA (along with other agencies) has developed the Multi-Agency Radiological Laboratory Analytical Protocols (MARLAP) Manual to address the need for a nationally consistent approach to producing radioanalytical laboratory data (EPA, 2004). MARLAP states that an important aspect of sampling and measurement is uncertainty. The Combined Standard Uncertainty (CSU) can be viewed as the statistical standard deviation of an individual radiological result (McCurdy et al., 2008). The concentration of a radiological constituent in a sample is typically calculated using a mathematical equation that includes such parameters as the measured signal response of a radiation detector (events per time unit), the detector background signal response, the detector efficiency for the radiation emission producing the response, sample aliquant size processed, chemical yield of the radiochemical process, and decay and ingrowth factors based on the half-life of the radionuclide or its decay product. Each measurement parameter in the equation has its own uncertainty defined as a standard uncertainty. The CSU of the final result is determined using the common statistical approach that the variance (squared CSU) of a function of several variables can be approximated by applying the function to the variance of each variable component (for example, MARLAP, Chapter 19 [EPA, 2004]). Using this logic, the CSU of a radiological result is the square root of a sum of variances. When a concentration and its associated CSU are reported, a confidence interval can be calculated that defines the range of concentration (the lower and upper concentration) for the "true concentration" with a certain confidence. For this project, Eberline calculated and reported the CSU at the 95-percent or 2-

sigma confidence level (analogous to the standard confidence level used when reporting the standard deviation for other water-quality results). The confidence level that is used when interpreting or publishing radiological results is dependent on the Data Quality Objectives (DQOs) of the project. Reporting the concentration with its corresponding CSU (as provided in the data) provides the 95-percent confidence interval. Therefore, the summary tables of the radionuclide analyses (see Section 6) include the laboratory calculated CSU associated with each sample result.

Test America analyzed the chemical samples for VOCs by gas chromatography/mass spectrometry (GC/MS) using EPA Method 8260C; for the Target Analyte List (TAL) trace metals by Inductively Coupled Plasma (ICP) using EPA Method 6010C; and for Mercury by Cold Vapor Atomic Adsorption (CVAA) using EPA Method 7470A. The Test America Analytical Reports are included in Appendix B.

In addition to the analyses requested by EPA, the samples were analyzed for certain chemistry characterizations: major anions by Ion Chromatography (IC) using SW-846 Method 300.0; major cations by ICP using EPA Method 6010C; alkalinity by SW-846 Method 310.1; and bromide and iodide by IC using SW-846 Method 300.0. Results of these analyses can also be found in the Test America Analytical Reports included in Appendix B.

4. DATA VALIDATION

A Level III validation was performed consisting of manually examining data deliverables to determine data quality for the analytical results for samples collected by the Respondents. Analytical results provided by EPA and MDNR for split samples were not validated. All data were validated using method applicable guidelines and in accordance with the requirements of the National Functional Guidelines for Organic and Inorganic Data Review (EPA, 2008 and 2010) and by EPA SW-846 guidelines (EPA, 2007) specific to the method. Radionuclides were validated in general accordance with the guidelines and criteria specified in the MARLAP Manual (EPA, 2004). Data validation included application of data qualifiers to the analytical results based on adherence to method protocols and project-specific QA/QC limits. The data validation reports for each sample delivery group are included in Appendix C.

Method protocols reviewed included:

- Analytical holding times,
- Method blanks (MB),
- Trip blanks (TB),
- Equipments blanks (EBs),
- Matrix spikes/matrix spike duplicates (MS/MSDs),
- Laboratory control samples (LCSs),
- Shipping cooler temperatures,

- Calibrations,
- Laboratory duplicates,
- Internal Standards (ISs),
- Surrogates, and
- Chemical recovery (radionuclides).

Based on the data validation, appropriate data qualifiers, if any, were added to the analytical results. An analytical database that includes the applied data qualifiers is included in Appendix C.

Data quality assessment (DQA) criteria were used to evaluate the quality of the field sampling efforts and laboratory results for compliance with project DQOs. The DQA criteria are expressed in terms of analytical precision, accuracy, representativeness, completeness, and comparability (PARCC).

Precision is the measure of variability between individual sample measurements under prescribed conditions. The relative percent difference (RPD) for the field duplicate, matrix spike/matrix spike duplicate (MS/MSD), and laboratory duplicate analyses demonstrate the precision of the analytical methods. An RPD within the method-specific control limit indicates satisfactory precision in a measurement system. For this sampling event, duplicate results were predominantly in control.

Accuracy is the degree of agreement of a measurement with an accepted reference or true value. The results of surrogate, MS/MSD, chemical recovery, and LCS analyses, when expressed in terms of percent recovery, demonstrate the accuracy of the method. Accuracy results for all methods and matrices are predominantly in control. The accuracy results which were out-of-control are not significant for any one compound, method, or matrix and do not represent a negative impact to data quality. Therefore, overall accuracy for this sampling event was acceptable.

Representativeness. Sample data are believed to be representative of the site conditions prevailing at the time of sample collection because most of the samples were properly collected, stored, and preserved. All samples were analyzed within holding time. The sample obtained from well S-82 for dissolved metals analyses was received at the laboratory without preservative. The laboratory corrected the pH to <2. Data quality was not adversely affected. Although blank contamination did occur (mostly with common lab contaminants), sample data quality was not adversely affected.

Comparability. All samples were reported in industry-standard units. Water reporting units were micrograms per liter (µg/L), milligrams per liter (mg/L) or picocuries per liter (pCi/L). Analytical protocols for the methods were adhered to (with the exceptions noted in this report) and analytical results are considered comparable.

Completeness is defined as the percentage of laboratory measurements judged to be valid on a method-by-method basis. Valid data are defined as all data and/or qualified data which meet the DQOs for this project. Data completeness is expressed as percent complete (PC), which is calculated as follows: (the number of rejected samples per compound ÷ total number of samples per compound) X 100. Completeness is 100%, understanding that all results qualified with U, UJ or J are usable to meet the project objectives of this sampling event. The goal for meeting analytical holding times was l00% completeness and was met for all samples.

Sensitivity was evaluated using the RLs and MDLs for each sample as compared to project maximum allowable RLs. The laboratory RLs met required RL limits for most compounds except when adjusted for sample dilution. For radionuclides, when the sample results are greater than the MDA but have a combined standard uncertainty less than 50% of the sample activity, the sample is qualified with a J. This is an indication that the value is near the MDA and has a relatively large combined standard uncertainty compared to the sample result.

The groundwater data are of acceptable quality and are considered usable to support the project objectives for this sampling event. Samples are representative of the Site when used in accordance with the validation qualifiers.

5. GROUNDWATER LEVELS

Groundwater is present within the alluvium and bedrock deposits beneath the Site. The edge of the geomorphic floodplain for the Missouri River was evaluated as part of the Supplemental Feasibility Study (EMSI, 2011) and was determined to be located beneath the southeastern portion of the Site (Figure 2). To the northwest of this boundary, the uppermost (shallowest) groundwater occurs within the alluvial deposits. Because alluvium is not present beneath the southeastern portion of the Site, the uppermost groundwater is found in bedrock of the St. Louis Formation.

Water level measurements were obtained from the monitoring wells (Table 1), and these data were used to develop a potentiometric surface (water level) map for the Site (Figure 2). Groundwater within the St. Louis Formation beneath the southern and southeastern boundaries of the Site displayed the highest water level elevations [ranging from approximately 449 to approximately 468 feet (ft) above mean sea level (amsl)], whereas the lowest groundwater elevations (approximately 426 to 428 ft amsl) were present within the alluvial deposits beneath the northern portion of the Site. These data indicate that the overall direction of the hydraulic gradient in the area of the Site is to the northwest, towards the Missouri River.

The water level data also indicate that overall, groundwater within the bedrock generally discharges to the alluvial deposits at the Site (Figure 2). With the exception of the area immediately around the North and South Quarry landfills, the water levels in the bedrock (e.g., PZ-208-SS, PZ-201A-SS, PZ-102-SS and PZ-102R-SS) are substantially higher (i.e., approximately 452 to 468 ft amsl) than the water levels in the alluvial deposits (i.e., approximately 433 to 434 ft amsl), indicating that groundwater flows from the bedrock into the alluvium. In addition, water level data obtained from co-located alluvial and bedrock wells support the conclusion that groundwater within the bedrock discharges to the alluvium. The water level data indicate that the water levels within the bedrock wells are generally higher than the water levels in nearby alluvial wells, suggesting that an upward gradient generally exists from the bedrock to the alluvium beneath the Site. Comparison of the water levels in the PZ-113 well cluster indicates a slightly upward gradient between the shallow alluvium and bedrock and essentially the same elevation between the deep alluvium and bedrock. For the co-located PZ-205 wells, there is a 1.49 foot difference in the water levels indicating a significant upward gradient between the St. Louis Formation bedrock well PZ-205-SS (water level elevation 435.98) and co-located alluvial well PZ-205-AS (434.49).

Review of water level data obtained from well clusters completed within the alluvial deposits beneath the northern portion of the Site (Table 3) indicates that the relative heights of the water levels within co-located alluvial monitoring wells were variable in July 2013. Some of the alluvial well clusters displayed higher water levels in the shallower alluvial wells which are completed in the upper portion of the alluvium while lower water levels appeared in the deeper alluvial wells that are completed near the base of the alluvial deposits (e.g., compare water levels from S-5, I-4, and D-3 and the S-84 and D-85 well clusters near OU-1 Area 1; the MW-102 and D-6 and the S-10, I-11 and D-12 well clusters near Area 2; and the PZ-302 well cluster near the Inactive Landfill). The water level data obtained from these well clusters indicate that a slight downward hydraulic gradient was present within the alluvial deposits beneath portions of the Site in July 2013. However, in other well clusters (e.g., compare the water levels in the S-10, I-11 and D-12 and S-82, I-9 and D-93 well clusters near Area 2 and the PZ-304 well cluster near the Inactive Landfill), the highest water levels occurred in the deeper portions of the alluvial aquifer (e.g., compare water levels from the S-84 and D-85 well cluster near Area 1 and the S-10, I-11 and D-12 well cluster near Area 2). These data suggest that a slight upward hydraulic gradient was present within the alluvial deposits beneath portions of the Site in July 2013.

The hydraulic gradient within the bedrock wells in the southern portion of the Site is relatively steep, as much as 6 feet per 375 feet or 0.1 ft/ft to the northwest beneath Area 1, and 10 feet per 90 feet or 0.11 ft/ft to 10 feet per 300 feet or 0.03 ft/ft to the northeast in the area to the east of the North Quarry Landfill. The hydraulic gradient within the alluvial deposit beneath the northern portion of the Site is very flat ranging from approximately 0.0002 to 0.0011 ft/ft beneath Areas 1 and 2. These values are within the range of values reported in the RI (EMSI, 2000). Based on reported average values of 3×10^{-2} to 3×10^{-3} cm/sec (85 to 8.5 ft/day) for the hydraulic conductivity of the alluvium (EMSI, 2000), an assumed effective porosity of 25%, and a hydraulic gradient of 0.0002 ft/ft to 0.0011 ft/ft, the overall velocity of groundwater flow within the alluvium would be approximately 0.0068 to 0.37 feet per day or approximately 2.5 to 137 feet per year.

6. GROUNDWATER SAMPLE RESULTS

This section summarizes the analytical laboratory results for the groundwater samples.

6.1 Radionuclides

The results of the laboratory analyses of the uranium, thorium and radium isotopes are summarized on Tables 4, 5 and 6, respectively. Of the 75 wells sampled during this July 2013 sampling event, 23 are OU-1 wells which historically have been sampled for uranium, thorium, and both Radium-226 and Radium-228. The remaining 52 wells are either OU-2 RI wells which, prior to the current rounds of additional groundwater sampling initiated in July/August 2012, were previously sampled for uranium, thorium, and Radium-226 (but not Radium-228) parameters in 1997 or 2004; or are Bridgeton Landfill monitoring wells which were not subject to radiological sampling and so, again, were not sampled for uranium, thorium or radium prior to the current West Lake Landfill 2012/2013 additional groundwater sampling events.

6.1.1 Uranium

Table 4 presents a summary of the analytical results of the uranium isotopes. The reported results are presented in units of activity (picocuries per liter or pCi/L) which were converted to units of mass (micrograms per liter) [µg/L] using the procedure defined by EPA (2000).

None of the samples contained calculated total uranium mass concentration that exceed the EPA Maximum Contaminant Level (MCL) of 30 µg/L (Table 4).

The highest concentrations of both total and dissolved uranium were detected in monitoring well S-53 (15.36 dissolved and 16.04 total µg/L) during the July 2013 event. Well S-53 is located to the west of the southern portion of the Inactive Sanitary Landfill and the South Quarry Landfill. The total fraction sample obtained from well S-53 during the April 2013 monitoring event reportedly contained uranium at a level greater than the MCL; however, this result was not reproduced during the July event. During the prior April 2013 event, this well contained only a limited amount of water and so was sampled without purging the well. The groundwater produced by this well in the April 2013 event also contained a large amount of suspended sediment which likely contributed to the reported April sampling results. In addition, this well was dry during the July/August 2012 sampling event and therefore was not sampled as part of that event. Prior to commencement of the 2012/2013 additional groundwater sampling events, this well had never been sampled for radionuclides, and had not been sampled for any other parameters in many years. The dissolved fraction samples obtained from this well in both the April and July (Table 4) 2013 monitoring events contained significantly lower uranium levels than the total samples and were below the EPA MCL.

With the exception of monitoring well S-53, the highest levels of uranium detected in the Site groundwater were found in monitoring well MW-102, an intermediate depth alluvial monitoring well located adjacent to the northwestern boundary of Area 2. The July 2013 results from this well were greater than those reported for the July/August 2012 monitoring event (13.32 µg/L dissolved in July 2013 as compared to 5.62 µg/L dissolved in July/August 2012). This well was dry during the April 2013 monitoring event and therefore could not be sampled at that time. As compared to the April 2013 sampling event, higher levels of uranium were also reported for monitoring wells completed in the deeper bedrock formations located to the south (upgradient) of OU-1 Radiological Areas 1 and 2 (e.g., PZ-102-SS total and dissolved, PZ-102R-SS total and dissolved, PZ-102R-SS total, and PZ-111-KS dissolved fractions), and in the dissolved fraction sample obtained from alluvial monitoring well PZ-302-AI, which is located along the southwestern boundary of the Inactive Sanitary Landfill. Again, all of these results were below the EPA MCL for uranium.

6.1.2 Thorium

Table 5 presents a summary of the analytical results of the Site groundwater samples for the thorium isotopes. Overall, only low levels (less than 1 pCi/L) of the thorium isotopes were detected in the majority of the wells. The highest total thorium (Thorium-228 plus Thorium-230 plus Thorium-232) values found in the July 2013 sampling event were reported in the total fraction samples obtained from alluvial monitoring wells S-53, S-61 and D-85 and bedrock monitoring well PZ-102-SS (Table 5); all were less than 10 pCi/L. In contrast, the dissolved fraction samples from these same wells contained only very low or non-detectable levels of total thorium, indicating that the thorium occurrences in these wells are most likely associated with the suspended sediment contained within the total fraction samples. There are no federal or State drinking water or other water quality standards for any of the thorium isotopes or for total thorium.

6.1.3 Radium

Table 6 summarizes the analytical results for the radium isotopes (Radium-226 and Radium-228) for the July 2013 groundwater samples. Figures 3 and 4 present the total and dissolved fraction Radium-226 results plotted on the Site base map. Figures 5 and 6 present the total and dissolved fraction Radium-228 results plotted on the Site base map. Figures 7 and 8 present the combined Radium-226 plus Radium-228 results for the total and dissolved fraction samples, respectively, on the Site base map. EPA has not set separate MCLs for the two radium isotopes, nor are they reported separately. Rather, the MCL for radium is for the combination of both Radium-226 and Radium-228, and EPA has set it at 5 pCi/L.

6.1.3.1 Radium-226

The highest levels of Radium-226 detected in the total fraction samples were for samples obtained from upgradient bedrock monitoring wells PZ-101-SS (23.66 pCi/L), PZ-102-SS (7.69

J pCi/L), PZ-107-SS (6.39 J pCi/L); and Area 1 bedrock monitoring well PZ-115-SS (6.27 J pCi/L) [Table 6 and Figure 3]. The highest levels of Radium-226 detected in the dissolved fraction samples were obtained from upgradient bedrock monitoring wells PZ-101-SS (27.91 pCi/L), MW-1204 (7.42 pCi/L), and PZ 104-SD (7.39 pCi/L); and Area 1 bedrock monitoring well PZ-115-SS (6.46 pCi/L) [Table 6 and Figure 4]. The highest concentrations of Radium-226 detected in any of the alluvial monitoring wells occurred in the total fraction samples obtained from upgradient monitoring well S-53 (4.04 J+ pCi/L), and from Area 1 wells D-85 (4.64 pCi/L) and the dissolved fraction of the field duplicate sample from well D-83 (4.04 pCi/L).

6.1.3.2 Radium-228

The highest level of Radium-228 detected in the total fraction samples occurred in upgradient bedrock monitoring wells PZ-102-SS (5.39 J pCi/L) and PZ-103-SS (7.01 pCi/L); and in Area 1 alluvial monitoring wells S-5 (5.52 J+ pCi/L), I-4 (5.20 J+ pCi/L), and PZ-113-AD (5.11 J+ pCi/L and 7.16 pCi/L in the field duplicate sample). The highest reported levels of Radium-228 detected in the dissolved fraction samples occurred in upgradient bedrock monitoring well PZ-116-SS (5.19 J+ pCi/L); Area 1 alluvial monitoring wells D-3 (6.18 J+ pCi/L), I-4 (5.89 J+ pCi/L) and PZ-113-AD (6.09 J+ pCi/L and 7.98 pCi/L in the field duplicate sample); and Area 2 alluvial monitoring well D-83 (5.01 J+ pCi/L) [Table 6 and Figure 6].

6.1.3.3 Combined Radium-226 and -228

Figures 7 and 8 present the combined Radium-226 plus Radium-228 results for the total and dissolved fraction samples, respectively, plotted on the Site base map. The highest combined Radium-226 plus Radium-228 values for the total (unfiltered) fraction samples occurred in bedrock monitoring wells PZ-100-SS (6.03 pCi/L), PZ-101-SS (27.14 pCi/L), PZ-102-SS (13.08 pCi/L), PZ-103-SS (10.88 pCi/L), PZ-107-SS (9.42 pCi/L and 9.16 pCi/L in the field duplicate sample), PZ-110-SS (8.23 pCi/L), and MW-1204 (8.18 pCi/L), and alluvial monitoring well S-53 (6.70 pCi/L), all of which are located upgradient of Areas 1 and 2. Higher combined Radium-226 plus Radium-228 was also reported for Area 1 alluvial monitoring wells S-5 (6.50 pCi/L), I-4 (6.57 pCi/L but for which the field duplicate only contained 3.56 pCi/L), I-68 (5.07 pCi/L), D-3 (8.34 pCi/L), D-14 (5.35 pCi/L), D-85 (9.55 pCi/L), PZ-112-AS (5.66 pCi/L), and PZ-113-AD (7.96 pCi/L and 9.94 pCi/L in the field duplicate sample), and Area 1 bedrock monitoring well PZ-115-SS (7.71 pCi/L); Inactive Sanitary Landfill monitoring well D-87 (5.89 pCi/L) and Area 2 alluvial monitoring wells D-6 (6.23 pCi/L), D-83 (7.34 pCi/L and 7.53 pCi/L in the field duplicate sample) [Table 6 and Figure 7].

The highest combined Radium-226 plus Radium-228 values for the dissolved (filtered) fraction samples occurred in upgradient bedrock monitoring wells PZ-101-SS (30.65 pCi/L), PZ-104-SD (9.89 pCi/L), PZ-107-SS (7.71 pCi/L and 7.77 pCi/L in the field duplicate sample), PZ-110-SS (8.63 pCi/L), PZ-111-SD (6.30 pCi/L), PZ-116-SS (5.19 pCi/L), and MW-1204 (10.88 pCi/L). Higher combined Radium-226 plus Radium-228 was also reported for Area 1 alluvial monitoring wells I-4 (6.85 pCi/L), D-3 (9.90 pCi/L), D-85 (6.36 pCi/L), and PZ-113-AD (8.65 pCi/l and

11.43 pCi/L in the field duplicate sample), and Area 1 bedrock monitoring well PZ-115-SS (6.46 pCi/L); Inactive Sanitary Landfill monitoring well D-87 (5.52 pCi/L); and in Area 2 alluvial monitoring wells I-9 (5.22 pCi/L), D-6 (6.95 pCi/L), D-83 (8.55 pCi/L and 8.33 pCi/L in the field duplicate sample), and D-93 (6.23 pCi/L) [Table 6 and Figure 8].

A total of 25 of the 75 monitoring wells sampled in the July 2013 event (including both upgradient and downgradient wells) showed an exceedance of the combined Radium-226 plus Radium-228 MCL of 5 pCi/L, either for total and dissolved fraction, total fraction only, or dissolved fraction only. The combined Radium-226 plus Radium-228 results from twelve of the 75 monitoring wells exceeded the MCL for both the total fraction and the dissolved fraction. These include four upgradient bedrock monitoring wells (PZ-101-SS, PZ-107-SS, PZ-110-SS, and MW-1204); four Area 1 alluvial (D-3, D-85, and PZ-113-AD) and bedrock (PZ-115-SS) monitoring wells, three Area 2 alluvial monitoring wells (I-4 [Note the discrepancies between the original and field duplicate results], D-6 and D-83), and Inactive Sanitary Landfill monitoring well (D-87) [Table 6 and Figures 7 and 8]. The combined total fraction (but not the dissolved fraction) radium results in eight other monitoring wells exceeded the MCL. These eight monitoring wells include four upgradient alluvial (S-53) and bedrock monitoring wells (PZ-100-SS, PZ-102-SS and PZ-103-SS); and four Area 1 alluvial monitoring wells (S-5, I-68, D-14, and PZ-112-AS (Table 6 and Figure 7). The combined dissolved fraction (but not the total fraction) radium results in five monitoring wells exceed the MCL, including upgradient bedrock monitoring wells PZ-104-SD, PZ-111-SD, and PZ-116-SS; and Area 2 alluvial monitoring wells I-9 and D-93.

The combined Radium-226 plus Radium-228 results for the other 50 of the 75 monitoring wells sampled in the July 2013 event were less, and for the majority of the wells significantly less, than the MCL of 5 pCi/L. For the combined total fraction, results for 17 of the 50 wells were less than 1 pCi/L; nine were between 1 and 2 pCi/L; 20 were between 2 and 3 pCi/L; 10 were between 3 and 4 pCi/L; and only four were between 4 and 5 pCi/L.

6.1.3.4 Duplicate Sample Results for Radium

Eight field duplicate samples were collected as part of the field effort (Tables 2 and 7). Field duplicate samples were obtained by filling two sets of sample bottles and submitting the two samples to the laboratories as unique samples. Comparisons of the field duplicate sample results for total and dissolved Radium-226 and Radium-228 are presented on Table 7. Relative percent difference (RPD) values are provided on Table 7 to assist in the evaluation of the field duplicate sample results.

The highest RPDs for the Radium-226 results were obtained from sample pairs that contained the lowest radium activity levels (i.e., less than 1 pCi/L of radium), and generally were associated with values that were qualified by the laboratory or the data validation effort as being estimated values. When the combined standard uncertainty values of the sample results are considered, the total Radium-226 results obtained from the duplicate samples were generally equivalent to the original samples.

In the cases where Radium-228 was detected in both the original and field duplicate sample, the results are generally equivalent with the exception of the duplicate sample results obtained from monitoring well I-4 (Table 7). Both the total and dissolved fraction results obtained from the I-4 field duplicate sample were approximately one half of the results obtained for the original investigative sample. Similar levels of variability were observed between the results of the original total fraction sample and the laboratory duplicate result for the total fraction sample obtained from monitoring well I-4 (see Eberline Services laboratory report 13-07098 contained in Appendix B.1 on the compact disk included with this report) and therefore, the variability in the reported results from monitoring well I-4 appears to reflect analytical variability as opposed to variability arising from sample collection. The Radium-228 results for many of the other duplicate samples were non-detect in the original sample, the duplicate sample or both samples (Table 7). In instances where one sample reportedly contained a detectable level of Radium-228 but the other sample did not, comparison of the minimum detectable activity (MDA) value for the non-detect result to the detected result in the other sample and consideration of the combined standard uncertainty of the results indicates that the results, although non-detect for one sample, are generally consistent.

6.1.3.5 Split Sample Results for Radium

EPA collected split samples from 11 monitoring wells during the July 2013 sampling event. EPA collected only total fraction samples for radionuclide analysis and did not collect any field duplicate samples. MDNR collected both total and dissolved fraction samples from an additional two monitoring wells. Field duplicate dissolved fraction samples were collected by MDNR for both wells. The list of wells where split samples were collected by EPA and MDNR is provided on Table 2.

Analytical results for Radium-226 and Radium-228 for the split samples are included on Table 8. The results provided by EPA and MDNR were unvalidated. For comparison purposes, the validated radium results for the split and field duplicate samples collected by the Respondents are also shown on Table 8. RPD values are provided on Table 8 to assist in the evaluation of the split sample results.

For well PZ-101-SS, even if the combined standard uncertainty values of the sample results are considered, the RPDs for total Radium-226 (39 percent) and total Radium-228 (86 percent) between the EPA split sample and the sample collected by the Respondents indicate that the results are substantially different.

For all of the other wells, the highest RPDs for the Radium-226 results were obtained from split samples that contained the lowest radium activity levels (i.e., less than 1.5 pCi/L of radium) and the highest RPDs for the Radium-228 results were associated with results that were qualified by the laboratory or the Respondents' data validation effort as being estimated values. When considering the combined standard uncertainty values for those wells where the total Radium-226 and Radium-228 activity levels are greater than 1.5 pCi/L and the results were not qualified as estimated (D-3, D-83, PZ-112-AS, PZ-113-AD, AND PZ-206-SS), the results obtained from the EPA and MDNR split samples were equivalent to the results from the samples collected by the Respondents.

6.1.3.6 Comparison to Prior Radium Sampling Results

Figures 9 and 10 present the historic total and dissolved Radium-226 results obtained for samples collected during the July 2013, April 2013, and July/August 2012 sampling events, as well as those reported for the OU-1 RI/FS sampling events (McLaren Hart, 1996, and EMSI, 2000 and 2006), and the OU-2 RI/FS sampling events (Herst & Associates, 2005). Because the OU-2 RI/FS samples were only analyzed for Radium-226 (the RIM-associated radium isotope) and not Radium-228, these figures only include results for Radium-226. Likewise, because the Bridgeton Sanitary Landfill was not required to monitor for radiological parameters, the monitoring well results for the former Permitted Landfill do not include radiological parameters prior to the July/August 2012 sampling event. Finally, the Radium-226 results for split samples collected by EPA during the August 2012 (dissolved-only), April 2013 (total-only), and July 2013 (total-only) sampling events and by MDNR during the August 2012 and July 2013 sampling events (MDNR did not collect split samples in April 2013) are also included on Figures 9 and 10.

6.2 Trace Metals

The groundwater samples were analyzed for 19 trace metals, exclusive of the major chemistry cations (e.g., calcium, magnesium, sodium and potassium). Results obtained for the thirteen most frequently detected trace metals are summarized on Table 9.

Arsenic was detected in one or both of the sample fractions (total or dissolved) obtained from 51 of the 75 monitoring wells. Twenty-four of the monitoring wells contained arsenic at levels below the drinking water standard (MCL) of 10 µg/L. Twenty-seven (27) of the monitoring wells reportedly contained arsenic concentrations in the total, dissolved, or both fractions that exceed the drinking water standard. The highest reported arsenic concentrations (110 to 390 µg/L) were found in alluvial wells S-82, S-84, I-73, PZ-112-AS, PZ-114-AS, PZ-302-AS, PZ-303-AS, and PZ-304-AS (Table 9).

The most frequently detected trace metals were iron and manganese which were detected in nearly all of the monitoring wells (Table 9). The majority of the iron results exceed the drinking water standard (which is a secondary standard based on aesthetic considerations) of 300 µg/L. The highest levels of iron (i.e., greater than 50,000 µg/L) were found in the total (unfiltered) and dissolved (filtered) sample fractions obtained from alluvial wells S-10, S-84, I-73, D-85, PZ-114-AS, PZ-205-AS, PZ-302-AS, and PZ-303-AS; and the total fraction samples obtained from S-53, and MW-104.

Nearly all of the manganese results exceed the drinking water standard (a secondary standard based on aesthetic considerations) of 50 µg/L. The highest levels of manganese (i.e., greater than 5,000 µg/L) were found in the total and dissolved sample fractions obtained from alluvial wells PZ-113-AS, and PZ-302-AS; and bedrock well PZ-200-SS.

It should be noted that the solubility of arsenic, iron and manganese is largely controlled by their oxidation states, with the reduced form of these metals possessing higher solubility values. Consequently, these metals are commonly detected at solid waste landfills where the anaerobic biodegradation of organic matter and the decreased infiltration of typically oxygen-rich precipitation (recharge) due to the presence of a lower permeability landfill cover results in the creation of reducing conditions. The presence of these trace metals can reflect dissolution of the metals from either the waste materials or dissolution of naturally occurring arsenic, iron and manganese within cover soil material, contained in the waste materials, or in the soil and bedrock adjacent to the waste deposits.

6.3 Volatile Organic Compounds

Table 10 presents a summary of the primary VOCs that were detected in the groundwater samples. The most commonly detected VOC was benzene, which was reported to be present in 27 of the 75 wells. Other VOCs (exclusive of common laboratory contaminants) that were detected in a number of the groundwater wells included cis-1,2-dichloroethene (detected in 18 of the wells), chlorobenzene (detected in 24 of the wells), methyl-tert-butyl ether [MTBE] (detected in 19 of the wells), and 1,4-dichlorobenzene (detected in 13 of the wells). Other VOCs that were detected include ethyl benzene (detected in 15 of the wells), isopropylbenzene [also known as cumene] (detected in 14 of the wells), xylenes (detected in 11 of the wells), chloroethane (detected in 10 of the wells), and vinyl chloride (detected in 10 of the wells).

Benzene was detected in thirteen monitoring wells at concentrations greater than its water quality standard of 5 µg/L. The highest concentrations of benzene were detected in bedrock monitoring wells PZ-104-SS and PZ-104-SD, and alluvial monitoring well PZ-205-AS, all of which are located adjacent to the South Quarry Landfill. These are the same wells in which the higher levels of other hydrocarbon constituents (e.g., ethyl benzene, cumene, xylenes and MTBE) were detected, although the highest xylene levels were found in PZ-303-AS.

7. REFERENCES

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Tables

Table 1: Groundwater Elevation Measurements, July 8, 2013, West Lake Landfill OU-1

Well	Top of Casing (TOC) Elevation (ft. MSL)*	Water Level (ft. below TOC)	Water Level Elevation (ft. MSL)	Well	Top of Casing (TOC) Elevation (ft. MSL)*	Water Level (ft. below TOC)	Water Level Elevation (ft. MSL)
S-5	466.45	32.82	433.63	PZ-102-SS	483.90	25.63	458.27
S-8	443.83	10.54	433.29	PZ-103-SS	483.56	6.72	476.84
S-10	480.06	46.95	433.11	PZ-104-KS	483.95	19.11	464.84
S-53	444.18	11.12	433.06	PZ-104-SD	483.51	22.17	461.34
S-61	449.52	16.43	433.09	PZ-104-SS	483.45	20.11	463.34
S-82	449.94	16.95	432.99	PZ-105-SS	483.51	24.24	459.27
S-84	456.78	23.34	433.44	PZ-106-KS	464.20	4.34	459.86
I-4	465.88	32.60	433.28	PZ-106-SD	463.36	13.52	449.84
I-9	449.84	17.82	432.02	PZ-106-SS	462.71	12.47	450.24
I-11	480.01	46.90	433.11	PZ-107-SS	464.56	31.12	433.44
I-62	446.37	12.80	433.57	PZ-109-SS	458.56	35.86	422.70
I-65	441.53	8.08	433.45	PZ-110-SS	461.15	28.81	432.34
I-66	441.87	8.29	433.58	PZ-111-KS	465.56	8.51	457.05
I-67	441.78	8.23	433.55	PZ-111-SD	466.46	33.16	433.30
I-68	450.39	16.88	433.51	PZ-112-AS	462.29	29.09	433.20
I-73	461.40	28.07	433.33	PZ-113-AD	461.54	28.10	433.44
D-3	467.92	34.65	433.27	PZ-113-AS	461.40	28.05	433.35
D-6	447.09	14.28	432.81	PZ-113-SS	461.77	28.34	433.43
D-12	479.67	46.62	433.05	PZ-114-AS	451.26	17.39	433.87
D-13	470.25	36.89	433.36	PZ-115-SS	452.27	14.94	437.33
D-14	483.09	28.97	454.12	PZ-116-SS	484.85	25.68	459.17
D-81	450.87	17.75	433.12	PZ-200-SS	485.57	26.66	458.91
D-83	448.55	15.10	433.45	PZ-201A-SS	480.20	10.60	469.60
D-85	457.06	23.60	433.46	PZ-202-SS	481.02	15.24	465.78
D-87	464.41	31.20	433.21	PZ-203-SS	486.44	24.84	461.60
D-93	450.76	16.85	433.91	PZ-204A-SS	462.60	5.49	457.11
LR-100	468.14	15.16	452.98	PZ-204-SS	464.79	7.96	456.83
LR-103	470.54	37.29	433.25	PZ-205-AS	459.95	25.46	434.49
LR-104	459.38	25.98	433.40	PZ-205-SS	461.73	25.75	435.98
LR-105	485.36	30.49	454.87	PZ-206-SS	460.29	26.14	434.15
MW-102	447.90	14.88	433.02	PZ-207-AS	462.17	28.76	433.41
MW-103	438.85	6.40	432.45	PZ-208-SS	474.19	21.57	452.62
MW-104	440.91	7.83	433.08	PZ-302-AI	451.02	17.96	433.06
MW-1204	485.53	27.47	458.06	PZ-302-AS	451.33	17.57	433.76
PZ-100-KS	485.61	26.14	459.47	PZ-303-AS	453.08	20.11	432.97
PZ-100-SD	485.72	36.75	448.97	PZ-304-AI	453.86	20.88	432.98
PZ-100-SS	485.75	34.18	451.57	PZ-304-AS	453.61	20.59	433.02
PZ-101-SS	491.26	58.19	433.07	PZ-305-AI	459.83	26.38	433.45
PZ-102R-SS	485.62	25.14	460.48				

Note:
* Survey Data provided by Aquaterra in a spreadsheet dated 9/14/2012; except for I-4, D-13, PZ-112-AS, and PZ-207-AS, which were provided by an April 17, 2013 electronic mail from Weaver Boos Consultants.

Table 2: Wells Sampled During July 2013 Groundwater Monitoring Effort

Well	Well	Duplicate Samples	
PZ-100-SS	LR-100	DUP-01	I-4
PZ-100-SD	LR-103	DUP-02	PZ-113-AD
PZ-100-KS	LR-104	DUP-03	D-83
PZ-101-SS		DUP-04	I-62
PZ-102-SS	MW-102	DUP-05	D-12
PZ-102R-SS	MW-103	DUP-06	D-81
PZ-103-SS	MW-104	DUP-07	I-65
PZ-104-SS	MW-1204	DUP-08	PZ-107-SS
PZ-104-SD			
PZ-104-KS	S-5		
PZ-105-SS	S-8	**EPA Split Samples**	
PZ-106-SS	S-10	S-5	
PZ-106-SD	S-53	S-82	
PZ-106-KS	S-61	I-4	
PZ-107-SS	S-82	I-9	
PZ-109-SS	S-84	D-3	
PZ-110-SS		D-83	
PZ-111-SD	I-4	D-85	
PZ-111-KS	I-9	D-93	
PZ-112-AS	I-11	D-93 DUP	
PZ-113-AS	I-62	PZ-101-SS	
PZ-113-AD	I-65	PZ-112-AS	
PZ-113-SS	I-66	PZ-113-AD	
PZ-114-AS	I-67		
PZ-115-SS	I-68		
PZ-116-SS	I-73	**MDNR Split Samples**	
PZ-200-SS		PZ-206_SS	
PZ-201A-SS	D-3	PZ-207-AS	
PZ-202-SS	D-6		
PZ-203-SS	D-12		
PZ-204-SS	D-13		
PZ-204A-SS	D-14	**Well Legend**	
PZ-205-AS	D-81	S prefix or AS suffix	Shallow alluvial well
PZ-205-SS	D-83	I prefix or AI suffix	Intermediate alluvial well
PZ-206-SS	D-85	D prefix or AD suffix	Deep intermediate well
PZ-207-AS	D-87	SS suffix	St. Louis Fm. bedrock well
PZ-208-SS	D-93	SD suffix	Salem Fm. bedrock well
PZ-302-AI		KS suffix	Keokuk Fm. Bedrock well
PZ-303-AS			
PZ-304-AS	Total = 75 wells		
PZ-304-AI			
PZ-305-AI	Not sampled: LR-105 and PZ-302-AS (see discussion in the Report text)		

Table 3: Vertical Groundwater Gradients, July 8, 2013

Well	Water Level Elevation (ft amsl)	Original Top of Screen Elevation (ft amsl)	Original Bottom of Screen Elevation (ft amsl)	Midpoint Elevation of Screen Interval (ft amsl)	Head Difference (ft)	Difference in Screen Midpoint Elevations (ft)	Vertical Gradient (ft/ft)
Alluvial Well Clusters							
S-5	433.63	435.70	425.70	430.70	0.35	36.20	0.0097
I-4	433.28	399.50	389.50	394.50	0.01	28.80	0.0003
D-3	433.27	370.70	360.70	365.70	0.36	65.00	0.0055
MW-102	433.02	432.18	422.18	427.18	0.21	84.28	0.0025
D-6	432.81	347.90	337.90	342.90			
S-10	433.11	445.50	425.50	435.50	0.00	43.40	0.0000
I-11	433.11	397.10	387.10	392.10	0.06	53.40	0.0011
D-12	433.05	343.70	333.70	338.70	0.06	96.80	0.0006
S-8	433.29	434.80	414.80	424.80	-0.28	19.70	-0.0142
I-62	433.57	410.10	400.10	405.10	0.12	47.70	0.0025
D-83	433.45	367.40	347.40	357.40	-0.16	67.40	-0.0024
S-84	434.44	432.00	422.00	427.00	0.98	45.90	0.0214
D-85	433.46	391.10	371.10	381.10			
S-82	432.99	432.20	422.20	427.20	-0.03	26.80	-0.0011
I-9	433.02	405.40	395.40	400.40	-0.89	29.70	-0.0300
D-93	433.91	380.70	360.70	370.70	-0.92	56.50	-0.0163
PZ-302-AS	433.76	437.30	427.50	432.40	0.70	19.90	0.0352
PZ-302-AI	433.06	417.40	407.60	412.50			
PZ-304-AS	433.02	434.30	424.50	429.40	-0.43	21.70	-0.0198
PZ-304-AI	433.45	412.60	402.80	407.70			
Alluvial and Bedrock Well Clusters							
PZ-113-AS	433.35	431.00	421.20	426.10	-0.09	69.70	-0.0013
PZ-113-AD	433.44	361.30	351.50	356.40	0.01	49.87	0.0002
PZ-113-SS	433.43	311.43	301.63	306.53	-0.08	119.57	-0.0007
PZ-205-AS	434.49	420.75	410.95	415.85	-1.49	49.82	-0.0299
PZ-205-SS	435.98	370.93	361.13	366.03			

Notes: Positive values for vertical gradient indicate a downward gradient whereas negative values indicate an upward gradient.

Table 4: Summary of Uranium Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Uranium-234				Uranium-235				Uranium-238				TOTAL U-234 + U-235 + U-238	Total Uranium (µg/L)
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
S-5 DIS	7/9/2013	0.17	0.19	0.22	J	0.16	0.2	0.24	U	0.29	0.25	0.28	J	0.46 *	0.98
S-5 TOT	7/9/2013	1.1	0.91	0.79	R	0.17	0.41	0.85	U	-0.06	0.33	0.79	U	1.10 *	2.75
S-8 DIS	7/12/2013	1.14	0.32	0.11		0.2	0.14	0.11	J	0.63	0.22	0.09		1.97	1.97
S-8 TOT	7/12/2013	1	0.37	0.16	J	0.37	0.24	0.18	J	0.72	0.31	0.15	J	2.09	2.32
S-10 DIS	7/15/2013	0.38	0.2	0.11	J	0.26	0.19	0.18	J+	0.25	0.16	0.11	J	0.89	0.87
S-10 TOT	7/15/2013	0.62	0.24	0.09	J	0.38	0.2	0.11	J+	0.37	0.18	0.1	J	1.37	1.28
S-53 DIS	7/18/2013	5.19	0.88	0.07	J+	0.62	0.22	0.07		5.06	0.86	0.09	J	10.87	15.36
S-53 TOT	7/18/2013	5.9	1.08	0.11	J+	1.31	0.39	0.1	J	5.18	0.97	0.1	J	12.39	16.04
S-61 DIS	7/12/2013	1.12	0.41	0.13	J+	0.22	0.2	0.22	J+	0.63	0.3	0.18	J	1.97	1.98
S-61 TOT	7/12/2013	1.26	0.4	0.18		0.24	0.18	0.17	J	0.79	0.31	0.22		2.29	2.46
S-82 DIS	7/11/2013	0.42	0.23	0.17	J	0.1	0.14	0.21	UJ	0.33	0.2	0.12	J	0.75 *	1.08
S-82 TOT	7/11/2013	0.67	0.26	0.09	J	0.11	0.11	0.11	J	0.31	0.18	0.13	J	1.09	0.97
S-84 DIS	7/10/2013	1.69	1.02	0.91	J+	1	0.86	0.97	J	0.42	0.48	0.62	U	1.69 *	2.31
S-84 TOT	7/10/2013	1.33	0.75	0.48	J+	0.39	0.45	0.59	UJ	1.32	0.74	0.48	J	2.65 *	4.21
I-4 DIS	7/9/2013	1.47	0.84	0.58	J	0.67	0.63	0.71	U	0.18	0.36	0.67	U	1.47 *	2.33
I-4 FD DIS	7/9/2013	0.78	1.05	1.56	R	-0.05	0.64	1.34	R	0	0.72	1.55	U	0.78 *	4.59
I-4 TOT	7/9/2013	0.6	0.51	0.43	J	0.32	0.44	0.67	U	0.17	0.29	0.49	U	0.60 *	1.77
I-4 FD TOT	7/9/2013	1.02	1.01	1.04	R	0.4	0.77	1.41	R	0.58	0.76	1.04	U	1.02 *	3.28
I-9 DIS	7/11/2013	0.37	0.19	0.1	J	0.07	0.1	0.15	UJ	0.13	0.11	0.11	J	0.50 *	0.46
I-9 TOT	7/11/2013	0.34	0.17	0.09	J	0.09	0.09	0.1	UJ	0.17	0.12	0.09	J	0.51 *	0.55
I-11 DIS	7/15/2013	1.26	0.34	0.13		0.2	0.13	0.11	J+	0.81	0.26	0.1		2.27	2.51
I-11 TOT	7/15/2013	1.19	0.32	0.11		0.19	0.13	0.11	J+	0.63	0.22	0.11		2.01	1.97
I-62 DIS	7/12/2013	0.58	0.24	0.12	J	0.16	0.14	0.16	J	0.31	0.17	0.09	J	1.05	1.00
I-62 FD DIS	7/12/2013	0.47	0.2	0.12	J	0.14	0.12	0.1	J	0.35	0.17	0.12	J	0.96	1.11
I-62 TOT	7/12/2013	0.38	0.18	0.12		0.33	0.18	0.13	J	0.18	0.12	0.13	J	0.89	0.69
I-62 FD TOT	7/12/2013	0.38	0.2	0.11	J	0.1	0.11	0.15	UJ	0.2	0.14	0.11	J	0.58 *	0.67
I-65 DIS	7/18/2013	1.09	0.28	0.06	J+	0.17	0.11	0.07	J	0.93	0.26	0.08	J	2.19	2.85
I-65 FD DIS	7/18/2013	1.16	0.31	0.07	J+	0.33	0.16	0.08		0.93	0.27	0.07	J	2.42	2.92
I-65 TOT	7/18/2013	1.62	0.44	0.1	J+	0.6	0.27	0.16	J	1.28	0.38	0.1	J	3.50	4.09
I-65 FD TOT	7/18/2013	1.38	0.34	0.09	J+	0.34	0.17	0.11		0.77	0.24	0.09	J	2.49	2.45

Table 4: Summary of Uranium Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Uranium-234				Uranium-235				Uranium-238				TOTAL U-234 + U-235 + U-238	Total Uranium (µg/L)
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
I-66 DIS	7/15/2013	1.1	0.43	0.19	J	0.2	0.19	0.17	J+	0.4	0.25	0.22	J	1.70	1.28
I-66 TOT	7/15/2013	0.72	0.23	0.08		0.17	0.12	0.11	J+	0.59	0.2	0.09		1.48	1.84
I-67 DIS	7/12/2013	0.67	0.25	0.11	J	0.28	0.18	0.15	J	0.43	0.2	0.1	J	1.38	1.41
I-67 TOT	7/12/2013	0.89	0.33	0.11	J	0.22	0.18	0.19	J	0.56	0.26	0.15	J	1.67	1.77
I-68 DIS	7/12/2013	0.9	0.29	0.09		0.26	0.16	0.1	J	0.61	0.23	0.08		1.77	1.94
I-68 TOT	7/12/2013	1.54	0.44	0.11	J	0.5	0.25	0.17	J	1.67	0.46	0.11	J	3.71	5.21
I-73 DIS	7/19/2013	0.97	0.44	0.18	J+	0.1	0.18	0.31	UJ	0.87	0.42	0.2	J	1.84 *	2.74
I-73 TOT	7/19/2013	1.56	0.59	0.18	J+	0.67	0.39	0.22	J	1.1	0.48	0.25	J	3.33	3.59
D-3 DIS	7/9/2013	0.19	0.18	0.19	J	0.14	0.17	0.21	U	0.04	0.11	0.24	U	0.19 *	0.81
D-3 TOT	7/9/2013	0.18	0.19	0.24	UJ	0.1	0.15	0.22	U	0.09	0.17	0.32	U	ND	1.06
D-6 DIS	7/12/2013	0.32	0.17	0.13	J	0.06	0.09	0.14	UJ	0.23	0.15	0.13	J	0.55 *	0.75
D-6 TOT	7/12/2013	0.37	0.21	0.18	J+	0.01	0.09	0.22	UJ	0.05	0.08	0.14	UJ	0.37 *	0.52
D-12 DIS	7/15/2013	0.34	0.19	0.1	J+	0.22	0.17	0.17	J+	0.12	0.11	0.1	J+	0.68	0.46
D-12 FD DIS	7/15/2013	0.46	0.18	0.11	J+	0.28	0.15	0.12	J+	0.26	0.13	0.08	J+	1.00	0.90
D-12 TOT	7/15/2013	0.58	0.21	0.07	J+	0.38	0.18	0.08	J+	0.4	0.17	0.08	J+	1.36	1.37
D-12 FD TOT	7/15/2013	0.66	0.25	0.1	J+	0.22	0.16	0.15	J+	0.26	0.15	0.12	J+	1.14	0.88
D-13 DIS	7/18/2013	0.44	0.19	0.09	J+	0.27	0.16	0.12	J	0.2	0.12	0.1	J	0.91	0.72
D-13 TOT	7/18/2013	0.29	0.14	0.06	J+	0.15	0.11	0.11	J	0.1	0.08	0.07	J	0.54	0.37
D-14 DIS	7/18/2013	0.99	0.47	0.22	J+	0.34	0.3	0.34	J	0.32	0.26	0.29	J	1.65	1.11
D-14 TOT	7/18/2013	0.55	0.29	0.23	J+	0.3	0.23	0.23	J	0.68	0.33	0.23	J	1.53	2.17
D-81 DIS	7/17/2013	2.1	0.54	0.15	J+	1.28	0.42	0.16	J	1.8	0.49	0.16	J	5.18	5.96
D-81 FD DIS	7/17/2013	1.65	0.42	0.08	J+	0.43	0.21	0.14		1.45	0.38	0.09	J	3.53	4.52
D-81 TOT	7/17/2013	1.66	0.48	0.12	J+	0.73	0.32	0.13	J	1.39	0.43	0.15	J	3.78	4.48
D-81 FD TOT	7/17/2013	1.58	0.37	0.07	J+	0.25	0.14	0.11	J	1.35	0.33	0.09	J	3.18	4.14
D-83 DIS	7/11/2013	0.15	0.12	0.13	J	0.06	0.09	0.15	UJ	-0.04	0.07	0.2	UJ	0.15 *	0.67
D-83 FD DIS	7/11/2013	0.73	0.46	0.3	J	0.16	0.27	0.47	U	0.19	0.25	0.38	U	0.73 *	1.35
D-83 TOT	7/11/2013	0.12	0.14	0.19	UJ	0.03	0.08	0.16	UJ	0.12	0.14	0.19	UJ	ND	0.64
D-83 FD TOT	7/11/2013	0.19	0.15	0.13	J	0.13	0.14	0.14	U	0.13	0.12	0.13	J	0.32 *	0.45
D-85 DIS	7/10/2013	1.05	0.48	0.21	J+	0.36	0.3	0.26	J	0.4	0.3	0.3	J	1.81	1.36
D-85 TOT	7/10/2013	2.95	1.27	0.44	J+	1.31	0.9	0.78	J	2.39	1.12	0.5		6.65	7.73

Table 4: Summary of Uranium Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Uranium-234				Uranium-235				Uranium-238				TOTAL U-234 + U-235 + U-238	Total Uranium (µg/L)
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
D-87 DIS	7/17/2013	0.49	0.25	0.17	J+	0.31	0.21	0.15	J	0.32	0.2	0.15	J	1.12	1.10
D-87 TOT	7/17/2013	1.05	0.29	0.06	J+	0.13	0.11	0.11	J	0.47	0.18	0.06	J	1.65	1.46
D-93 DIS	7/11/2013	0.25	0.13	0.1	J	0.06	0.08	0.12	U	0.12	0.09	0.1	J	0.37 *	0.41
D-93 TOT	7/11/2013	0.22	0.14	0.14	J	0.04	0.08	0.15	U	0.15	0.11	0.09	J	0.37 *	0.52
LR-100 DIS	7/17/2013	0.38	0.3	0.29	J+	0.31	0.29	0.27	J	0.08	0.15	0.27	UJ	0.38 *	0.95
LR-100 TOT	7/17/2013	0.35	0.33	0.3	J+	0	0.24	0.53	UJ	0.12	0.2	0.34	UJ	0.35 *	1.26
LR-103 DIS	7/17/2013	0.18	0.14	0.12	J+	0.12	0.13	0.18	UJ	0.14	0.12	0.11	J	0.32 *	0.50
LR-103 TOT	7/17/2013	0.83	0.37	0.15	J+	0.53	0.32	0.19	J	0.64	0.32	0.15	J	2.00	2.15
LR-104 DIS	7/22/2013	2.35	1.14	0.52	R	0.06	0.23	0.6	R	1.24	0.76	0.48	R	3.65	3.72
LR-104 TOT	7/22/2013	2.94	0.61	0.11		0.14	0.12	0.12	J	2.02	0.47	0.11		5.10	6.08
MW-102 DIS	7/15/2013	5.63	0.96	0.08		0.95	0.29	0.08	J+	4.33	0.77	0.07		10.91	13.34
MW-102 TOT	7/15/2013	5.58	0.99	0.09		1.05	0.32	0.09	J+	4.63	0.85	0.11		11.26	14.28
MW-103 DIS	7/15/2013	2.48	0.54	0.09		0.39	0.19	0.11	J+	2.27	0.51	0.09		5.14	6.94
MW-103 TOT	7/15/2013	3	0.6	0.07		0.67	0.25	0.12	J+	2.79	0.57	0.07		6.46	8.62
MW-104 DIS	7/16/2013	2.21	0.52	0.1	J+	0.36	0.2	0.14	J+	1.65	0.43	0.12	J+	4.22	5.08
MW-104 TOT	7/16/2013	2.89	0.63	0.12	J+	0.74	0.28	0.12	J+	2.39	0.54	0.08	J+	6.02	7.46
MW-1204 DIS	7/11/2013	0.18	0.22	0.34	UJ+	0.21	0.24	0.32	UJ	0.02	0.1	0.26	UJ	ND	0.92
MW-1204 TOT	7/11/2013	0.19	0.18	0.19	J	0.04	0.1	0.21	UJ	0	0.09	0.25	UJ	0.19 *	0.84
PZ-100-KS DIS	7/23/2013	0.05	0.05	0.05	J	0.07	0.07	0.07	J	0.03	0.04	0.06	UJ	0.05 *	0.21
PZ-100-KS TOT	7/23/2013	0.05	0.06	0.09	UJ	0.05	0.06	0.09	UJ	-0.02	0.05	0.14	UJ	ND	0.46
PZ-100-SD DIS	7/9/2013	0.44	0.2	0.14		0.03	0.07	0.15	U	0.34	0.18	0.11	J	0.78 *	1.08
PZ-100-SD TOT	7/9/2013	0.42	0.16	0.07	J	0.05	0.06	0.07	U	0.34	0.15	0.07		0.76 *	1.05
PZ-100-SS DIS	7/9/2013	4.82	0.89	0.11		0.26	0.16	0.13	J	1.86	0.44	0.07		6.94	5.66
PZ-100-SS TOT	7/9/2013	4.99	0.87	0.12		0.4	0.18	0.11		2.22	0.47	0.09		7.61	6.80
PZ-101-SS DIS	7/11/2013	0.53	0.25	0.14	J	0	0.09	0.19	UJ	0.48	0.24	0.12	J	1.01 *	1.52
PZ-101-SS TOT	7/11/2013	0.55	0.42	0.3	J	0.09	0.24	0.52	UJ	0.28	0.32	0.42	UJ	0.55 *	1.49
PZ-102R-SS DIS	7/19/2013	3.47	0.7	0.1	J+	0.72	0.26	0.14		2.25	0.5	0.09	J	6.44	7.04
PZ-102R-SS TOT	7/19/2013	4.13	0.85	0.11	J+	0.76	0.27	0.12		3.53	0.75	0.1	J	8.42	10.87
PZ-102-SS DIS	7/19/2013	5.84	0.98	0.08	J+	0.98	0.3	0.12		3.85	0.7	0.08		10.67	11.92
PZ-102-SS TOT	7/19/2013	4.67	0.82	0.08	J+	0.64	0.23	0.11		4.43	0.79	0.09		9.74	13.50

Table 4: Summary of Uranium Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Uranium-234				Uranium-235				Uranium-238				TOTAL U-234 + U-235 + U-238	Total Uranium (µg/L)
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-103-SS DIS	7/19/2013	0.33	0.14	0.07	J+	0.14	0.1	0.09	J	0.14	0.09	0.08	J	0.61	0.48
PZ-103-SS TOT	7/19/2013	0.63	0.4	0.28	J+	0.13	0.21	0.31	UJ	1.01	0.51	0.36	J	1.64 *	3.15
PZ-104-KS DIS	7/18/2013	0.56	0.19	0.06	J+	0.3	0.15	0.1		0.29	0.13	0.06	J	1.15	1.00
PZ-104-KS TOT	7/18/2013	0.62	0.2	0.07	J+	0.27	0.14	0.1	J	0.18	0.1	0.08	J	1.07	0.66
PZ-104-SD DIS	7/11/2013	0.21	0.24	0.28	UJ	-0.01	0.14	0.3	UJ	0.17	0.2	0.24	UJ	ND	0.85
PZ-104-SD TOT	7/11/2013	0.1	0.17	0.29	UJ	0	0.21	0.46	UJ	0.22	0.25	0.29	UJ	ND	1.08
PZ-104-SS DIS	7/11/2013	0.31	0.13	0.05		0.02	0.05	0.1	U	0.12	0.08	0.08	J	0.43 *	0.40
PZ-104-SS TOT	7/11/2013	0.52	0.18	0.06		0.11	0.09	0.07	J	0.22	0.11	0.08		0.85	0.71
PZ-105-SS DIS	7/12/2013	2.78	0.54	0.08		0.55	0.21	0.11	J+	1.78	0.4	0.1		5.11	5.56
PZ-105-SS TOT	7/12/2013	2.81	0.56	0.06		0.25	0.14	0.11	J+	1.54	0.37	0.06		4.60	4.70
PZ-106-KS DIS	7/19/2013	2.02	0.53	0.14	J+	0.22	0.16	0.14	J	0.78	0.3	0.21		3.02	2.43
PZ-106-KS TOT	7/19/2013	2.04	0.45	0.09	J+	0.31	0.16	0.1	J	0.93	0.27	0.08		3.28	2.91
PZ-106-SD DIS	7/10/2013	1.24	0.55	0.31	J+	0.64	0.43	0.38	J	0.1	0.18	0.31	U	1.24 *	1.22
PZ-106-SD TOT	7/10/2013	1.11	0.53	0.33	J+	0.62	0.44	0.41	J	0.77	0.43	0.23	J	2.50	2.58
PZ-106-SS DIS	7/10/2013	1.94	0.64	0.2	J+	0.62	0.37	0.22	J	0.54	0.31	0.2	J	3.10	1.90
PZ-106-SS TOT	7/10/2013	1.18	0.53	0.34	J+	0.37	0.33	0.39	UJ	0.59	0.37	0.33	J	1.77 *	1.94
PZ-107-SS DIS	7/19/2013	1.85	0.57	0.19	J+	0.16	0.17	0.21	UJ	0.83	0.35	0.18	J	2.68 *	2.57
PZ-107-SS FD DIS	7/19/2013	1.57	0.46	0.15	J+	0.24	0.18	0.18	J	0.93	0.33	0.12	J	2.74	2.88
PZ-107-SS TOT	7/19/2013	1.65	0.38	0.09	J+	0.18	0.12	0.11	J	1.42	0.34	0.06		3.25	4.31
PZ-107-SS FD TOT	7/19/2013	1.74	0.6	0.16	J+	0.31	0.25	0.22	J	1.51	0.54	0.18	J	3.56	4.64
PZ-109-SS DIS	7/10/2013	1.4	0.32	0.05	J	0.13	0.09	0.09	J	0.61	0.19	0.08	J	2.14	1.88
PZ-109-SS TOT	7/10/2013	1.36	0.32	0.06		0.17	0.11	0.1	J	0.54	0.18	0.08		2.07	1.69
PZ-110-SS DIS	7/9/2013	0.08	0.08	0.1	UJ	0.01	0.05	0.12	U	0.06	0.07	0.1	U	ND	0.35
PZ-110-SS TOT	7/9/2013	0.1	0.09	0.11	U	0.11	0.09	0.1	J	0.02	0.04	0.1	U	0.02 *	0.35
PZ-111-KS DIS	7/17/2013	8.15	1.6	0.11	J+	0.99	0.39	0.19	J	3.47	0.82	0.12	J	12.61	10.80
PZ-111-KS TOT	7/17/2013	7.02	1.25	0.08	J+	0.82	0.3	0.1	J	2.41	0.55	0.11		10.25	7.56
PZ-111-SD DIS	7/9/2013	0.3	0.13	0.06		0.05	0.06	0.08	U	0.18	0.1	0.08	J	0.48 *	0.57
PZ-111-SD TOT	7/9/2013	0.35	0.14	0.09	J	0.06	0.07	0.1	U	0.26	0.12	0.07		0.61 *	0.82
PZ-112-AS DIS	7/9/2013	0.25	0.19	0.15	J	0.15	0.16	0.19	U	-0.03	0.07	0.19	U	0.25 *	0.65
PZ-112-AS TOT	7/9/2013	0.19	0.15	0.16	J	0.05	0.08	0.14	U	0.09	0.09	0.1	U	0.19 *	0.36

Table 4: Summary of Uranium Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Uranium-234				Uranium-235				Uranium-238				TOTAL U-234 + U-235 + U-238	Total Uranium (µg/L)
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-113-AD DIS	7/10/2013	0.56	0.36	0.3	J+	0.35	0.33	0.38	UJ	0.2	0.24	0.35	U	0.56 *	1.22
PZ-113-AD FD DIS	7/10/2013	0.33	0.29	0.28	J	-0.04	0.15	0.38	UJ	0.33	0.29	0.28	J	0.66 *	1.16
PZ-113-AD TOT	7/10/2013	1.92	1.49	1.02	R	0.15	0.62	1.59	R	0.16	0.5	1.17	U	1.92 *	3.56
PZ-113-AD FD TOT	7/10/2013	0.31	0.3	0.32	UJ	0.07	0.16	0.34	UJ	0.05	0.13	0.28	UJ	ND	0.99
PZ-113-AS DIS	7/10/2013	0.56	0.25	0.17		0.18	0.15	0.16	J	0.22	0.17	0.21	J	0.96	0.74
PZ-113-AS TOT	7/10/2013	0.69	0.26	0.13	J	0.14	0.13	0.14	J	0.62	0.25	0.13	J	1.45	1.91
PZ-113-SS DIS	7/11/2013	1.49	0.32	0.07	J	0.12	0.09	0.08	J	0.83	0.23	0.11	J	2.44	2.53
PZ-113-SS TOT	7/11/2013	1.72	0.39	0.09		0.19	0.12	0.07	J	0.99	0.27	0.09		2.90	3.04
PZ-114-AS DIS	7/12/2013	0.29	0.16	0.13	J	0.14	0.12	0.13	J+	0.16	0.12	0.08	J	0.59	0.54
PZ-114-AS TOT	7/12/2013	0.3	0.21	0.17	J	0.01	0.09	0.24	UJ+	0.14	0.16	0.21	UJ	0.30 *	0.74
PZ-115-SS DIS	7/11/2013	3.41	0.7	0.11		0.33	0.17	0.09	J+	2.19	0.5	0.09		5.93	6.68
PZ-115-SS TOT	7/11/2013	3.67	0.76	0.11	J	0.32	0.18	0.13	J+	2.53	0.58	0.13	J	6.52	7.69
PZ-116-SS DIS	7/11/2013	5.24	0.83	0.06	J	0.33	0.15	0.08	J	1.74	0.36	0.06	J	7.31	5.34
PZ-116-SS TOT	7/11/2013	5.64	0.96	0.09		0.37	0.18	0.11	J+	1.68	0.39	0.09		7.69	5.18
PZ-200-SS DIS	7/19/2013	0.49	0.18	0.09	J+	0.06	0.08	0.13	UJ	0.41	0.16	0.06	J	0.90 *	1.28
PZ-200-SS TOT	7/19/2013	0.96	0.27	0.09	J+	0.17	0.12	0.11	J	0.8	0.24	0.08		1.93	2.46
PZ-201A-SS DIS	7/10/2013	2.85	0.85	0.22	J+	1.03	0.51	0.24	J	1.36	0.55	0.29		5.24	4.53
PZ-201A-SS TOT	7/10/2013	3.12	0.93	0.3	J+	0.64	0.42	0.35	J	1.91	0.71	0.48		5.67	5.99
PZ-202-SS DIS	7/11/2013	1.51	0.44	0.11	J	0.18	0.15	0.15	J	0.82	0.3	0.11	J	2.51	2.53
PZ-202-SS TOT	7/11/2013	2.41	0.52	0.08	J+	0.18	0.12	0.09	J+	1.12	0.31	0.07		3.71	3.42
PZ-203-SS DIS	7/17/2013	3.03	0.56	0.08	J+	0.31	0.15	0.1		0.88	0.24	0.06	J	4.22	2.77
PZ-203-SS TOT	7/17/2013	2.86	0.56	0.06	J+	0.22	0.13	0.09	J	0.4	0.16	0.07	J	3.48	1.29
PZ-204A-SS DIS	7/16/2013	2.41	0.64	0.11	J+	0.4	0.25	0.2	J+	1.86	0.54	0.11	J+	4.67	5.73
PZ-204A-SS TOT	7/16/2013	1.98	0.67	0.21	J+	0.38	0.28	0.2	J+	1.27	0.5	0.19	J+	3.63	3.96
PZ-204-SS DIS	7/17/2013	2.42	0.5	0.09	J+	0.28	0.15	0.11	J	1.5	0.36	0.09		4.20	4.60
PZ-204-SS TOT	7/17/2013	2.85	0.58	0.08	J+	0.44	0.2	0.12	J	1.73	0.41	0.1		5.02	5.36
PZ-205-AS DIS	7/18/2013	0.99	0.47	0.2	J+	0.46	0.34	0.24	J	1.08	0.5	0.2	J	2.53	3.43
PZ-205-AS TOT	7/18/2013	0.79	0.34	0.18	J+	0.11	0.15	0.23	UJ	0.88	0.36	0.18	J	1.67 *	2.73
PZ-205-SS DIS	7/10/2013	0.47	0.17	0.06		0.11	0.09	0.1	J	0.42	0.16	0.06		1.00	1.30
PZ-205-SS TOT	7/10/2013	0.54	0.18	0.07	J	0.16	0.1	0.09	J	0.45	0.16	0.06	J	1.15	1.41

Table 4: Summary of Uranium Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Uranium-234				Uranium-235				Uranium-238				TOTAL U-234 + U-235 + U-238	Total Uranium (µg/L)
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-206-SS DIS	7/18/2013	0.28	0.13	0.07	J+	0.07	0.07	0.07	J	0.1	0.08	0.08	J	0.45	0.33
PZ-206-SS TOT	7/18/2013	0.53	0.18	0.07	J+	0.23	0.12	0.07	J	0.49	0.17	0.07	J	1.25	1.57
PZ-207-AS DIS	7/18/2013	0.21	0.18	0.18	J+	0.28	0.25	0.28	J	0.11	0.15	0.23	UJ	0.21 *	0.82
PZ-207-AS TOT	7/18/2013	0.1	0.22	0.43	UJ+	0.1	0.22	0.43	UJ	-0.03	0.14	0.44	UJ	ND	1.51
PZ-208-SS DIS	7/16/2013	1.58	0.39	0.1	J+	0.48	0.21	0.13	J+	0.98	0.29	0.08	J+	3.04	3.14
PZ-208-SS TOT	7/16/2013	1.81	0.43	0.11	J+	0.32	0.17	0.13	J+	1.43	0.37	0.09	J+	3.56	4.41
PZ-302-AI DIS	7/16/2013	5.18	1.31	0.23	J+	0.84	0.43	0.28	J+	4.06	1.08	0.16	J+	10.08	12.49
PZ-302-AI TOT	7/16/2013	3.6	0.65	0.07	J+	0.73	0.24	0.08	J+	3.1	0.58	0.07	J+	7.43	9.57
PZ-302-AS DIS	7/16/2013	2.45	0.56	0.09	J+	0.46	0.22	0.15	J	1.39	0.39	0.12		4.30	4.35
PZ-302-AS TOT	7/16/2013	2.35	0.61	0.12	J+	0.62	0.29	0.13	J	1.44	0.44	0.15	J	4.41	4.58
PZ-303-AS DIS	7/15/2013	1.05	0.36	0.13	J	0.37	0.22	0.13	J+	1.02	0.36	0.13	J	2.44	3.21
PZ-303-AS TOT	7/15/2013	0.84	0.35	0.18	J	0.37	0.25	0.22	J+	0.53	0.27	0.12	J	1.74	1.75
PZ-304-AI DIS	7/16/2013	0.63	0.35	0.18	J+	0.16	0.21	0.32	UJ+	0.33	0.25	0.18	J+	0.96 *	1.13
PZ-304-AI TOT	7/16/2013	0.72	0.37	0.17	J+	0.49	0.33	0.21	J+	0.8	0.39	0.17	J+	2.01	2.61
PZ-304-AS DIS	7/16/2013	1.27	0.91	0.89	J+	0.35	0.6	1.05	UJ	0.54	0.56	0.59	UJ	1.27 *	2.24
PZ-304-AS TOT	7/16/2013	0.46	0.69	1.11	UJ+	0.72	0.98	1.53	UJ	0.45	0.68	1.1	UJ	ND	3.99
PZ-305-AI DIS	7/22/2013	0.13	0.1	0.11	J	0.04	0.08	0.13	U	0	0.04	0.08	U	0.13 *	0.30
PZ-305-AI TOT	7/22/2013	0.09	0.09	0.11	U	0.02	0.07	0.16	U	0.05	0.07	0.11	U	ND	0.40

Notes:

All values are in units of picoCuries per liter (pCi/L), except as noted.

DIS = dissolved sample (field filtered sample); TOT = total sample (unfiltered sample)

FD = Field duplicate sample

CSU = Combined Standard Uncertainty (2-sigma)

Data Validation Qualifiers (Final Q) include: U = Non-detect at the reported value;

UJ = Non-Detect at the estimated reported value; UJ+ = Non-Detect at the estimated reported value which may be biased high;

J = estimated result; J+ = estimated result which may be biased high.

TOTAL U-238 + U-235 + U-234 based on sum of detected values only. The * flag indicates one or more of the individual isotopes was non-detect.

Total uranium values in µg/L based on use of Minimum Detectable Activity (MDA) values for non-detect results.

MCL = Maximum Contaminant Level for drinking water systems of 30 µg/L for total Uranium

Table 5: Summary of Thorium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Thorium-228				Thorium-230				Thorium-232				TOTAL Thorium 228 + 230 + 232	
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
S-5 DIS	7/9/2013	0.07	0.09	0.15	U	0.01	0.05	0.11	UJ+	-0.01	0.04	0.11	UJ	ND	*
S-5 TOT	7/9/2013	0.15	0.13	0.17	UJ	0.1	0.11	0.15	UJ+	0.18	0.13	0.12	J	0.00	*
S-8 DIS	7/12/2013	0.03	0.07	0.14	U	0.28	0.15	0.09	J+	0.09	0.09	0.1	U	0.28	*
S-8 TOT	7/12/2013	-0.02	0.04	0.11	U	0.4	0.19	0.11	J+	0.08	0.08	0.11	U	0.40	*
S-10 DIS	7/15/2013	0.08	0.08	0.11	U	0.58	0.24	0.09	J+	0.05	0.07	0.11	U	0.58	*
S-10 TOT	7/15/2013	0.05	0.06	0.08	U	0.41	0.17	0.08	J+	0.18	0.1	0.07	J	0.59	*
S-53 DIS	7/18/2013	0	0.05	0.17	UJ	0.51	0.25	0.12	J+	0.12	0.11	0.1	J	0.63	*
S-53 TOT	7/18/2013	2.02	0.58	0.08	J	2.52	0.71	0.12	J+	1.9	0.55	0.08	J	6.44	
S-61 DIS	7/12/2013	0.01	0.11	0.24	UJ	0.65	0.29	0.14	J+	0.12	0.12	0.13	UJ	0.65	*
S-61 TOT	7/12/2013	0.73	0.26	0.14		5.72	1.35	0.09	J+	0.74	0.25	0.08		7.19	
S-82 DIS	7/11/2013	0.15	0.11	0.13	J	0.51	0.2	0.06	J+	0.05	0.06	0.09	UJ	0.66	*
S-82 TOT	7/11/2013	0.02	0.06	0.12	UJ	0.11	0.08	0.06	J+	0.02	0.04	0.07	UJ	0.11	*
S-84 DIS	7/10/2013	0.1	0.07	0.07	J	0.16	0.09	0.06	J	0.04	0.04	0.05	U	0.26	*
S-84 TOT	7/10/2013	0.56	0.26	0.11	J	0.7	0.3	0.1	J	0.62	0.28	0.11	J	1.88	
I-4 DIS	7/9/2013	0.06	0.06	0.09	UJ	0.11	0.08	0.08	J+	0.04	0.05	0.06	UJ	0.11	*
I-4 FD DIS	7/9/2013	0.05	0.07	0.1	UJ	0.2	0.13	0.09	J	0.02	0.04	0.08	UJ	0.20	*
I-4 TOT	7/9/2013	0.01	0.07	0.14	U	0.06	0.07	0.11	UJ+	0.01	0.03	0.07	U	ND	*
I-4 FD TOT	7/9/2013	0.03	0.05	0.08	U	0.19	0.1	0.07	J	0	0.03	0.05	U	0.19	*
I-9 DIS	7/11/2013	0.06	0.08	0.13	U	0.29	0.18	0.15	J+	-0.01	0.05	0.17	U	0.29	*
I-9 TOT	7/11/2013	0.08	0.1	0.16	U	0.19	0.12	0.1	J+	0.07	0.07	0.08	U	0.19	*
I-11 DIS	7/15/2013	0.2	0.19	0.26	UJ	0.69	0.32	0.18	J+	0.01	0.05	0.14	UJ	0.69	*
I-11 TOT	7/15/2013	0.2	0.15	0.17	J+	0.76	0.3	0.13	J+	0.04	0.07	0.11	UJ	0.96	*
I-62 DIS	7/12/2013	0	0.06	0.15	U	0.53	0.22	0.11	J+	0.06	0.07	0.07	U	0.53	*
I-62 FD DIS	7/12/2013	0.03	0.05	0.07	UJ	0.29	0.14	0.06	J+	0.1	0.07	0.05	J	0.39	*
I-62 TOT	7/12/2013	0.12	0.11	0.16	U	0.4	0.19	0.13	J+	0.12	0.09	0.08	J	0.52	*
I-62 FD TOT	7/12/2013	0.06	0.07	0.08	U	0.33	0.16	0.07	J+	0.07	0.07	0.08	U	0.33	*
I-65 DIS	7/18/2013	0.02	0.04	0.08	UJ	0.49	0.22	0.13	J+	0.01	0.07	0.16	UJ	0.49	*
I-65 FD DIS	7/18/2013	0.03	0.06	0.11	UJ	0.21	0.13	0.09	J	0.07	0.08	0.08	UJ	0.21	*
I-65 TOT	7/18/2013	0.39	0.2	0.12	J	0.44	0.21	0.11	J+	0.15	0.11	0.09	J	0.98	
I-65 FD TOT	7/18/2013	0.48	0.25	0.15	J	0.41	0.22	0.1	J	0.14	0.12	0.1	J	1.03	

Table 5: Summary of Thorium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Thorium-228				Thorium-230				Thorium-232				TOTAL Thorium 228 + 230 + 232	
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
I-66 DIS	7/15/2013	0.06	0.09	0.16	UJ	0.26	0.16	0.09	J+	0.06	0.08	0.09	UJ	0.26	*
I-66 TOT	7/15/2013	0.24	0.18	0.16	J+	0.75	0.35	0.16	J+	0.03	0.08	0.17	UJ	0.99	*
I-67 DIS	7/12/2013	0.05	0.07	0.11	U	0.46	0.2	0.08	J+	0.1	0.09	0.1	J	0.56	*
I-67 TOT	7/12/2013	0.03	0.06	0.13	UJ	0.87	0.39	0.18	J+	0.05	0.08	0.12	UJ	0.87	*
I-68 DIS	7/12/2013	0.03	0.05	0.08	U	0.23	0.12	0.07	J+	0.06	0.06	0.08	U	0.23	*
I-68 TOT	7/12/2013	1.27	0.4	0.08		1.63	0.5	0.07	J+	0.95	0.32	0.08		3.85	
I-73 DIS	7/19/2013	0.14	0.12	0.12	J	0.57	0.26	0.1	J	0.06	0.07	0.09	UJ	0.71	*
I-73 TOT	7/19/2013	0.34	0.17	0.08		0.49	0.21	0.07	J	0.08	0.08	0.08	J	0.91	
D-3 DIS	7/9/2013	0.18	0.11	0.09	J	0.09	0.07	0.06	J+	0.03	0.05	0.08	U	0.27	*
D-3 TOT	7/9/2013	0.15	0.13	0.13	J	0.15	0.12	0.13	J+	0	0.04	0.09	UJ	0.30	*
D-6 DIS	7/12/2013	0.17	0.15	0.16	J	0.68	0.34	0.14	J+	0.06	0.09	0.13	UJ	0.85	*
D-6 TOT	7/12/2013	0.13	0.09	0.08	J	0.36	0.15	0.07	J+	0.07	0.06	0.05	J	0.56	
D-12 DIS	7/15/2013	-0.03	0.07	0.19	UJ	0.54	0.29	0.13	J+	0.1	0.12	0.18	UJ	0.54	*
D-12 FD DIS	7/15/2013	-0.02	0.06	0.16	U	0.54	0.22	0.09	J+	-0.01	0.03	0.09	U	0.54	*
D-12 TOT	7/15/2013	0.11	0.1	0.12	UJ	0.54	0.24	0.08	J+	0.12	0.1	0.08	J	0.66	*
D-12 FD TOT	7/15/2013	0.03	0.07	0.14	UJ	0.54	0.23	0.09	J+	0.17	0.12	0.08	J	0.71	*
D-13 DIS	7/18/2013	0.17	0.13	0.13	J	0.98	0.36	0.12	J+	0.22	0.15	0.12	J	1.37	
D-13 TOT	7/18/2013	0.24	0.16	0.13	J	0.89	0.35	0.1	J+	0.09	0.1	0.14	UJ	1.13	*
D-14 DIS	7/18/2013	0.08	0.09	0.11	U	0.87	0.32	0.09	J+	0.09	0.09	0.08	J	0.96	*
D-14 TOT	7/18/2013	0.66	0.25	0.1		0.97	0.33	0.09	J+	0.72	0.26	0.11		2.4	
D-81 DIS	7/17/2013	0.07	0.08	0.13	UJ	0.3	0.15	0.12	J	0.04	0.05	0.08	UJ	0.30	*
D-81 FD DIS	7/17/2013	0.1	0.1	0.12	U	0.53	0.25	0.13	J+	0.09	0.09	0.09	J	0.62	*
D-81 TOT	7/17/2013	0.06	0.07	0.08	U	0.37	0.18	0.1		0.04	0.06	0.08	U	0.37	*
D-81 FD TOT	7/17/2013	0.05	0.09	0.16	U	0.43	0.23	0.13	J+	0.17	0.14	0.15	J	0.60	*
D-83 DIS	7/11/2013	0.11	0.08	0.06	J	0.14	0.1	0.08	J+	0.01	0.03	0.06	UJ	0.25	*
D-83 FD DIS	7/11/2013	0.17	0.11	0.07	J	0.47	0.2	0.09	J+	0.04	0.05	0.07	U	0.64	*
D-83 TOT	7/11/2013	0.14	0.11	0.14	J	0.14	0.09	0.08	J+	0.06	0.06	0.08	U	0.28	*
D-83 FD TOT	7/11/2013	0.26	0.14	0.08	J	0.41	0.18	0.08	J+	0	0.05	0.1	U	0.67	*
D-85 DIS	7/10/2013	0.05	0.07	0.11	U	0.06	0.07	0.08	U	0.05	0.07	0.1	U	ND	*
D-85 TOT	7/10/2013	2.68	0.9	0.13	J	4.26	1.35	0.19	J	2.5	0.84	0.13	J	9.44	

Table 5: Summary of Thorium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Thorium-228				Thorium-230				Thorium-232				TOTAL Thorium 228 + 230 + 232	
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
D-87 DIS	7/17/2013	0.06	0.1	0.17	UJ	0.89	0.32	0.09	J+	0.09	0.09	0.12	UJ	0.89	*
D-87 TOT	7/17/2013	0.55	0.24	0.16		1.45	0.45	0.13	J+	0.51	0.22	0.12		2.51	
D-93 DIS	7/11/2013	0.12	0.12	0.18	U	0.17	0.13	0.16	J+	0.05	0.08	0.13	U	0.17	*
D-93 TOT	7/11/2013	0.2	0.14	0.13	J	0.18	0.13	0.12	J+	0.07	0.08	0.09	U	0.38	*
LR-100 DIS	7/17/2013	0.05	0.07	0.11	U	0.41	0.2	0.11		0.04	0.05	0.08	U	0.41	*
LR-100 TOT	7/17/2013	0	0.08	0.2	U	0.55	0.24	0.11		-0.01	0.04	0.11	U	0.55	*
LR-103 DIS	7/17/2013	0.02	0.06	0.13	U	0.55	0.22	0.11		0.09	0.08	0.1	U	0.55	*
LR-103 TOT	7/17/2013	0.06	0.09	0.14	U	0.52	0.23	0.1		0.06	0.07	0.11	U	0.52	*
LR-104 DIS	7/22/2013	0.05	0.07	0.1	U	0.09	0.08	0.07	J	0	0.03	0.09	U	0.09	*
LR-104 TOT	7/22/2013	0.06	0.06	0.07	UJ	0.1	0.07	0.05	J	0.01	0.02	0.05	UJ	0.10	*
MW-102 DIS	7/15/2013	0.1	0.13	0.19	UJ	0.25	0.2	0.2	J+	0.15	0.14	0.13	J+	0.40	*
MW-102 TOT	7/15/2013	0.09	0.12	0.18	UJ	0.29	0.19	0.14	J+	0.12	0.13	0.17	UJ	0.29	*
MW-103 DIS	7/15/2013	0.06	0.07	0.08	UJ	0.37	0.19	0.14	J+	0.03	0.08	0.17	UJ	0.37	*
MW-103 TOT	7/15/2013	1.18	0.4	0.11	J+	1.8	0.55	0.09	J+	0.91	0.32	0.08	J+	3.89	
MW-104 DIS	7/16/2013	0	0.04	0.11	UJ	0.46	0.21	0.1	J+	0.05	0.06	0.09	UJ	0.46	*
MW-104 TOT	7/16/2013	0.71	0.26	0.09		1.15	0.37	0.1	J+	0.6	0.23	0.07		2.46	
MW-1204 DIS	7/11/2013	0.02	0.05	0.11	U	0.44	0.2	0.08	J+	0.05	0.06	0.08	U	0.44	*
MW-1204 TOT	7/11/2013	0.09	0.1	0.14	U	0.29	0.15	0.09	J+	0.05	0.07	0.12	U	0.29	*
PZ-100-KS DIS	7/23/2013	-0.05	0.03	0.11	UJ	0.13	0.08	0.06	J	-0.01	0.02	0.06	UJ	0.13	*
PZ-100-KS TOT	7/23/2013	0.02	0.05	0.1	U	0.04	0.05	0.07	U	0	0.03	0.06	U	ND	*
PZ-100-SD DIS	7/9/2013	0.03	0.06	0.11	U	0.09	0.08	0.08	J+	0.02	0.05	0.08	U	0.09	*
PZ-100-SD TOT	7/9/2013	0.02	0.04	0.08	UJ	0.1	0.07	0.06	J+	0.01	0.02	0.05	UJ	0.10	*
PZ-100-SS DIS	7/9/2013	0.05	0.07	0.1	U	0.02	0.05	0.1	UJ+	0.05	0.06	0.07	U	ND	*
PZ-100-SS TOT	7/9/2013	0.04	0.06	0.09	U	0.17	0.11	0.07	J+	0.03	0.05	0.09	U	0.17	*
PZ-101-SS DIS	7/11/2013	0.08	0.08	0.1	U	0.19	0.11	0.09	J	0.04	0.05	0.07	UJ+	0.19	*
PZ-101-SS TOT	7/11/2013	-0.01	0.07	0.19	U	0.24	0.16	0.09	J	0.05	0.08	0.13	UJ+	0.24	*
PZ-102R-SS DIS	7/19/2013	0	0.04	0.11	UJ	0.14	0.11	0.08	J	0.05	0.06	0.08	UJ	0.14	*
PZ-102R-SS TOT	7/19/2013	0.4	0.2	0.17	J	0.49	0.22	0.14	J	0.53	0.23	0.13	J	1.42	
PZ-102-SS DIS	7/19/2013	-0.01	0.06	0.16	UJ	0.19	0.13	0.13	J-	-0.02	0.04	0.11	U	0.19	*
PZ-102-SS TOT	7/19/2013	2.99	0.71	0.07	J	2.88	0.72	0.09	J-	2.71	0.65	0.08		8.58	

Table 5: Summary of Thorium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Thorium-228				Thorium-230				Thorium-232				TOTAL Thorium 228 + 230 + 232	
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-103-SS DIS	7/19/2013	0.06	0.14	0.27	U	0.04	0.1	0.2	UJ	0.06	0.1	0.16	U	ND	*
PZ-103-SS TOT	7/19/2013	0.62	0.5	0.64	U	1.3	0.66	0.43	J	0.31	0.31	0.36	U	1.30	*
PZ-104-KS DIS	7/18/2013	0	0.05	0.13	UJ	0.24	0.15	0.12	J	0.04	0.06	0.1	UJ	0.24	*
PZ-104-KS TOT	7/18/2013	0.02	0.05	0.09	U	0.24	0.14	0.1	J	0.03	0.04	0.07	U	0.24	*
PZ-104-SD DIS	7/11/2013	0.03	0.05	0.09	U	0.12	0.09	0.09	J	0.08	0.07	0.07	J+	0.20	*
PZ-104-SD TOT	7/11/2013	-0.04	0.07	0.22	UJ	0.09	0.1	0.15	UJ	-0.04	0.05	0.17	UJ+	ND	*
PZ-104-SS DIS	7/11/2013	0.02	0.07	0.15	U	0.05	0.06	0.07	U	0.04	0.06	0.09	UJ+	ND	*
PZ-104-SS TOT	7/11/2013	0.05	0.06	0.08	UJ	0.11	0.08	0.06	J	0.03	0.04	0.06	UJ+	0.11	*
PZ-105-SS DIS	7/12/2013	0.06	0.08	0.12	U	0.45	0.19	0.07	J+	0.12	0.09	0.08	J	0.57	*
PZ-105-SS TOT	7/12/2013	-0.03	0.04	0.14	U	0.45	0.19	0.11	J+	0.06	0.07	0.09	U	0.45	*
PZ-106-KS DIS	7/19/2013	0.04	0.13	0.28	UJ	0.06	0.12	0.23	UJ-	0.05	0.12	0.26	UJ	ND	*
PZ-106-KS TOT	7/19/2013	-0.01	0.06	0.16	UJ	0.14	0.1	0.09	J-	0.03	0.06	0.12	U	0.14	*
PZ-106-SD DIS	7/10/2013	-0.01	0.03	0.08	U	0.04	0.05	0.08	U	0.01	0.04	0.09	U	ND	*
PZ-106-SD TOT	7/10/2013	-0.01	0.03	0.07	U	0.18	0.11	0.06	J	0.08	0.07	0.07		0.26	*
PZ-106-SS DIS	7/10/2013	0.05	0.05	0.06	U	0.2	0.11	0.08	J	0.04	0.05	0.05	U	0.20	*
PZ-106-SS TOT	7/10/2013	0.04	0.07	0.12	UJ	0.07	0.08	0.1	UJ	0.06	0.08	0.11	UJ	ND	*
PZ-107-SS DIS	7/19/2013	-0.04	0.14	0.39	UJ	0.32	0.28	0.32	J-	0.04	0.13	0.29	UJ	0.32	*
PZ-107-SS FD DIS	7/19/2013	0.16	0.13	0.1	J	0.25	0.16	0.14	J-	0.04	0.06	0.09	UJ	0.41	*
PZ-107-SS TOT	7/19/2013	1.13	0.36	0.14	J	1.66	0.49	0.1	J-	1.38	0.41	0.1		4.17	
PZ-107-SS FD TOT	7/19/2013	1.15	0.38	0.1	J	1.33	0.43	0.12	J-	1.57	0.47	0.08		4.05	
PZ-109-SS DIS	7/10/2013	0.05	0.07	0.12	U	0.13	0.09	0.09	j	0.02	0.04	0.05	UJ+	0.13	*
PZ-109-SS TOT	7/10/2013	0.06	0.08	0.14	U	0.05	0.07	0.11	U	0.04	0.05	0.07	UJ+	ND	*
PZ-110-SS DIS	7/9/2013	-0.01	0.04	0.11	UJ	0.1	0.08	0.07	J+	0.06	0.06	0.07	UJ	0.10	*
PZ-110-SS TOT	7/9/2013	0.05	0.07	0.09	UJ	0.2	0.13	0.08	J+	0.02	0.05	0.11	UJ	0.20	*
PZ-111-KS DIS	7/17/2013	0	0.04	0.11	UJ	0.49	0.21	0.09	J	0	0.03	0.1	UJ	0.49	*
PZ-111-KS TOT	7/17/2013	0.02	0.06	0.13	U	0.42	0.18	0.07		-0.02	0.03	0.1	U	0.42	*
PZ-111-SD DIS	7/9/2013	0.01	0.05	0.11	U	0.11	0.08	0.06	J+	-0.01	0.03	0.08	U	0.11	*
PZ-111-SD TOT	7/9/2013	0.02	0.05	0.09	U	0.07	0.07	0.1	UJ+	0.02	0.05	0.08	U	ND	*
PZ-112-AS DIS	7/9/2013	0.07	0.08	0.09	U	0.13	0.1	0.1	J+	-0.04	0.05	0.17	U	0.13	*
PZ-112-AS TOT	7/9/2013	0.06	0.07	0.07	U	0.16	0.11	0.1	J+	0.02	0.05	0.1	U	0.16	*

Table 5: Summary of Thorium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Thorium-228				Thorium-230				Thorium-232				TOTAL Thorium 228 + 230 + 232	
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-113-AD DIS	7/10/2013	0.08	0.1	0.15	U	0.12	0.1	0.11	J	-0.01	0.04	0.11	U	0.12	*
PZ-113-AD FD DIS	7/10/2013	0.07	0.08	0.13	UJ	0.09	0.07	0.07	J	0	0.03	0.07	UJ+	0.09	*
PZ-113-AD TOT	7/10/2013	0.2	0.11	0.07	J	0.1	0.08	0.08	J	-0.04	0.04	0.14	U	0.30	*
PZ-113-AD FD TOT	7/10/2013	0.19	0.11	0.12	J	0.12	0.09	0.08		0.02	0.04	0.07	UJ+	0.31	*
PZ-113-AS DIS	7/10/2013	0.09	0.08	0.09	J	0.1	0.07	0.06	J	0.04	0.05	0.07	UJ+	0.19	*
PZ-113-AS TOT	7/10/2013	0.06	0.07	0.09	UJ	0.21	0.12	0.09	J	0.12	0.09	0.09	J+	0.33	*
PZ-113-SS DIS	7/11/2013	0.05	0.07	0.12	U	0.12	0.08	0.07	J	0.03	0.06	0.1	UJ+	0.12	*
PZ-113-SS TOT	7/11/2013	0.2	0.11	0.06	J	0.32	0.15	0.09	J	0.17	0.1	0.06	J+	0.69	
PZ-114-AS DIS	7/12/2013	0.08	0.13	0.23	U	0.52	0.32	0.2	J+	0	0.11	0.23	U	0.52	*
PZ-114-AS TOT	7/12/2013	0	0.04	0.13	UJ	0.35	0.18	0.12	J+	0.04	0.07	0.12	UJ	0.35	*
PZ-115-SS DIS	7/11/2013	0.05	0.06	0.07	U	0.18	0.1	0.06	J+	0.04	0.05	0.07	U	0.18	*
PZ-115-SS TOT	7/11/2013	0.02	0.05	0.1	U	0.12	0.09	0.08	J+	0.03	0.05	0.1	U	0.12	*
PZ-116-SS DIS	7/11/2013	0.04	0.09	0.18	U	0.16	0.12	0.12	J+	0.01	0.05	0.13	U	0.16	*
PZ-116-SS TOT	7/11/2013	0.03	0.05	0.1	U	0.22	0.12	0.08	J+	0.04	0.05	0.07	U	0.22	*
PZ-200-SS DIS	7/19/2013	0.07	0.09	0.14	UJ	0.14	0.11	0.12	J-	0.02	0.05	0.08	UJ	0.14	*
PZ-200-SS TOT	7/19/2013	0.17	0.11	0.07	J	0.46	0.19	0.09	J-	0.24	0.12	0.07	J	0.87	
PZ-201A-SS DIS	7/10/2013	-0.02	0.05	0.15	U	0.11	0.09	0.08	J	0.02	0.04	0.08	U	0.11	*
PZ-201A-SS TOT	7/10/2013	0	0.06	0.14	U	0.22	0.13	0.09	J	0.04	0.05	0.08	U	0.22	*
PZ-202-SS DIS	7/11/2013	0.06	0.11	0.19	UJ	0.34	0.19	0.12	J+	0.05	0.07	0.11	UJ	0.34	*
PZ-202-SS TOT	7/11/2013	0.05	0.07	0.1	UJ	0.09	0.09	0.09	J+	0.03	0.05	0.08	UJ	0.09	*
PZ-203-SS DIS	7/17/2013	-0.02	0.05	0.15	U	0.74	0.29	0.11	J+	0.1	0.1	0.12	U	0.74	*
PZ-203-SS TOT	7/17/2013	-0.01	0.05	0.14	U	0.58	0.23	0.11	J+	0.1	0.09	0.1	J	0.68	*
PZ-204A-SS DIS	7/16/2013	0.04	0.06	0.1	U	0.42	0.19	0.08	J+	0.12	0.09	0.07	J	0.54	*
PZ-204A-SS TOT	7/16/2013	0.37	0.21	0.15	J	0.49	0.25	0.14	J+	0.18	0.14	0.11	J	1.04	
PZ-204-SS DIS	7/17/2013	0.01	0.07	0.16	U	0.55	0.24	0.13		0.06	0.08	0.11	U	0.55	*
PZ-204-SS TOT	7/17/2013	0.09	0.07	0.06	J	0.29	0.14	0.08	J	0.03	0.05	0.07	UJ	0.38	*
PZ-205-AS DIS	7/18/2013	0.02	0.05	0.1	U	0.62	0.24	0.09	J+	0.11	0.09	0.08	J	0.73	*
PZ-205-AS TOT	7/18/2013	0.9	0.32	0.11		1.44	0.45	0.11	J+	0.79	0.29	0.08		3.13	
PZ-205-SS DIS	7/10/2013	0.01	0.03	0.08	U	0.14	0.1	0.07	J	0.06	0.06	0.06	J+	0.20	*
PZ-205-SS TOT	7/10/2013	0.03	0.06	0.11	U	0.04	0.06	0.09	U	0	0.03	0.07	UJ+	ND	*

Table 5: Summary of Thorium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Thorium-228				Thorium-230				Thorium-232				TOTAL Thorium 228 + 230 + 232	
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-206-SS DIS	7/18/2013	0.07	0.07	0.07	J	0.13	0.11	0.12	J	0.03	0.07	0.15	U	0.20	*
PZ-206-SS TOT	7/18/2013	0.15	0.09	0.07	J	0.17	0.09	0.06	J	0.1	0.07	0.05	J	0.42	
PZ-207-AS DIS	7/18/2013	0.05	0.07	0.1	U	0.24	0.14	0.1	J	0.05	0.06	0.1	U	0.24	*
PZ-207-AS TOT	7/18/2013	0.04	0.06	0.1	U	0.22	0.13	0.07	J	0	0.04	0.11	U	0.22	*
PZ-208-SS DIS	7/16/2013	0.09	0.08	0.08	J	0.43	0.18	0.09	J+	0.09	0.08	0.06	J	0.61	
PZ-208-SS TOT	7/16/2013	0.21	0.14	0.11	J	0.7	0.28	0.11	J+	0.25	0.15	0.08	J	1.16	
PZ-302-AI DIS	7/16/2013	0	0.03	0.07	U	0.57	0.22	0.06	J+	0.07	0.07	0.07	J	0.64	*
PZ-302-AI TOT	7/16/2013	0.12	0.09	0.07	J	0.59	0.24	0.1	J+	0.15	0.11	0.1	J	0.86	
PZ-302-AS DIS	7/16/2013	0.01	0.04	0.1	U	0.26	0.13	0.07		0.05	0.06	0.06	U	0.26	*
PZ-302-AS TOT	7/16/2013	0.17	0.12	0.11	J	0.43	0.2	0.08	J	0.22	0.14	0.11	J	0.82	
PZ-303-AS DIS	7/15/2013	0.01	0.06	0.15	U	0.35	0.17	0.09	J+	0.01	0.03	0.08	U	0.35	*
PZ-303-AS TOT	7/15/2013	0.07	0.09	0.13	U	0.66	0.26	0.09	J+	0.13	0.11	0.11	J	0.79	*
PZ-304-AI DIS	7/16/2013	0.07	0.08	0.11	U	0.25	0.14	0.08	J+	0.06	0.07	0.07	U	0.25	*
PZ-304-AI TOT	7/16/2013	0.1	0.09	0.07	J	0.62	0.25	0.1	J+	0.05	0.06	0.07	U	0.72	*
PZ-304-AS DIS	7/16/2013	0.09	0.1	0.12	UJ	0.64	0.27	0.1	J+	0.1	0.09	0.09	J	0.74	*
PZ-304-AS TOT	7/16/2013	0.03	0.06	0.12	UJ	0.64	0.27	0.11	J+	0.15	0.12	0.13	J	0.79	*
PZ-305-AI DIS	7/22/2013	-0.03	0.04	0.14	U	0.04	0.07	0.12	U	-0.02	0.04	0.11	U	ND	*
PZ-305-AI TOT	7/22/2013	-0.02	0.09	0.24	UJ	0.05	0.1	0.17	UJ	-0.02	0.05	0.14	UJ	ND	*

Notes:
All values are in units of picoCuries per liter (pCi/L)
DIS = dissolved sample (field filtered sample); TOT = total sample (unfiltered sample)
CSU = Combined Standard Uncertainty (2-sigma); MDA = Minimum Detectable Activity
FD = Field duplicate sample
Data Validation Qualifiers (Final Q) include: U = Non-detect at the reported value;
UJ = Non-Detect at the estimated reported value; UJ+ = Non-Detect at the estimated reported value which may be biased high;
UJ- = Non-Detect at the estimated reported value which may be biased low;
J = estimated result; J+ = estimated result which may be biased high; J- = estimated result which may be biased low
Total Thorium - 228 + 230 +232 based on sum of detected values. ND indicates that results for all Thorium isotopes were non-detect and a * flag indicates that only one or two of the isotopes were detected.

Table 6: Summary of Radium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Radium-226				Radium-228				Combined Radium 226 + 228	Combined Radium relative to 5 pCi/L MCL
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
S-5 DIS	7/9/2013	0.83	0.64	0.66	J	4.01	1.1	0.15	J+	4.84	Less Than MCL
S-5 TOT	7/9/2013	0.98	0.7	0.8	J	5.52	1.48	0.17	J+	6.50	Exceeds MCL
S-8 DIS	7/12/2013	0.24	0.2	0.17	J	1.03	0.81	1.55	U	0.24 *	Less Than MCL
S-8 TOT	7/12/2013	0.35	0.31	0.39	U	0.67	0.66	1.29	U	Non-Detect	Less Than MCL
S-10 DIS	7/15/2013	0.14	0.15	0.18	U	1.39	0.77	1.34	J	1.39 *	Less Than MCL
S-10 TOT	7/15/2013	0.43	0.25	0.14	J	2.55	0.97	1.38		2.98	Less Than MCL
S-53 DIS	7/18/2013	0.22	0.24	0.33	UJ+	0.94	0.74	1.42	U	Non-Detect	Less Than MCL
S-53 TOT	7/18/2013	4.04	1.36	0.4	J+	2.66	1.03	1.51		6.70	Exceeds MCL
S-61 DIS	7/12/2013	0.31	0.22	0.2	J	1.53	0.76	1.28		1.84	Less Than MCL
S-61 TOT	7/12/2013	1.29	0.51	0.2		1.27	0.7	1.22	J	2.56	Less Than MCL
S-82 DIS	7/11/2013	1.07	0.47	0.19		1.84	0.82	1.31	J+	2.91	Less Than MCL
S-82 TOT	7/11/2013	1.48	0.61	0.27		1.18	0.9	1.71	UJ+	1.48 *	Less Than MCL
S-84 DIS	7/10/2013	0.67	0.35	0.17	J	3.35	1.02	1.08	J+	4.02	Less Than MCL
S-84 TOT	7/10/2013	1.3	0.61	0.27	J+	2.88	1.02	1.36	J+	4.18	Less Than MCL
I-4 DIS	7/9/2013	0.96	0.54	0.31	J	5.89	1.49	0.13	J+	6.85	Exceeds MCL
I-4 FD DIS	7/9/2013	1.56	0.67	0.36	J	2.23	0.85	1.22	J+	3.79	Less Than MCL
I-4 TOT	7/9/2013	1.37	0.6	0.28		5.2	1.32	0.11	J+	6.57	Exceeds MCL
I-4 FD TOT	7/9/2013	1.18	0.52	0.21	J	2.38	0.81	0.99	J+	3.56	Less Than MCL
I-9 DIS	7/11/2013	1.01	0.47	0.23		4.21	1.19	1.05	J+	5.22	Exceeds MCL
I-9 TOT	7/11/2013	1.14	0.51	0.28		2.41	0.95	1.42	J+	3.55	Less Than MCL
I-11 DIS	7/15/2013	1.43	0.56	0.3		2.91	1.08	1.52		4.34	Less Than MCL
I-11 TOT	7/15/2013	1.44	0.54	0.25		1.82	0.87	1.45		3.26	Less Than MCL
I-62 DIS	7/12/2013	0.44	0.27	0.2	J	0.7	0.72	1.42	U	0.44 *	Less Than MCL
I-62 FD DIS	7/12/2013	0.2	0.2	0.24	U	1.2	0.72	1.3	U	Non-Detect	Less Than MCL
I-62 TOT	7/12/2013	0.66	0.34	0.16	J	1.38	0.78	1.38	J	2.04	Less Than MCL
I-62 FD TOT	7/12/2013	0.27	0.22	0.23	J	1.85	0.84	1.36		2.12	Less Than MCL
I-65 DIS	7/18/2013	0.29	0.21	0.15	J+	1.24	0.71	1.25	U	0.29 *	Less Than MCL
I-65 FD DIS	7/18/2013	0.2	0.18	0.17	J	0.53	0.89	1.82	U	0.20 *	Less Than MCL
I-65 TOT	7/18/2013	1.4	0.65	0.45	J+	1.12	0.74	1.37	U	1.40 *	Less Than MCL
I-65 FD TOT	7/18/2013	0.63	0.31	0.15		1.44	0.84	1.49	U	0.63 *	Less Than MCL

Table 6: Summary of Radium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Radium-226				Radium-228				Combined Radium 226 + 228	Combined Radium relative to 5 pCi/L MCL
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
I-66 DIS	7/15/2013	0.33	0.25	0.23	J	0.85	0.75	1.45	U	0.33 *	Less Than MCL
I-66 TOT	7/15/2013	0.33	0.27	0.31	J	1.59	0.77	1.27		1.92	Less Than MCL
I-67 DIS	7/12/2013	0.47	0.28	0.23	J	1.28	0.67	1.14	J	1.75	Less Than MCL
I-67 TOT	7/12/2013	0.49	0.28	0.22	J	1.19	0.68	1.2	U	0.49 *	Less Than MCL
I-68 DIS	7/12/2013	0.76	0.4	0.23	J	1.65	0.77	1.25		2.41	Less Than MCL
I-68 TOT	7/12/2013	1.4	0.53	0.19		3.67	1.17	1.38		5.07	Exceeds MCL
I-73 DIS	7/19/2013	2.83	1.62	0.85	J	1.97	1.15	2.05	U	2.83 *	Less Than MCL
I-73 TOT	7/19/2013	1.9	1.36	1.05	J	1.07	1.19	2.36	U	1.90 *	Less Than MCL
D-3 DIS	7/9/2013	3.72	1.27	0.49		6.18	1.74	1.6	J+	9.90	Exceeds MCL
D-3 TOT	7/9/2013	3.53	1.2	0.3		4.81	1.45	1.6	J+	8.34	Exceeds MCL
D-6 DIS	7/12/2013	2.88	0.95	0.26		4.07	1.3	1.57		6.95	Exceeds MCL
D-6 TOT	7/12/2013	3.1	0.98	0.2		3.13	1.13	1.59		6.23	Exceeds MCL
D-12 DIS	7/15/2013	0.47	0.3	0.29	J	1.74	0.79	1.26	J+	2.21	Less Than MCL
D-12 FD DIS	7/15/2013	0.44	0.34	0.39	J	1.44	0.79	1.37	J+	1.88	Less Than MCL
D-12 TOT	7/15/2013	0.29	0.23	0.23	J	1.13	0.72	1.3	UJ+	0.29 *	Less Than MCL
D-12 FD TOT	7/15/2013	0.36	0.23	0.16	J	0.97	0.73	1.39	UJ+	0.36 *	Less Than MCL
D-13 DIS	7/18/2013	1.09	0.46	0.24	J+	2.3	0.86	1.21		3.39	Less Than MCL
D-13 TOT	7/18/2013	0.78	0.38	0.21	J+	1.87	0.77	1.18		2.65	Less Than MCL
D-14 DIS	7/18/2013	1.21	0.58	0.41	J+	2.4	0.85	1.1		3.61	Less Than MCL
D-14 TOT	7/18/2013	2.22	0.9	0.32	J+	3.13	1.11	1.48		5.35	Exceeds MCL
D-81 DIS	7/17/2013	0.84	0.4	0.21		1.15	0.65	1.14	J	1.99	Less Than MCL
D-81 FD DIS	7/17/2013	0.77	0.42	0.34	J+	1.44	0.77	1.34	J	2.21	Less Than MCL
D-81 TOT	7/17/2013	0.3	0.29	0.39	U	1.22	0.68	1.21	J	1.22 *	Less Than MCL
D-81 FD TOT	7/17/2013	0.39	0.29	0.32	J+	0.54	0.64	1.28	U	0.39 *	Less Than MCL
D-83 DIS	7/11/2013	3.54	1.18	0.35		5.01	1.4	1.27	J+	8.55	Exceeds MCL
D-83 FD DIS	7/11/2013	4.04	1.3	0.42		4.29	1.24	1.25		8.33	Exceeds MCL
D-83 TOT	7/11/2013	3.04	0.98	0.32		4.3	1.3	1.43	J+	7.34	Exceeds MCL
D-83 FD TOT	7/11/2013	3.1	1.02	0.45		4.43	1.26	1.21		7.53	Exceeds MCL
D-85 DIS	7/10/2013	1.56	0.68	0.49	J	4.8	1.4	1.4	J+	6.36	Exceeds MCL
D-85 TOT	7/10/2013	4.64	1.41	0.33	J	4.91	2.31	3.81	J+	9.55	Exceeds MCL

Table 6: Summary of Radium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Radium-226				Radium-228				Combined Radium 226 + 228	Combined Radium relative to 5 pCi/L MCL
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
D-87 DIS	7/17/2013	2.26	0.89	0.44	J+	3.26	1.11	1.44		5.52	Exceeds MCL
D-87 TOT	7/17/2013	2.52	0.93	0.28	J+	3.37	1.11	1.38		5.89	Exceeds MCL
D-93 DIS	7/11/2013	2.05	0.72	0.27		4.18	1.22	1.24	J+	6.23	Exceeds MCL
D-93 TOT	7/11/2013	2.37	0.82	0.27		1.35	0.77	1.37	UJ+	2.37 *	Less Than MCL
LR-100 DIS	7/17/2013	0.36	0.25	0.18	J	0.51	0.66	1.34	U	0.36 *	Less Than MCL
LR-100 TOT	7/17/2013	0.58	0.35	0.31	J	-0.17	0.6	1.3	U	0.58 *	Less Than MCL
LR-103 DIS	7/17/2013	1.05	0.52	0.35		1.99	0.87	1.37		3.04	Less Than MCL
LR-103 TOT	7/17/2013	0.71	0.39	0.29	J	0.72	0.78	1.55	U	0.71 *	Less Than MCL
LR-104 DIS	7/22/2013	0.58	0.32	0.24	J	0.94	0.61	1.12	U	0.58 *	Less Than MCL
LR-104 TOT	7/22/2013	0.62	0.34	0.17	J	1.57	0.76	1.25		2.19	Less Than MCL
MW-102 DIS	7/15/2013	0.33	0.23	0.17	J	1.57	0.84	1.45	J	1.90	Less Than MCL
MW-102 TOT	7/15/2013	1.09	0.48	0.3		1.8	1.01	1.78	J	2.89	Less Than MCL
MW-103 DIS	7/15/2013	0.21	0.22	0.27	U	1.24	0.83	1.54	U	Non-Detect	Less Than MCL
MW-103 TOT	7/15/2013	0.7	0.4	0.35	J	1.73	0.83	1.38		2.43	Less Than MCL
MW-104 DIS	7/16/2013	0.24	0.22	0.28	U	0.85	0.75	1.46	UJ+	Non-Detect	Less Than MCL
MW-104 TOT	7/16/2013	0.98	0.49	0.26		1.72	0.88	1.49	J+	2.70	Less Than MCL
MW-1204 DIS	7/11/2013	7.42	1.94	0.18		3.46	1.17	1.54	J+	10.88	Exceeds MCL
MW-1204 TOT	7/11/2013	4.97	1.39	0.2		3.21	1.06	1.3	J+	8.18	Exceeds MCL
PZ-100-KS DIS	7/23/2013	0.21	0.21	0.29	U	1.11	0.71	1.29	U	Non-Detect	Less Than MCL
PZ-100-KS TOT	7/23/2013	0.22	0.19	0.2	J	0.19	0.64	1.34	U	0.22 *	Less Than MCL
PZ-100-SD DIS	7/9/2013	1.85	0.61	0.12		0.67	0.64	1.25	UJ+	1.85 *	Less Than MCL
PZ-100-SD TOT	7/9/2013	1.87	0.64	0.18		1.35	0.73	1.27	J+	3.22	Less Than MCL
PZ-100-SS DIS	7/9/2013	3.19	0.93	0.2		0.74	0.68	1.33	UJ+	3.19 *	Less Than MCL
PZ-100-SS TOT	7/9/2013	4.04	1.17	0.23		1.99	0.96	1.6	J+	6.03	Exceeds MCL
PZ-101-SS DIS	7/11/2013	27.91	6.36	0.21		2.74	1.02	1.45		30.65	Exceeds MCL
PZ-101-SS TOT	7/11/2013	23.66	5.4	0.24		3.48	1.08	1.21		27.14	Exceeds MCL
PZ-102R-SS DIS	7/19/2013	1.98	0.69	0.28		2.25	0.94	1.43		4.23	Less Than MCL
PZ-102R-SS TOT	7/19/2013	3.25	1.01	0.28		1.32	1.05	2.02	U	3.25 *	Less Than MCL
PZ-102-SS DIS	7/19/2013	3.12	0.93	0.18	J	1.88	0.76	1.15		5.00	Exceeds MCL
PZ-102-SS TOT	7/19/2013	7.69	2	0.31	J	5.39	2.24	3.39	J	13.08	Exceeds MCL

Table 6: Summary of Radium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Radium-226				Radium-228				Combined Radium 226 + 228	Combined Radium relative to 5 pCi/L MCL
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-103-SS DIS	7/19/2013	3.44	1.12	0.43		1.14	0.85	1.59	U	3.44 *	Less Than MCL
PZ-103-SS TOT	7/19/2013	3.87	1.18	0.28		7.01	1.88	1.48		10.88	Exceeds MCL
PZ-104-KS DIS	7/18/2013	0.1	0.13	0.18	U	0.28	0.78	1.62	U	Non-Detect	Less Than MCL
PZ-104-KS TOT	7/18/2013	0.26	0.21	0.16	J	0.12	0.69	1.46	U	0.26 *	Less Than MCL
PZ-104-SD DIS	7/11/2013	7.39	2.16	0.51		2.5	1.05	1.62		9.89	Exceeds MCL
PZ-104-SD TOT	7/11/2013	4.08	1.22	0.22		-0.15	1.06	2.28	U	4.08 *	Less Than MCL
PZ-104-SS DIS	7/11/2013	1.76	0.68	0.28		1.15	0.82	1.54	U	1.76 *	Less Than MCL
PZ-104-SS TOT	7/11/2013	1.99	0.65	0.22		1.23	0.73	1.3	U	1.99 *	Less Than MCL
PZ-105-SS DIS	7/12/2013	1.48	0.54	0.16		1.89	0.81	1.28		3.37	Less Than MCL
PZ-105-SS TOT	7/12/2013	1.54	0.56	0.24		0.92	0.7	1.32	U	1.54 *	Less Than MCL
PZ-106-KS DIS	7/19/2013	0.35	0.25	0.21	J	2.73	0.94	1.23		3.08	Less Than MCL
PZ-106-KS TOT	7/19/2013	0.33	0.24	0.18	J	0.22	0.61	1.27	U	0.33 *	Less Than MCL
PZ-106-SD DIS	7/10/2013	0.8	0.45	0.41	J	1.79	0.86	1.44	J+	2.59	Less Than MCL
PZ-106-SD TOT	7/10/2013	0.66	0.33	0.23	J	1.62	0.87	1.52	J+	2.28	Less Than MCL
PZ-106-SS DIS	7/10/2013	3.55	1.03	0.17	J	1.08	0.68	1.22	UJ+	3.55 *	Less Than MCL
PZ-106-SS TOT	7/10/2013	3.31	0.98	0.2	J	0.85	0.68	1.3	UJ+	3.31 *	Less Than MCL
PZ-107-SS DIS	7/19/2013	5.33	1.43	0.19	J	2.38	0.83	1.08		7.71	Exceeds MCL
PZ-107-SS FD DIS	7/19/2013	5.09	1.44	0.32	J	2.68	0.95	1.26		7.77	Exceeds MCL
PZ-107-SS TOT	7/19/2013	6.39	1.82	0.35	J	3.03	1.08	1.44	J	9.42	Exceeds MCL
PZ-107-SS FD TOT	7/19/2013	5.32	1.48	0.18	J	3.84	1.23	1.47		9.16	Exceeds MCL
PZ-109-SS DIS	7/10/2013	2.15	0.74	0.24		1.88	0.84	1.34		4.03	Less Than MCL
PZ-109-SS TOT	7/10/2013	1.46	0.54	0.21		1.34	0.68	1.14	J	2.80	Less Than MCL
PZ-110-SS DIS	7/9/2013	3.43	1.01	0.21		5.2	1.32	0.11	J+	8.63	Exceeds MCL
PZ-110-SS TOT	7/9/2013	4.12	1.18	0.23		4.11	1.08	0.12	J+	8.23	Exceeds MCL
PZ-111-KS DIS	7/17/2013	0.37	0.24	0.19	J	0.57	0.58	1.15	U	0.37 *	Less Than MCL
PZ-111-KS TOT	7/17/2013	0.21	0.2	0.25	U	0.52	0.64	1.28	U	Non-Detect	Less Than MCL
PZ-111-SD DIS	7/9/2013	1.53	0.57	0.24		4.77	1.22	0.11	J+	6.30	Exceeds MCL
PZ-111-SD TOT	7/9/2013	1.05	0.43	0.16		3.72	0.98	0.11	J+	4.77	Less Than MCL
PZ-112-AS DIS	7/9/2013	1.19	0.58	0.38		1.96	0.87	1.4	J+	3.15	Less Than MCL
PZ-112-AS TOT	7/9/2013	2.27	0.88	0.26		3.39	1.03	1.09	J+	5.66	Exceeds MCL

Table 6: Summary of Radium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Radium-226				Radium-228				Combined Radium 226 + 228	Combined Radium relative to 5 pCi/L MCL
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-113-AD DIS	7/10/2013	2.56	0.88	0.27	J	6.09	1.61	1.18	J+	8.65	Exceeds MCL
PZ-113-AD FD DIS	7/10/2013	3.45	1.08	0.28		7.98	2.14	1.76		11.43	Exceeds MCL
PZ-113-AD TOT	7/10/2013	2.85	1.03	0.35	J	5.11	1.38	1.11	J+	7.96	Exceeds MCL
PZ-113-AD FD TOT	7/10/2013	2.78	0.93	0.38		7.16	1.87	1.3		9.94	Exceeds MCL
PZ-113-AS DIS	7/10/2013	0.43	0.29	0.22	J	1.39	0.65	1.06		1.82	Less Than MCL
PZ-113-AS TOT	7/10/2013	0.65	0.33	0.19	J	0.53	0.56	1.1	U	0.65 *	Less Than MCL
PZ-113-SS DIS	7/11/2013	1.99	0.66	0.21		1.79	0.75	1.16		3.78	Less Than MCL
PZ-113-SS TOT	7/11/2013	2.12	0.68	0.17		1.31	0.75	1.33	U	2.12 *	Less Than MCL
PZ-114-AS DIS	7/12/2013	0.19	0.2	0.28	U	1.09	0.73	1.34	U	Non-Detect	Less Than MCL
PZ-114-AS TOT	7/12/2013	0.54	0.33	0.29	J	1.34	0.83	1.5	U	0.54 *	Less Than MCL
PZ-115-SS DIS	7/11/2013	6.46	1.71	0.24		0.99	0.71	1.34	UJ+	6.46 *	Exceeds MCL
PZ-115-SS TOT	7/11/2013	6.27	1.66	0.21	J	1.44	0.66	1.06	J+	7.71	Exceeds MCL
PZ-116-SS DIS	7/11/2013	0.19	0.18	0.2	U	5.19	1.41	1.14	J+	5.19 *	Exceeds MCL
PZ-116-SS TOT	7/11/2013	0.32	0.25	0.25	J	0.17	0.74	1.56	UJ+	0.32 *	Less Than MCL
PZ-200-SS DIS	7/19/2013	1.8	0.67	0.29	J	1.77	0.72	1.08		3.57	Less Than MCL
PZ-200-SS TOT	7/19/2013	0.97	0.44	0.26	J	1.95	0.85	1.3		2.92	Less Than MCL
PZ-201A-SS DIS	7/10/2013	0.37	0.26	0.29	J	0.77	0.54	0.99	UJ+	0.37 *	Less Than MCL
PZ-201A-SS TOT	7/10/2013	0.5	0.3	0.24	J	1.16	0.69	1.23	UJ+	0.50 *	Less Than MCL
PZ-202-SS DIS	7/11/2013	1.13	0.47	0.24		2.32	0.8	1.02	J+	3.45	Less Than MCL
PZ-202-SS TOT	7/11/2013	1.03	0.43	0.19		1.04	0.65	1.19	UJ+	1.03 *	Less Than MCL
PZ-203-SS DIS	7/17/2013	1.36	0.55	0.28	J+	0.79	0.62	1.19	U	1.36 *	Less Than MCL
PZ-203-SS TOT	7/17/2013	2.31	0.77	0.17	J+	1.19	0.62	1.04	J	3.50	Less Than MCL
PZ-204A-SS DIS	7/16/2013	1.07	0.45	0.18		1.59	0.81	1.37	J+	2.66	Less Than MCL
PZ-204A-SS TOT	7/16/2013	1.82	0.65	0.23		0.57	0.74	1.5	UJ+	1.82 *	Less Than MCL
PZ-204-SS DIS	7/17/2013	0.58	0.31	0.15	J	1.34	0.82	1.48	UJ	0.58 *	Less Than MCL
PZ-204-SS TOT	7/17/2013	0.88	0.44	0.26		0.2	0.81	1.69	U	0.88 *	Less Than MCL
PZ-205-AS DIS	7/18/2013	1.31	0.56	0.33	J+	1.24	0.79	1.45	U	1.31 *	Less Than MCL
PZ-205-AS TOT	7/18/2013	2.94	0.99	0.28	J+	0.92	0.7	1.33	U	2.94 *	Less Than MCL
PZ-205-SS DIS	7/10/2013	0.93	0.41	0.29		0.77	0.76	1.49	U	0.93 *	Less Than MCL
PZ-205-SS TOT	7/10/2013	1.06	0.44	0.21		1.21	0.68	1.18	J	2.27	Less Than MCL

Table 6: Summary of Radium Isotope Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Date	Radium-226				Radium-228				Combined Radium 226 + 228	Combined Radium relative to 5 pCi/L MCL
		Result	CSU	MDA	FINAL Q	Result	CSU	MDA	FINAL Q		
PZ-206-SS DIS	7/18/2013	1.04	0.46	0.27		0.63	0.84	1.71	UJ	1.04 *	Less Than MCL
PZ-206-SS TOT	7/18/2013	2.3	0.77	0.19		1.63	0.81	1.35		3.93	Less Than MCL
PZ-207-AS DIS	7/18/2013	0.82	0.42	0.35	J	1.3	0.85	1.56	U	0.82 *	Less Than MCL
PZ-207-AS TOT	7/18/2013	0.88	0.44	0.34		1.88	0.86	1.37		2.76	Less Than MCL
PZ-208-SS DIS	7/16/2013	0.45	0.26	0.19	J	1.1	0.74	1.37	UJ+	0.45 *	Less Than MCL
PZ-208-SS TOT	7/16/2013	0.71	0.35	0.2		2.37	0.97	1.46	J+	3.08	Less Than MCL
PZ-302-AI DIS	7/16/2013	0.69	0.37	0.24	J	1.34	0.93	1.74	UJ+	0.69 *	Less Than MCL
PZ-302-AI TOT	7/16/2013	0.8	0.38	0.18		0.85	0.78	1.53	UJ+	0.80 *	Less Than MCL
PZ-302-AS DIS	7/16/2013	0.34	0.27	0.26	J	1.43	0.87	1.57	UJ	0.34 *	Less Than MCL
PZ-302-AS TOT	7/16/2013	0.85	0.44	0.34	J	1.26	0.7	1.23	J	2.11	Less Than MCL
PZ-303-AS DIS	7/15/2013	0.54	0.34	0.27	J	1.61	0.91	1.62	U	0.54 *	Less Than MCL
PZ-303-AS TOT	7/15/2013	1.01	0.5	0.21		1.54	0.8	1.36	J	2.55	Less Than MCL
PZ-304-AI DIS	7/16/2013	1.15	0.51	0.3		2.43	0.97	1.44	J+	3.58	Less Than MCL
PZ-304-AI TOT	7/16/2013	1.64	0.73	0.26		2.52	0.95	1.33	J+	4.16	Less Than MCL
PZ-304-AS DIS	7/16/2013	1.68	0.74	0.45		1.93	0.91	1.49	J+	3.61	Less Than MCL
PZ-304-AS TOT	7/16/2013	2	0.84	0.45		1.79	0.81	1.28	J+	3.79	Less Than MCL
PZ-305-AI DIS	7/22/2013	1.43	0.58	0.2		1.51	0.74	1.23		2.94	Less Than MCL
PZ-305-AI TOT	7/22/2013	0.95	0.5	0.35	J	1.19	0.74	1.34	U	0.95 *	Less Than MCL

Notes:

All values are in units of picoCuries per liter (pCi/L)

DIS = dissolved (filtered) sample; TOT = total (unfiltered) sample

CSU = Combined Standard Uncertainty (2-sigma); MDA = Minimum Detectable Activity

Data Validation Qualifiers (Final Q) include: U = Non-detect at the reported value, UJ = Non-Detect at the estimated reported value, UJ+ = Non-Detect at the estimated reported value which may be biased high, J = estimated result; J+ = estimated result which may be biased high

Combined Radium-226 plus Radium-228 = the sum of the Ra-226 and Ra-228 results unless one of results was non-detect, in which case is only the detected result shown and the value is flagged with a *.

Non-Detect = neither Radium-226 nor Radium-228 were detected in the sample

MCL = Maximum Contaminant Level for drinking water systems of 5 pCi/L for combined Radium-226 plus Radium-228

FB - Field blank

FD - Field duplicate sample

Table 7: Comparision of Radium Results for Field Duplicate Samples - July 2013 Groundwater Sampling

Sample ID	Sample Date	Radium-226						Radium-228					
		Result	CSU	MDA	FINAL Q	Ra-226 = Detect?	Relative Percent Difference (%)	Result	CSU	MDA	FINAL Q	Ra228 = Detect?	Relative Percent Difference (%)
I-4 DIS	7/9/2013	0.96	0.54	0.31	J	Detect	47.6	5.89	1.49	0.13	J+	Detect	90.1
I-4 FD DIS	7/9/2013	1.56	0.67	0.36	J	Detect		2.23	0.85	1.22	J+	Detect	
I-4 TOT	7/9/2013	1.37	0.6	0.28		Detect		5.2	1.32	0.11	J+	Detect	
I-4 FD TOT	7/9/2013	1.18	0.52	0.21	J	Detect	14.9	2.38	0.81	0.99	J+	Detect	74.4
I-62 DIS	7/12/2013	0.44	0.27	0.2	J	Detect	Non-Detect	0.7	0.72	1.42	U	Non-Detect	Non-Detect
I-62 FD DIS	7/12/2013	0.2	0.2	0.24	U	Non-Detect		1.2	0.72	1.3	U	Non-Detect	
I-62 TOT	7/12/2013	0.66	0.34	0.16	J	Detect		1.38	0.78	1.38	J	Detect	
I-62 FD TOT	7/12/2013	0.27	0.22	0.23	J	Detect	83.9	1.85	0.84	1.36		Detect	29.1
I-65 DIS	7/18/2013	0.29	0.21	0.15	J+	Detect	36.7	1.24	0.71	1.25	U	Non-Detect	Non-Detect
I-65 FD DIS	7/18/2013	0.2	0.18	0.17	J	Detect		0.53	0.89	1.82	U	Non-Detect	
I-65 TOT	7/18/2013	1.4	0.65	0.45	J+	Detect		1.12	0.74	1.37	U	Non-Detect	
I-65 FD TOT	7/18/2013	0.63	0.31	0.15		Detect	75.9	1.44	0.84	1.49	U	Non-Detect	Non-Detect
D-12 DIS	7/15/2013	0.47	0.3	0.29	J	Detect	6.6	1.74	0.79	1.26	J+	Detect	18.9
D-12 FD DIS	7/15/2013	0.44	0.34	0.39	J	Detect		1.44	0.79	1.37	J+	Detect	
D-12 TOT	7/15/2013	0.29	0.23	0.23	J	Detect		1.13	0.72	1.3	UJ+	Non-Detect	
D-12 FD TOT	7/15/2013	0.36	0.23	0.16	J	Detect	21.5	0.97	0.73	1.39	UJ+	Non-Detect	Non-Detect
D-81 DIS	7/17/2013	0.84	0.4	0.21		Detect	8.7	1.15	0.65	1.14	J	Detect	22.4
D-81 FD DIS	7/17/2013	0.77	0.42	0.34	J+	Detect		1.44	0.77	1.34	J	Detect	
D-81 TOT	7/17/2013	0.3	0.29	0.39	U	Non-Detect		1.22	0.68	1.21	J	Detect	
D-81 FD TOT	7/17/2013	0.39	0.29	0.32	J+	Detect	Non-Detect	0.54	0.64	1.28	U	Non-Detect	Non-Detect
D-83 DIS	7/11/2013	3.54	1.18	0.35		Detect	13.2	5.01	1.4	1.27	J+	Detect	15.5
D-83 FD DIS	7/11/2013	4.04	1.3	0.42		Detect		4.29	1.24	1.25		Detect	
D-83 TOT	7/11/2013	3.04	0.98	0.32		Detect		4.3	1.3	1.43	J+	Detect	
D-83 FD TOT	7/11/2013	3.1	1.02	0.45		Detect	2.0	4.43	1.26	1.21		Detect	3.0
PZ-107-SS DIS	7/19/2013	5.33	1.43	0.19	J	Detect	4.6	2.38	0.83	1.08		Detect	11.9
PZ-107-SS FD DIS	7/19/2013	5.09	1.44	0.32	J	Detect		2.68	0.95	1.26		Detect	
PZ-107-SS TOT	7/19/2013	6.39	1.82	0.35	J	Detect		3.03	1.08	1.44	J	Detect	
PZ-107-SS FD TOT	7/19/2013	5.32	1.48	0.18	J	Detect	18.3	3.84	1.23	1.47		Detect	23.6
PZ-113-AD DIS	7/10/2013	2.56	0.88	0.27	J	Detect	29.6	6.09	1.61	1.18	J+	Detect	26.9
PZ-113-AD FD DIS	7/10/2013	3.45	1.08	0.28		Detect		7.98	2.14	1.76		Detect	
PZ-113-AD TOT	7/10/2013	2.85	1.03	0.35	J	Detect		5.11	1.38	1.11	J+	Detect	
PZ-113-AD FD TOT	7/10/2013	2.78	0.93	0.38		Detect	2.5	7.16	1.87	1.3		Detect	33.4

Notes: All results are in units of pCi/L; FD = Field duplicate; CSU = Combined Standard Uncertainty (2-sigma); MDA = Minimum Detectable Activity
Data Validation Qualifiers (Final Q) include: J = estimated result, J+ = estimated result which may be biased high, U = Non-detect at the reported value, and UJ+ = Non-Detect at the estimated reported value which may be biased high

Table 8: Comparision of Split Sample Radium Results - July 2013 Groundwater Sampling

Sample ID	Sample Date	Radium-226						Radium-228					
		Result	CSU	MDA	FINAL Q	Ra-226 = Detect?	Relative Percent Difference (%)	Result	CSU	MDA	FINAL Q	Ra228 = Detect?	Relative Percent Difference (%)
S-5 TOT	7/9/2013	0.98	0.7	0.8	J	Detect	40.5	5.52	1.48	0.17	J+	Detect	147.7
S-5 EPA TOT	7/9/2013	0.650	0.280	0.318		Detect		0.830	0.503	0.742		Detect	
S-82 TOT	7/11/2013	1.48	0.61	0.27		Detect	66.5	1.18	0.9	1.71	UJ+	Non-Detect	Non-Detect
S-82 EPA TOT	7/11/2013	0.741	0.228	0.212		Detect		1.08	0.297	0.344		Detect	
I-4 TOT	7/9/2013	1.37	0.6	0.28		Detect	27.4	5.2	1.32	0.11	J+	Detect	130.2
I-4 FD TOT	7/9/2013	1.18	0.52	0.21	J	Detect	12.6	2.38	0.81	0.99	J+	Detect	73.6
I-4 EPA TOT	7/9/2013	1.04	0.214	0.126		Detect		1.10	0.312	0.356		Detect	
I-9 TOT	7/11/2013	1.14	0.51	0.28		Detect	21.2	2.41	0.95	1.42	J+	Detect	40.4
I-9 EPA TOT	7/11/2013	1.41	0.304	0.192		Detect		1.60	0.324	0.297		Detect	
D-3 TOT	7/9/2013	3.53	1.2	0.3		Detect	32.2	4.81	1.45	1.6	J+	Detect	3.3
D-3 EPA TOT	7/9/2013	2.55	0.362	0.121		Detect		4.97	0.674	0.351		Detect	
D-83 TOT	7/11/2013	3.04	0.98	0.32		Detect	15.2	4.3	1.3	1.43	J+	Detect	20.5
D-83 FD TOT	7/11/2013	3.1	1.02	0.45		Detect	17.2	4.43	1.26	1.21		Detect	23.5
D-83 EPA TOT	7/11/2013	2.61	0.435	0.170		Detect		3.50	0.508	0.306		Detect	
D-85 TOT	7/10/2013	4.64	1.41	0.33	J	Detect	12.4	4.91	2.31	3.81	J+	Detect	33.8
D-85 EPA TOT	7/10/2013	4.10	0.649	0.203		Detect		3.49	0.839	0.897		Detect	
D-93 TOT	7/11/2013	2.37	0.82	0.27		Detect	2.5	1.35	0.77	1.37	UJ+	Non-Detect	Non-Detect
D-93 EPA TOT	7/11/2013	2.43	0.419	0.198		Detect		4.06	0.568	0.339		Detect	
PZ-101-SS TOT	7/11/2013	23.66	5.4	0.24		Detect	39.2	3.48	1.08	1.21		Detect	85.8
PZ-101-SS EPA TOT	7/11/2013	15.9	1.55	0.0927		Detect		1.39	0.328	0.337		Detect	
PZ-112-AS TOT	7/9/2013	2.27	0.88	0.26		Detect	38.3	3.39	1.03	1.09	J+	Detect	70.7
PZ-112-AS EPA TOT	7/9/2013	1.54	0.263	0.137		Detect		1.62	0.345	0.321		Detect	
PZ-113-AD TOT	7/10/2013	2.85	1.03	0.35	J	Detect	0.7	5.11	1.38	1.11	J+	Detect	22.0
PZ-113-AD FD TOT	7/10/2013	2.78	0.93	0.38		Detect	1.8	7.16	1.87	1.3		Detect	11.7
PZ-113-AD EPA TOT	7/10/2013	2.83	0.390	0.122		Detect		6.37	0.812	0.388		Detect	
PZ-206-SS DIS	7/18/2013	1.04	0.46	0.27		Detect	24.0	0.63	0.84	1.71	UJ	Non-Detect	Non-Detect
PZ-206-SS MDNR DIS	7/18/2013	1.32	0.45	0.22		Detect		-0.11	0.69	1.48	U	Non-Detect	
PZ-206-SS MDNR FD DIS	7/18/2013	1.46	0.46	0.20		Detect		-0.16	0.62	1.35	U	Non-Detect	
PZ-206-SS TOT	7/18/2013	2.3	0.77	0.19		Detect	49.2	1.63	0.81	1.35		Detect	59.2
PZ-206-SS MDNR TOT	7/18/2013	1.39	0.44	0.17		Detect		0.89	0.60	1.17	J	Detect	
PZ-207-AS DIS	7/18/2013	0.82	0.42	0.35	J	Detect	5.2	1.3	0.85	1.56	U	Non-Detect	Non-Detect
PZ-207-AS MDNR DIS	7/18/2013	0.86	0.41	0.29		Detect		1.66	0.63	1.15	J	Detect	
PZ-207-AS TOT	7/18/2013	0.88	0.44	0.34		Detect	22.9	1.88	0.86	1.37		Detect	39.5
PZ-207-AS MDNR TOT	7/18/2013	1.11	0.43	0.24		Detect		1.26	0.74	1.43	J	Detect	

Notes: All results are in units of pCi/L; FD = Field duplicate; CSU = Combined Standard Uncertainty (2-sigma); MDA = Minimum Detectable Activity
Data Validation Qualifiers (Final Q) include: J = estimated result, J+ = estimated result which may be biased high, U = Non-detect at the reported value, and UJ+ = Non-Detect at the estimated reported value which may be biased high

Table 9: Summary of Detected Trace Metal Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Fraction	Sample Date	Alumi-num	Anti-mony	Arsenic	Barium	Chro-mium	Cobalt	Iron	Lead	Manga-nese	Mercury	Nickel	Vana-dium	Zinc
S-5	DIS	7/9/2013	200 U	10 U	10 J+	540	8.9 J	12 J	18000	2.5 J	160	0.20 U	39 J	50 U	16 U
S-5	TOT	7/9/2013	150 J	4.0 J	16	550	10	15 J	22000	25	190	0.13 J	87	4.6 J	130
S-8	DIS	7/12/2013	200 U	10 U	10 U	290	10 U	50 U	220	1.8 J	330	0.076 U	40 U	50 U	6.7 U
S-8	TOT	7/12/2013	200 U	10 U	3.4 J	290	10 U	50 U	750	1.8 J	320	0.060 J	40 U	50 U	20 U
S-10	DIS	7/15/2013	110 J	5.3 J	46	650	10 U	50 U	64000	4.0 J	2300	0.20 U	14 J	50 U	20 U
S-10	TOT	7/15/2013	350	6.5 J	46	650	10 U	50 U	62000	4.4 J	2400	0.20 U	14 J	4.7 J	20 U
S-53	DIS	7/18/2013	200 U	6.3 J	10 U	410	10 U	7.0 J	100 U	2.7 J	2300	0.20 UJ-	40 U	50 U	9.2 U
S-53	TOT	7/18/2013	52000	10	31	1200 J-	59	38 J	82000	73	4100 J-	0.13 J-	130	130	440 J-
S-61	DIS	7/12/2013	200 U	10 U	10 U	240	10 U	4.1 J	44 J	2.5 J	680	0.13 U	14 J	50 U	20 U
S-61	TOT	7/12/2013	14000	6.6 J	9.4 U	540	19	19 J	19000	81	960	0.064 J	59	32 J	77
S-82	DIS	7/11/2013	200 U	10 U	210	790	10 U	9.9 J	37000	3.3 J	2100	0.23	25 J	50 U	20 U
S-82	TOT	7/11/2013	200 U	4.8 J	200	790	10 U	11 J	36000	5.3 J	2200	0.065 J	26 J	50 U	7.1 J
S-84	DIS	7/10/2013	200 U	4.5 J	140	850	10 U	15 J	66000	4.4 J	1900	0.20 U	25 J	50 U	20 U
S-84	TOT	7/10/2013	20000	8.4 J	130	1700	10 U	79	120000	49	3600	0.087 J	140	68	270
I-4	DIS	7/9/2013	200 U	4.7 J	14	630	4.5 J	4.6 J	30000	3.4 J	480	0.20 U	19 J	50 U	7.3 U
I-4 FD	DIS	7/9/2013	200 U	10 U	13	620	3.8 J	6.3 J	29000	3.6 U	470	0.20 U	19 J	50 U	12 U
I-4	TOT	7/9/2013	200 U	4.2 J	13	600	3.9 J	10 J	32000	4.3 J	490	0.20 U	18 J	50 U	11 U
I-4 FD	TOT	7/9/2013	200 U	10 U	14	600	10 U	11 J	32000	4.0 U	480	0.20 U	18 J	50 U	9.8 U
I-9	DIS	7/11/2013	200 U	4.2 J	24	1500	10 U	50 U	34000	2.9 J	1200	0.18 J	13 J	50 U	5.4 J
I-9	TOT	7/11/2013	190 J	5.6 J	26	1500	10 U	50 U	36000	4.1 J	1300	0.10 J	14 J	50 U	6.2 J
I-11	DIS	7/15/2013	200 U	4.2 J	16	830	10 U	50 U	30000	2.4 J	1800	0.20 U	15 J	50 U	20 U
I-11	TOT	7/15/2013	110 J	4.8 J	17	820	10 U	50 U	30000	3.0 J	1800	0.20 U	15 J	50 U	5.7 J
I-62	DIS	7/12/2013	200 U	10 U	11	380	10 U	50 U	6700	2.2 J	490	0.11 U	40 U	50 U	6.4 U
I-62 FD	DIS	7/12/2013	200 U	10 U	11	370	10 U	50 U	6500	2.0 J	470	0.12 U	40 U	50 U	20 U
I-62	TOT	7/12/2013	170 J	10 U	12	380	10 U	50 U	7400	2.9 J	500	0.20 U	40 U	50 U	7.8 J
I-62 FD	TOT	7/12/2013	180 J	5.1 J	13	380	10 U	50 U	7400	2.3 U	500	0.20 U	40 U	50 U	7.6 J
I-65	DIS	7/18/2013	200 U	4.1 J	10 U	180	10 U	50 U	100 U	2.2 J	34 J+	0.20 UJ-	40 U	50 U	20 U
I-65 FD	DIS	7/18/2013	200 U	4.8 J	10 U	190	10 U	50 U	100 U	2.1 J	35 J+	0.20 UJ-	40 U	50 U	20 U
I-65	TOT	7/18/2013	410	10 U	10 U	190 J-	3.9 J	50 U	620	3.9 J	250 J-	0.20 UJ-	40 U	50 U	10 J-
I-65 FD	TOT	7/18/2013	480	10 U	10 U	200 J-	3.8 J	6.5 J	710	2.8 J	270 J-	0.20 UJ-	40 U	5.0 J	5.3 J-
I-66	DIS	7/15/2013	200 U	10 U	4.6 J	120	10 U	5.1 J	950	1.9 J	4200	0.20 U	40 U	50 U	8.7 J
I-66	TOT	7/15/2013	270	10 U	7.3 J	140	10 U	5.4 J	3200	4.7 J	4500	0.20 U	40 U	50 U	300

Table 9: Summary of Detected Trace Metal Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Fraction	Sample Date	Alumi-num	Anti-mony	Arsenic	Barium	Chro-mium	Cobalt	Iron	Lead	Manga-nese	Mercury	Nickel	Vana-dium	Zinc
I-67	DIS	7/12/2013	200 U	10 U	4.9 J	290	10 U	50 U	8700	2.1 J	1400	0.13 U	40 U	50 U	20 U
I-67	TOT	7/12/2013	110 J	4.0 J	4.6 U	280	10 U	50 U	8900	2.6 U	1300	0.20 U	40 U	50 U	20 U
I-68	DIS	7/12/2013	200 U	10 U	2.2 J	390	10 U	11 J	130	2.0 J	1500	0.13 U	24 J	50 U	18 U
I-68	TOT	7/12/2013	14000	5.4 J	10 J+	510	24	22 J	13000	35	1600	0.15 J	52	28 J	140
I-73	DIS	7/19/2013	4000 U	200 U	130 J	3200	200 U	190 J	140000	38 J	3800 J+	0.20 UJ-	390 J	1000 U	1200
I-73	TOT	7/19/2013	9800	200 U	110 J	3100 J-	100 J	190 J	150000	88 J	3800 J-	0.20 UJ-	420 J	1000 U	5100 J-
D-3	DIS	7/9/2013	200 U	10 U	3.3 U	2600	10 U	5.6 J	38000	3.2 J	600	0.20 U	19 J	50 U	5.2 U
D-3	TOT	7/9/2013	200 U	5.2 J	3.8 U	2600	10 U	6.1 J	38000	3.2 J	600	0.071 J	19 J	50 U	9.0 U
D-6	DIS	7/12/2013	200 U	10 U	10 U	1300	10 U	50 U	18000	2.8 J	460	0.15 U	14 J	50 U	20 U
D-6	TOT	7/12/2013	170 J	4.6 J	2.5 U	1300	10 U	50 U	19000	3.2 U	480	0.20 U	13 J	50 U	20 U
D-12	DIS	7/15/2013	220	5.1 J	10 U	450	5.6 J	4.0 J	8600	10 U	990	0.20 U	16 J	5.8 J	20 U
D-12 FD	DIS	7/15/2013	190 J	10 U	10 U	460	10 U	50 U	8900	10 U	980	0.20 U	15 J	4.7 J	20 U
D-12	TOT	7/15/2013	250	4.4 J	10 U	440	10 U	50 U	9700	10 U	1000	0.20 U	15 J	50 U	20 U
D-12 FD	TOT	7/15/2013	220	4.3 J	10 U	440	10 U	50 U	9600	10 U	980	0.20 U	15 J	4.8 J	20 U
D-13	DIS	7/18/2013	200 U	4.4 J	10 U	660	10 U	50 U	14000	3.1 J	390	0.20 UJ-	40 U	50 U	20 U
D-13	TOT	7/18/2013	190 J	5.2 J	10 U	650 J-	10 U	50 U	14000	3.4 J	400 J-	0.20 UJ-	40 U	50 U	6.5 J-
D-14	DIS	7/18/2013	200 U	8.2 J	7.0 J	600	4.7 J	6.1 J	1100	3.6 J	1200	0.20 UJ-	22 J	50 U	7.3 U
D-14	TOT	7/18/2013	2300	7.1 J	10	760 J-	9.3 J	4.2 J	11000	9.9 J	1400 J-	0.29 J-	25 J	6.6 J	25 J-
D-81	DIS	7/17/2013	200 U	10 U	9.4 J	350	10 U	50 U	14000	2.4 J	810	0.20 U	40 U	50 U	6.3 J
D-81 FD	DIS	7/17/2013	200 U	4.3 J	7.9 J	350	10 U	50 U	14000	2.1 J	810	0.20 U	40 U	50 U	20 U
D-81	TOT	7/17/2013	200 U	4.4 J	8.6 J	350	10 U	4.4 U	15000	2.9 J	850	0.20 U	40 U	50 U	8.8 J
D-81 FD	TOT	7/17/2013	200 U	10 U	8.3 J	350	10 U	4.6 U	15000	3.1 J	860	0.20 U	40 U	50 U	7.1 J
D-83	DIS	7/11/2013	200 U	10 U	10 U	1700	10 U	50 U	16000	2.9 J	390	0.29	40 U	50 U	20 U
D-83 FD	DIS	7/11/2013	200 U	10 U	2.2 J	1700	10 U	50 U	16000	2.4 J	380	0.13 J	40 U	50 U	6.4 J
D-83	TOT	7/11/2013	200 U	5.0 J	2.8 J	1800	10 U	50 U	17000	2.8 J	410	0.099 J	40 U	50 U	5.4 J
D-83 FD	TOT	7/11/2013	200 U	4.5 J	3.2 J	1700	10 U	50 U	16000	2.4 J	400	0.075 J	40 U	50 U	20 U
D-85	DIS	7/10/2013	200 U	4.8 J	43	1900	10 U	50 U	55000	4.0 J	1000	0.20 U	40 U	50 U	20 U
D-85	TOT	7/10/2013	19000	6.7 J	49	2600	10 U	49 J	120000	56	2600	0.079 J	130	58	250
D-87	DIS	7/17/2013	200 U	4.7 J	2.3 J	1500	4.1 J	50 U	32000	2.9 J	570	0.20 U	16 J	50 U	5.5 J
D-87	TOT	7/17/2013	720	4.4 J	10 U	1500	10 U	50 U	35000	4.8 J	620	0.20 U	16 J	50 U	11 J
D-93	DIS	7/11/2013	200 U	10 U	2.8 J	1300	10 U	50 U	20000	2.5 J	400	0.19 J	40 U	50 U	5.4 J
D-93	TOT	7/11/2013	200	4.3 J	2.3 J	1400	10 U	50 U	21000	3.7 J	420	0.12 J	40 U	50 U	20 U

Table 9: Summary of Detected Trace Metal Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Fraction	Sample Date	Alumi-num	Anti-mony	Arsenic	Barium	Chro-mium	Cobalt	Iron	Lead	Manga-nese	Mercury	Nickel	Vana-dium	Zinc
LR-100	DIS	7/17/2013	200 U	4.6 J	10 U	450	6.1 J	50 U	21000	2.6 J	170	0.20 U	24 J	50 U	6.1 J
LR-100	TOT	7/17/2013	200 U	4.0 J	10 U	430	4.7 J	50 U	22000	11	170	0.20 U	23 J	50 U	25
LR-103	DIS	7/17/2013	200 U	5.3 J	52	1100	10 U	50 U	34000	3.1 J	980	0.20 U	40 U	50 U	20 U
LR-103	TOT	7/17/2013	120 J	5.5 J	52	1100	10 U	50 U	36000	4.1 J	1000	0.20 U	13 J	50 U	6.3 J
LR-104	DIS	7/22/2013	200 U	4.6 J	6.2 J	420	10 U	4.7 J	13000	2.6 J	1200	0.20 UJ-	40 U	50 U	20 U
LR-104	TOT	7/22/2013	140 J	5.1 J	5.0 J	410 J-	10 U	50 U	13000	3.1 J	1100 J-	0.20 UJ-	40 U	50 U	20 UJ-
MW-102	DIS	7/15/2013	200 U	10 U	21	98	10 U	50 U	5000	1.6 J	2600	0.20 U	40 U	50 U	7.3 J
MW-102	TOT	7/15/2013	680	10 U	18	170	10 U	8.0 J	11000	5.2 J	2800	0.20 U	19 J	50 U	22
MW-103	DIS	7/15/2013	200 U	10 U	10 U	160	10 U	50 U	100 U	1.9 J	880	0.20 U	40 U	50 U	5.8 J
MW-103	TOT	7/15/2013	18000	10 U	3.7 J	290	20	7.0 J	13000	20	1000	0.060 J	30 J	31 J	74
MW-104	DIS	7/16/2013	200 U	4.0 J	17	410	10 U	50 U	16000	1.7 J	2400	0.20 U	40 U	50 U	16 J
MW-104	TOT	7/16/2013	33000	9.3 J	39	810	37	20 U	58000	59	3000	0.086 J	72	82	230
MW-1204	DIS	7/11/2013	95 J	10 U	4.6 J	1100	32	50 U	12000	2.4 J	110	0.31	40 U	6.6 J	20 U
MW-1204	TOT	7/11/2013	160 J	10 U	5.9 J	1300	40	50 U	13000	2.4 J	120	0.11 J	40 U	7.0 J	14 J
PZ-100-KS	DIS	7/23/2013	200 U	10 U	10 U	4.4 J	4.8 J	50 U	50 J	10 U	17	0.20 UJ-	40 U	50 U	10 J
PZ-100-KS	TOT	7/23/2013	200 U	10 U	10 U	4.7 J	5.3 J	50 U	240	10 U	17	0.20 UJ-	40 U	50 U	10 J
PZ-100-SD	DIS	7/9/2013	200 U	10 U	2.3 J	330	10 U	50 U	820	1.8 J	66	0.20 U	40 U	50 U	21 J+
PZ-100-SD	TOT	7/9/2013	200 U	10 U	10 U	330	10 U	50 U	850	1.8 J	67	0.20 U	40 U	50 U	6.8 U
PZ-100-SS	DIS	7/9/2013	200 U	10 U	10 U	66	4.8 J	50 U	500 U	10 U	15 U	0.20 U	17 J	50 U	13 U
PZ-100-SS	TOT	7/9/2013	200 U	10 U	10 U	67	10 U	50 U	500 U	2.1 J	15 U	0.20 U	17 J	50 U	18 U
PZ-101-SS	DIS	7/11/2013	200 U	10 U	3.2 J	480	3.5 J	50 U	500 U	2.1 J	68	0.17 J	15 J	10 J	16 J
PZ-101-SS	TOT	7/11/2013	200 U	10 U	3.4 U	530	4.8 J	50 U	580 J	2.5 U	48	0.20 U	15 J	50 U	8.6 J
PZ-102R-SS	DIS	7/19/2013	200 U	10 U	10 U	73 J	10 U	50 U	100 UJ	10 U	23 J+	0.20 UJ-	40 U	50 U	14 UJ
PZ-102R-SS	TOT	7/19/2013	2400 J	10 U	10 U	76 J-	4.1 J	4.0 J	1800 J	3.7 J	39 J-	0.20 UJ-	40 U	50 U	29 J-
PZ-102-SS	DIS	7/19/2013	200 U	5.5 J	4.0 J	360 J	10 U	50 U	1700 J	2.5 J	190 J	0.20 UJ-	40 U	50 U	20 UJ
PZ-102-SS	TOT	7/19/2013	21000 J	5.9 J	14	790 J-	25	16 J	30000	23	1200 J-	0.20 UJ-	57	47 J	100 J-
PZ-103-SS	DIS	7/19/2013	200 U	10 U	2.1 J	400 J	10 U	50 U	11000	2.7 J	270 J	0.20 UJ-	40 U	50 U	20 UJ
PZ-103-SS	TOT	7/19/2013	21000 J	5.7 J	12	610 J-	40	15 J	39000	23	470 J-	0.067 J-	81	72	340 J-
PZ-104-KS	DIS	7/18/2013	200 U	10 U	10 U	50	10 U	50 U	430	2.0 J	11 U	0.20 UJ-	40 U	50 U	20 U
PZ-104-KS	TOT	7/18/2013	300	10 U	10 U	50 J-	4.6 J	50 U	590	2.0 J	14 J-	0.20 UJ-	40 U	50 U	20 UJ-
PZ-104-SD	DIS	7/11/2013	200 U	10 U	14	1000	19	5.8 J	14000	1.6 J	160	0.16 J	36 J	16 J	20 U
PZ-104-SD	TOT	7/11/2013	200 U	4.4 J	12 J+	800	16	5.0 J	9000	2.0 U	160	0.20 U	31 J	11 J	8.9 J

Table 9: Summary of Detected Trace Metal Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Fraction	Sample Date	Alumi-num	Anti-mony	Arsenic	Barium	Chro-mium	Cobalt	Iron	Lead	Manga-nese	Mercury	Nickel	Vana-dium	Zinc
PZ-104-SS	DIS	7/11/2013	200 U	10 U	2.2 J	100	3.2 J	50 U	1800	10 U	39	0.064 J	40 U	50 U	20 U
PZ-104-SS	TOT	7/11/2013	200 U	4.0 J	2.6 U	100	10 U	50 U	1800	1.7 U	40	0.20 U	40 U	50 U	20 U
PZ-105-SS	DIS	7/12/2013	200 U	10 U	10 U	170	9.0 J	50 U	210	1.8 J	6.1 J	0.098 U	40 U	50 U	19 U
PZ-105-SS	TOT	7/12/2013	200 U	10 U	10 U	170	10 U	50 U	270	1.5 J	7.6 J	0.20 U	40 U	50 U	20
PZ-106-KS	DIS	7/19/2013	200 U	10 U	10 U	44 J	10 U	4.6 J	220 J	2.1 J	4.1 UJ	0.20 UJ-	40 U	50 U	20 UJ
PZ-106-KS	TOT	7/19/2013	200 UJ	10 U	10 U	46 J-	5.7 J	50 U	250 J	10 U	5.0 J-	0.20 UJ-	40 U	50 U	7.8 J-
PZ-106-SD	DIS	7/10/2013	200 U	10 U	10 U	95	10 U	50 U	430	10 U	67	0.20 U	40 U	50 U	20 U
PZ-106-SD	TOT	7/10/2013	800	10 U	2.8 J	130	4.2 J	50 U	2200	3.9 J	78	0.20 U	40 U	50 U	13 J
PZ-106-SS	DIS	7/10/2013	200 U	10 U	2.0 J	150	10 U	50 U	610	1.6 J	26	0.20 U	40 U	50 U	20 U
PZ-106-SS	TOT	7/10/2013	200 U	10 U	2.2 J	150	10 U	50 U	570	10 U	24	0.20 U	40 U	50 U	20 U
PZ-107-SS	DIS	7/19/2013	200 U	10 U	3.2 J	620 J	10 U	50 U	1500	2.8 J	170 J	0.20 UJ-	41	4.5 J	11 UJ
PZ-107-SS FD	DIS	7/19/2013	200 U	4.1 J	2.6 J	640 J	3.1 J	50 U	1500	2.8 J	170 J	0.20 UJ-	42	6.1 J	9.4 UJ
PZ-107-SS	TOT	7/19/2013	15000 J	4.9 J	6.5 J	720 J-	15	4.1 J	11000	18	240 J-	0.11 J-	52	18 J	130 J-
PZ-107-SS FD	TOT	7/19/2013	16000 J	4.4 J	6.2 J	730 J-	13	50 U	11000	18	240 J-	0.078 J-	50	18 J	120 J-
PZ-109-SS	DIS	7/10/2013	200 U	10 U	10 U	66	10 U	50 U	500 U	1.8 J	15 U	0.20 U	40 U	50 U	23 J+
PZ-109-SS	TOT	7/10/2013	200 U	10 U	10 U	67	10 U	50 U	1000 U	10 U	15 U	0.20 U	40 U	50 U	19 J
PZ-110-SS	DIS	7/9/2013	200 U	10 U	10 U	310	10 U	50 U	7000	1.9 J	190	0.20 U	17 J	50 U	8.9 U
PZ-110-SS	TOT	7/9/2013	200 U	4.0 J	10 U	320	3.3 J	50 U	7200	2.2 J	200	0.063 J	17 J	50 U	5.8 U
PZ-111-KS	DIS	7/17/2013	170 J	10 U	3.2 J	6.2 J	10 U	50 U	160	10 U	3.3 J	0.20 U	40 U	50 U	8.2 J
PZ-111-KS	TOT	7/17/2013	130 J	10 U	10 U	6.1 J	4.5 J	50 U	170	10 U	15 U	0.20 U	40 U	50 U	8.0 J
PZ-111-SD	DIS	7/9/2013	200 U	10 U	10 U	110	10 U	50 U	500 U	10 U	15 U	0.20 U	40 U	50 U	7.2 U
PZ-111-SD	TOT	7/9/2013	200 U	10 U	10 U	110	3.1 J	50 U	500 U	10 U	15 U	0.20 U	40 U	50 U	13 U
PZ-112-AS	DIS	7/9/2013	200 U	4.5 J	190	2300	4.1 J	50 U	38000	3.0 U	200	0.20 U	14 J	50 U	7.4 U
PZ-112-AS	TOT	7/9/2013	130 J	4.2 J	190	2400	10 U	50 U	38000	4.4 U	200	0.20 U	14 J	50 U	10 U
PZ-113-AD	DIS	7/10/2013	200 U	10 U	4.9 J	2300	10 U	50 U	34000	3.1 J	610	0.20 U	20 J	50 U	20 U
PZ-113-AD FD	DIS	7/10/2013	200 U	10 U	4.4 J	2400	10 U	50 U	36000	3.6 J	630	0.20 U	21 J	50 U	20 U
PZ-113-AD	TOT	7/10/2013	200 U	5.6 J	4.7 J	2300	10 U	4.7 J	35000	2.9 J	640	0.065 J	20 J	50 U	5.6 J
PZ-113-AD FD	TOT	7/10/2013	200 U	4.5 J	4.9 J	2300	10 U	4.7 J	35000	3.1 J	640	0.077 J	20 J	50 U	8.0 J
PZ-113-AS	DIS	7/10/2013	200 U	10 U	10	690	10 U	11 J	5500	2.7 J	5400	0.20 U	29 J	50 U	6.9 U
PZ-113-AS	TOT	7/10/2013	130 J	4.8 J	11	700	10 U	13 J	5900	3.3 J	5500	0.20 U	29 J	50 U	7.7 J
PZ-113-SS	DIS	7/11/2013	200 U	10 U	10 U	180	10 U	50 U	54 J	10 U	26	0.20 U	40 U	50 U	6.4 J
PZ-113-SS	TOT	7/11/2013	8500	4.4 J	7.2 U	220	24	4.5 J	7600	4.6 U	100	0.20 U	21 J	27 J	48

Table 9: Summary of Detected Trace Metal Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Fraction	Sample Date	Alumi-num	Anti-mony	Arsenic	Barium	Chro-mium	Cobalt	Iron	Lead	Manga-nese	Mercury	Nickel	Vana-dium	Zinc
PZ-114-AS	DIS	7/12/2013	200 U	4.7 J	270	460	10 U	50 U	72000	4.9 J	2000	0.16 U	40 U	50 U	6.6 U
PZ-114-AS	TOT	7/12/2013	200 U	7.1 J	260	470	10 U	50 U	73000	4.4 J	1900	0.20 U	40 U	50 U	20 U
PZ-115-SS	DIS	7/11/2013	200 U	10 U	5.1 J	320	10 U	20 J	1600	1.8 J	51	0.16 J	44	50 U	20 U
PZ-115-SS	TOT	7/11/2013	200 U	4.3 J	6.0 J	330	10 U	15 J	1500	2.8 J	52	0.083 J	43	50 U	7.1 J
PZ-116-SS	DIS	7/11/2013	200 U	10 U	10 U	69	10 U	50 U	100 U	10 U	15 U	0.19 J	40 U	50 U	24
PZ-116-SS	TOT	7/11/2013	200 U	10 U	10 U	73	10 U	50 U	100 U	1.6 J	3.8 J	0.13 J	40 U	50 U	24
PZ-200-SS	DIS	7/19/2013	200 U	4.9 J	3.8 J	850 J	10 U	50 U	7300	3.9 J	6800 J	0.20 UJ-	40 U	50 U	20 UJ
PZ-200-SS	TOT	7/19/2013	830 J	5.2 J	27	880 J-	10 U	29 J	32000	6.0 J	7300 J-	0.20 UJ-	140	9.5 J	24 J-
PZ-201A-SS	DIS	7/10/2013	200 U	10 U	10 U	130	10 U	50 U	100 U	2.4 J	4.5 J	0.20 U	40 U	50 U	21 J+
PZ-201A-SS	TOT	7/10/2013	200 U	10 U	10 U	130	10 U	50 U	53 J	2.6 J	18	0.20 U	40 U	50 U	23
PZ-202-SS	DIS	7/11/2013	200 U	10 U	6.8 J	550	10 U	6.3 J	4900	2.9 J	870	0.20	20 J	50 U	6.1 J
PZ-202-SS	TOT	7/11/2013	98 J	10 U	7.4 J	580	10 U	6.9 J	5000	2.1 J	940	0.14 J	21 J	50 U	7.0 J
PZ-203-SS	DIS	7/17/2013	200 U	10 U	10 U	89	3.1 J	50 U	140	10 U	18	0.20 U	40 U	50 U	5.8 J
PZ-203-SS	TOT	7/17/2013	230	4.1 J	10 U	91	4.7 J	4.1 U	280	10 U	21	0.20 U	40 U	50 U	8.6 J
PZ-204A-SS	DIS	7/16/2013	200 U	4.7 J	15	350	4.5 J	8.3 J	7000	2.6 J	2100	0.20 U	17 J	4.1 J	20 U
PZ-204A-SS	TOT	7/16/2013	2600	4.1 J	15	440	4.3 J	8.4	9900	5.6 J	2300	0.20 U	20 J	6.4 J	20
PZ-204-SS	DIS	7/17/2013	700	4.1 J	2.5 J	180	4.0 J	50 U	2500	2.8 J	100	0.20 U	40 U	50 U	17 J
PZ-204-SS	TOT	7/17/2013	400	10 U	10 U	180	10 U	50 U	1900	2.6 J	110	0.20 U	40 U	50 U	16 J
PZ-205-AS	DIS	7/18/2013	200 U	5.6 J	39	1300	10 U	5.5 J	50000	3.4 J	1600	0.20 UJ-	24 J	5.8 J	6.6 U
PZ-205-AS	TOT	7/18/2013	80000	12	95 J	1800 J-	140	32 J	150000	94	2500 J-	0.22 J-	150	160	390 J-
PZ-205-SS	DIS	7/10/2013	200 U	10 U	10 U	150	10 U	50 U	500 U	1.9 J	15 U	0.20 U	40 U	50 U	7.4 U
PZ-205-SS	TOT	7/10/2013	200 U	10 U	10 U	150	10 U	50 U	1000 U	2.0 J	15 U	0.20 U	40 U	50 U	20 U
PZ-206-SS	DIS	7/18/2013	200 U	10 U	10 U	55	10 U	50 U	1000 U	1.7 J	19 J+	0.20 UJ-	40 U	50 U	20 U
PZ-206-SS	TOT	7/18/2013	980	10 U	10 U	73 J-	7.4 J	50 U	2200	3.6 J	45 J-	0.20 UJ-	40 U	50 U	12 J-
PZ-207-AS	DIS	7/18/2013	200 U	5.9 J	22	780	10 U	6.5 J	20000	3.5 J	66	0.20 UJ-	18 J	50 U	20 U
PZ-207-AS	TOT	7/18/2013	200 U	5.1 J	21	770 J-	8.0 J	5.5 J	16000	5.1 J	65 J-	0.20 UJ-	21 J	4.2 J	16 J-
PZ-208-SS	DIS	7/16/2013	740	10 U	10 U	150	3.7 J	50 U	720	2.4 J	20	0.20 U	40 U	50 U	6.7 J
PZ-208-SS	TOT	7/16/2013	530	4.0 J	10 U	150	10 U	50 U	1000	2.6 J	26	0.20 U	40 U	50 U	9.9 J
PS-302-AI	DIS	7/16/2013	200 U	4.1 J	2.2 J	350	10 U	5.7 J	1500	1.8 J	210	0.20 U	21 J	50 U	7.7 J
PS-302-AI	TOT	7/16/2013	320	10 U	2.8 J	350	4.0 J	6.7 U	2000	2.4 J	230	0.20 U	22 J	50 U	8.0 J
PS-302-AS	DIS	7/16/2013	200 U	12	330	390	100 U	5.9 U	130000	7.1 J	13000	0.20 U	19 J	4.3 J	200 U
PS-302-AS	TOT	7/16/2013	1400	12	390	550	100 U	21 U	150000	11	14000	0.20 U	72	7.9 J	80 J

Table 9: Summary of Detected Trace Metal Results - July 2013 Groundwater Sampling, West Lake Landfill OU-1

Sample ID	Sample Fraction	Sample Date	Alumi-num	Anti-mony	Arsenic	Barium	Chro-mium	Cobalt	Iron	Lead	Manga-nese	Mercury	Nickel	Vana-dium	Zinc
PZ-303-AS	DIS	7/15/2013	200 U	10	150	690	10 U	7.5 J	120000	5.4 J	2400	0.20 U	18 J	5.8 J	20 U
PZ-303-AS	TOT	7/15/2013	200 U	9.3 J	150	830	10 U	9.6 J	120000	10	2500	0.20 U	20 J	5.6 J	9.0 J
PZ-304-AI	DIS	7/16/2013	200 U	4.4 J	10 U	1300	10 U	50 U	15000	2.6 J	990	0.20 U	22 J	50 U	20 U
PZ-304-AI	TOT	7/16/2013	200 U	4.8 J	10 U	1300	10 U	4.0 U	16000	3.2 J	1000	0.20 U	22 J	50 U	20 U
PZ-304-AS	DIS	7/16/2013	200 U	4.3 J	210	2000	3.2 J	4.9 J	25000	3.1 J	110	0.20 U	54	50 U	6.9 J
PZ-304-AS	TOT	7/16/2013	280	4.7 J	220	2000	4.9 J	6.3 U	27000	6.6 J	130	0.20 U	62	50 U	8.6 J
PZ-305-AI	DIS	7/22/2013	200 U	6.5 J	25	630	10 U	50 U	46000	4.0 J	3500	0.20 UJ-	40 U	50 U	11
PZ-305-AI	TOT	7/22/2013	490 J	5.8 J	24	630 J-	10 U	50 U	46000	3.4 J	3400 J-	0.20 UJ-	40 U	5.4 J	10 J-

Notes:

All values are in units of micrograms per liter (µg/L)

Sample Fractions: DIS = Dissolved (filtered sample); TOT = Total (unfiltered sample)

FD - Field duplicate sample

Data Validation Qualifiers (Final Q) include:

U = non-detect at the reported value

J = estimated result

J+ = estimated result which may be biased high

J- = estimated result which may be biased low

UJ = non-detect at the estimated reported value

UJ- = non-detect at the estimated reported value which may be biased low

Table 10: Summary of Most Frequently Detected Volatile Organic Compounds - July 2013 Groundwater Sampling

Sample ID	Sample Date	Benzene	Ethyl Benzene	M, P-Xylenes	O-Xylene	Total Xylenes	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether	Chloro-benzene	1,4-Dichloro-benzene	Chloro-ethane	cis-1,2-Dichloro-ethene	Vinyl chloride
S-5	7/9/2013	3.9 J	5.0 U	4.8 J	3.6 J	8.4 J	2.3 J	0.63 J	3.4 J	7.5	10 U	5.0 U	5.0 U
S-8	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
S-10	7/15/2013	4.0 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	1.1 J	1.1 J
S-53	7/18/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
S-61	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	0.54 J	5.0 U
S-82	7/11/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	1.0 J	5.0 U	10 U	0.42 J	5.0 U
S-84	7/10/2013	2.6 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	11	5.0 U	10 U	0.47 J	5.0 U
I-4	7/9/2013	5.2	5.0 U	3.9 J	1.5 J	5.4 J	4.4 J	0.50 J	15	9.3	10 U	5.0 U	5.0 U
I-4 FD	7/9/2013	5.2	5.0 U	3.7 J	1.4 J	5.1 J	4.4 J	0.49 J	15	8.7	10 U	5.0 U	5.0 U
I-9	7/11/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	2.5 J
I-11	7/15/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	2.2 J+	2.0 J	5.0 U
I-62	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
I-62 FD	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
I-65	7/18/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
I-65 FD	7/18/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
I-66	7/15/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
I-67	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	0.63 J	5.0 U	5.0 U	10 U	5.0 U	5.0 U
I-68	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
I-73	7/19/2013	57	2.8 J	3.1 J	1.7 J	4.8 J	1.4 J	1.4 J	42	5.0 U	10 U	2.5 J	5.0 U
D-3	7/9/2013	0.33 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	0.56 J	2.0 J	5.0 U	10 U	5.0 U	5.0 U
D-6	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	2.7 J	5.0 U	5.0 U	10 U	0.40 J	5.0 U
D-12	7/15/2013	4.6 J	0.51 J	0.74 J	0.43 J	1.2 J	5.0 U	5.0 U	5.0 U	5.0 U	10 U	2.1 J	0.55 J
D-12 FD	7/15/2013	4.3 J	0.51 J	0.92 J	0.45 J	1.4 J	5.0 U	0.84 J	5.0 U	5.0 U	10 U	2.0 J	5.0 U
D-13	7/18/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	8.4	5.0 U	5.0 U	10 U	5.0 U	5.0 U
D-14	7/18/2013	8.6	1.5 J	2.4 J	1.2 J	3.6 J	1.4 J	5.0 U	36	8.5	10 U	5.0 U	5.0 U
D-81	7/17/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
D-81 FD	7/17/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
D-83	7/11/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	0.68 J	2.0 J	5.0 U	10 U	5.0 U	5.0 U
D-83 FD	7/11/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	0.71 J	2.0 J	5.0 U	10 U	5.0 U	5.0 U
D-85	7/10/2013	0.35 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	58	5.0 U	10 U	5.0 U	5.0 U
D-87	7/17/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U

Table 10: Summary of Most Frequently Detected Volatile Organic Compounds - July 2013 Groundwater Sampling

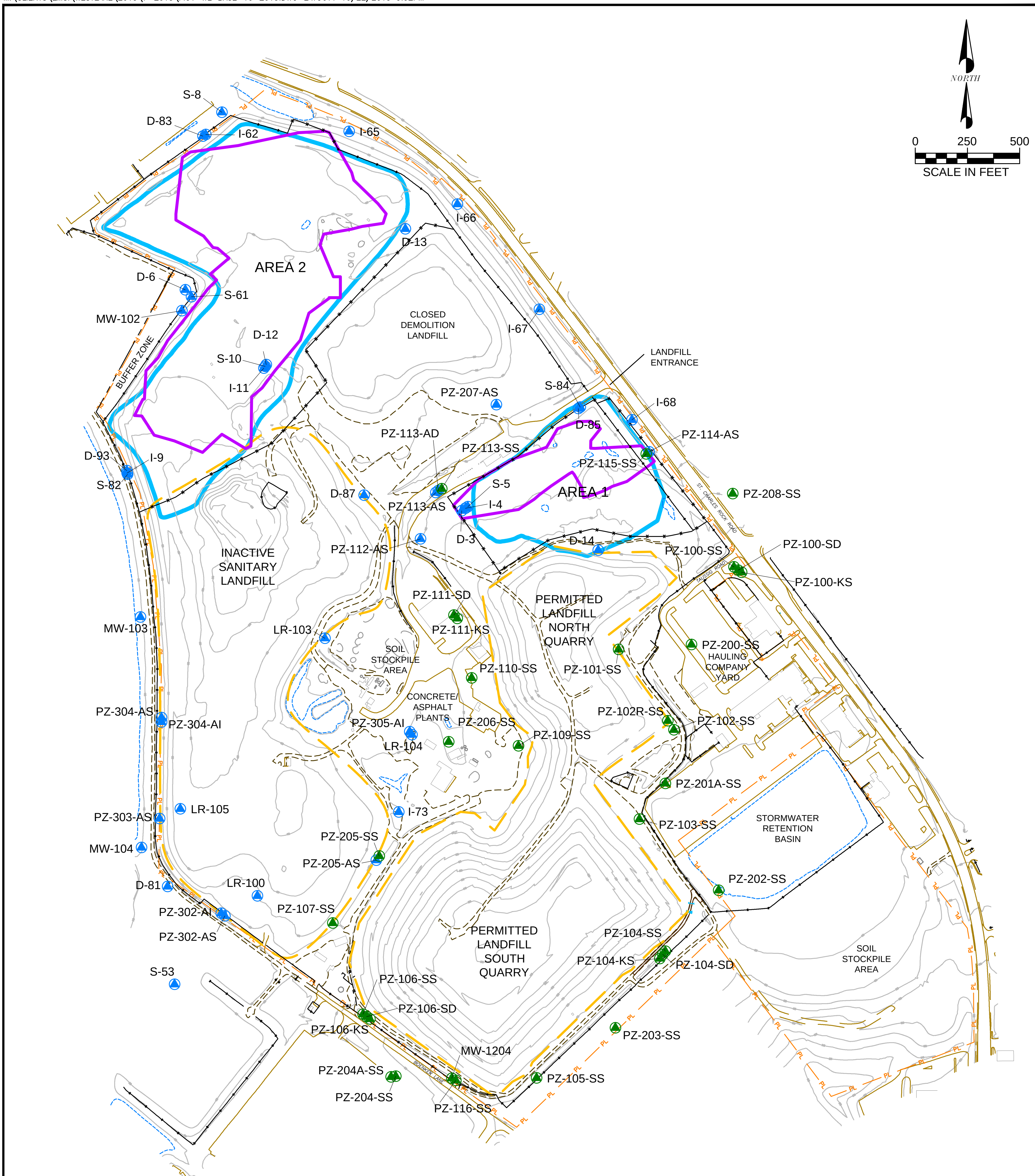
Sample ID	Sample Date	Benzene	Ethyl Benzene	M, P-Xylenes	O-Xylene	Total Xylenes	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether	Chloro-benzene	1,4-Dichloro-benzene	Chloro-ethane	cis-1,2-Dichloro-ethene	Vinyl chloride
D-93	7/11/2013	1.9 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	29	30
LR-100	7/17/2013	7.2 J	5.0 UJ	5.0 UJ	5.0 UJ	10 UJ	14 J	5.0 UJ	58 J	5.4 J	10 UJ	5.0 UJ	5.0 UJ
LR-103	7/17/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
LR-104	7/22/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
MW-102	7/15/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
MW-103	7/15/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
MW-104	7/16/2013	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	10 UJ	5.0 UJ	5.0 UJ	5.0 UJ	5.0 UJ	10 UJ	5.0 UJ	5.0 UJ
MW-1204	7/11/2013	1.1 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	1.9 J	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-100-KS	7/23/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-100-SD	7/9/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-100-SS	7/9/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-101-SS	7/11/2013	0.92 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	0.51 J	3.3 J	0.52 J	10 U	5.0 U	5.0 U
PZ-102R-SS	7/19/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-102-SS	7/19/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-103-SS	7/19/2013	140	7.9	16	8.8	25	1.3 J	5.0 U	5.0 U	9.8	10 U	5.0 U	5.0 U
PZ-104-KS	7/18/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-104-SD	7/11/2013	800	49	100	42	140	5.9	3.8 J	4.6 J	11	4.4 J+	5.0 U	5.0 U
PZ-104-SS	7/11/2013	1800	25	44	21	65	2.6 J	6.3	5.0 U	7.0	5.5 J+	5.0 U	5.0 U
PZ-105-SS	7/12/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-106-KS	7/19/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-106-SD	7/10/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-106-SS	7/10/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-107-SS	7/19/2013	0.95 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-107-SS FD	7/19/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-109-SS	7/10/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-110-SS	7/9/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	2.4 J	1.1 J
PZ-111-KS	7/17/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-111-SD	7/9/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-112-AS	7/9/2013	32	1.0 J	0.60 J	0.38 J	0.98 J	2.0 J	0.62 J	3500	22	10 U	0.23 J	5.0 U
PZ-113-AD	7/10/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	0.53 J	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-113-AD FD	7/10/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	0.59 J	5.0 U	5.0 U	10 U	5.0 U	5.0 U

Table 10: Summary of Most Frequently Detected Volatile Organic Compounds - July 2013 Groundwater Sampling

Sample ID	Sample Date	Benzene	Ethyl Benzene	M, P-Xylenes	O-Xylene	Total Xylenes	Isopropyl-benzene (Cumene)	Methyl tert-butyl ether	Chloro-benzene	1,4-Dichloro-benzene	Chloro-ethane	cis-1,2-Dichloro-ethene	Vinyl chloride
PZ-113-AS	7/10/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	2.9 J	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-113-SS	7/11/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-114-AS	7/12/2013	4.4 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	67	5.0 U	10 U	5.0 U	5.0 U
PZ-115-SS	7/11/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-116-SS	7/11/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-200-SS	7/19/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-201A-SS	7/10/2013	0.38 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-202-SS	7/11/2013	34	5.0 U	5.0 U	5.0 U	10 U	5.0 U	4.3 J	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-203-SS	7/17/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-204A-SS	7/16/2013	7.3	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	1.1 J	5.0 U	10 U	5.0 U	5.0 U
PZ-204-SS	7/17/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-205-AS	7/18/2013	1300 J	41 J	60 J	15 J	75 J	5.0 J	1.3 J	41 J	50 UJ	10 UJ	5.0 UJ	5.0 UJ
PZ-205-SS	7/10/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-206-SS	7/18/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PZ-207-AS	7/18/2013	1.8 J	5.0 U	5.0 U	5.0 U	10 U	2.8 J	5.0 U	20	3.5 J	10 U	5.0 U	5.0 U
PZ-208-SS	7/16/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PS-302-AI	7/16/2013	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U
PS-302-AS	7/16/2013	10	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	48	14	10 U	5.0 U	5.0 U
PZ-303-AS	7/15/2013	50	29	240	75	280	7.5	5.0 U	5.0 U	5.0 U	0.75 J+	2.2 J	1.3 J
PZ-304-AI	7/16/2013	1.6 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	14	2.0 J	10 U	5.0 U	5.0 U
PZ-304-AS	7/16/2013	7.1	5.0 U	5.0 U	5.0 U	10 U	0.53 J	5.0 U	58	13	10 U	5.0 U	5.0 U
PZ-305-AI	7/22/2013	1.5 J	5.0 U	5.0 U	5.0 U	10 U	5.0 U	5.0 U	7.5	5.0 U	10 U	5.0 U	5.0 U

Notes: All values are in units of micrograms per liter (µg/L).
FD = Field duplicate sample.
Data Validation Qualifiers (Final Q) include:
U = non-detect at the reported value
J = estimated result. J- = estimated result which may be biased low
UJ = non-detect at the estimated reported value

Figures



LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Existing 10' Contours
- Building or Structure
- Property Line
- Fence
- Paved Road
- Unpaved Road

WELL FORMATION DESIGNATIONS

LR or MW: Undifferentiated
S or AS: Alluvial Shallow Well
I or AI: Alluvial Intermediate Well
D or AD: Alluvial Deep Well
SS: St. Louis Formation Well
SD: Salem Formation Well
KS: Keokuk Formation Well

NOTES:

1. Horizontal Coordinates Based on State Plane Missouri East Zone NAD 27
2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

Generalized Stratagraphic Column

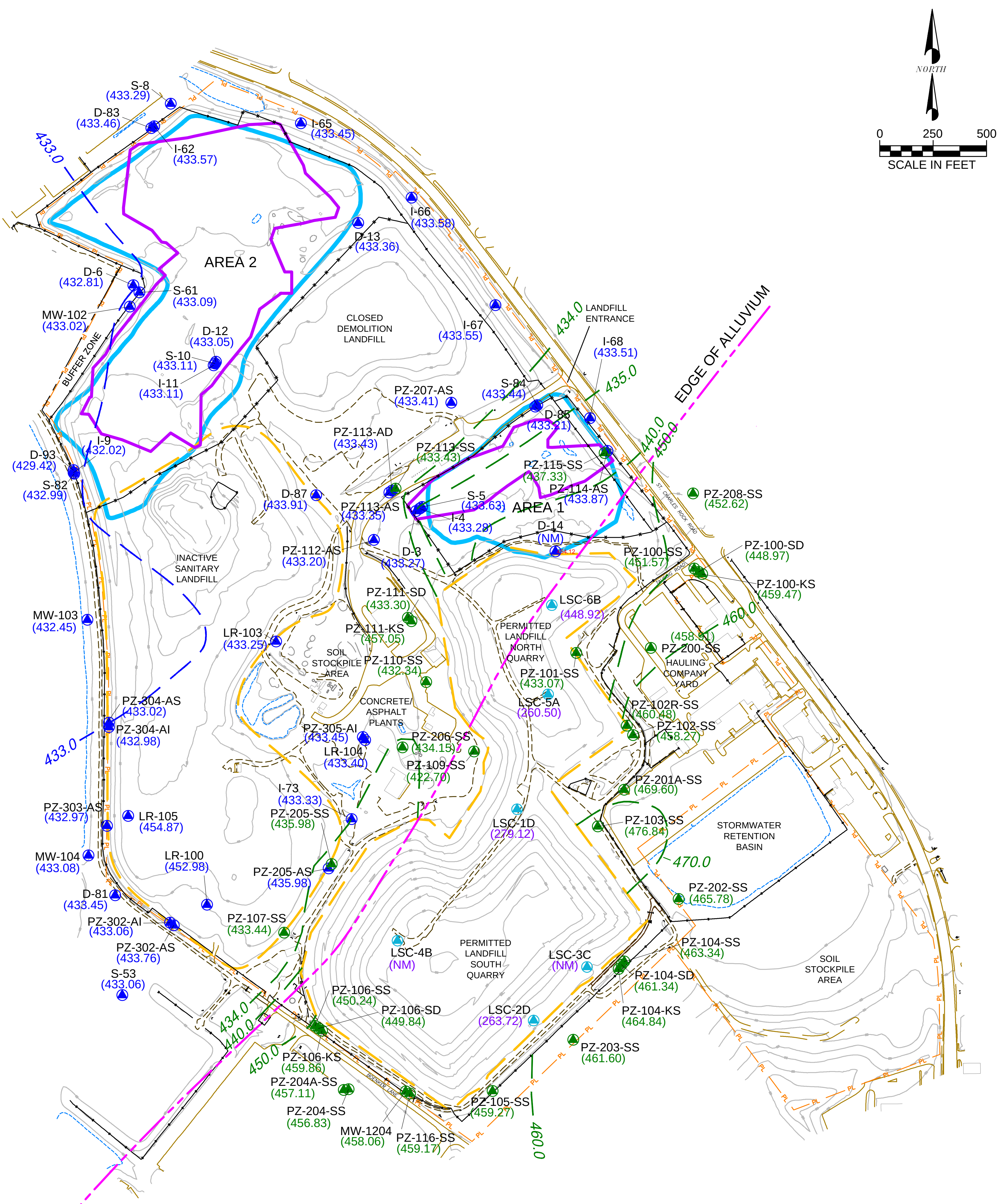
System	Series	Group	Formation	Thickness (ft)	Dominant Lithology
Quaternary	Holocene		Alluvium	0-150	Sand, gravel, silt, and clay.
	Pleistocene		Loess Glacial Till	1-110 0-55	Silt. Pebbly clay and silt.
Pennsylvanian	Missourian	Pleasanton	Undifferentiated	0-75	Shales, siltstones, "dirty" sandstones, coal beds and thin limestone beds.
	Desmoinesian	Marmaton	Undifferentiated	0-90	
		Cherokee	Undifferentiated	0-200	
	Atokan		Cheltenham Formation	unknown	
Mississippian	Meremacian		Ste. Genevieve Formation	0-160	Argillaceous to arenaceous limestone.
			St. Louis Limestone	0-180	
			Salem Formation	0-180	
			Warsaw Formation	0-110	Shales in upper portion, limestone in lower portions.
	Osagean		Burlington-Keokuk Formation	0-240	Cherty limestone.
			Fern Glen Formation	0-105	Red limestone and shale.

Figure 1

Base Map

West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.



LEGEND

- Leachate Collection Sump
- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

440	Groundwater Elevation Contour (FAMSL) - Alluvium
440	Groundwater Elevation Contour (FAMSL) - St. Louis Fm
(279.02)	Leachate Groundwater Elevation (FAMSL)
(429.82)	Alluvium Groundwater Elevation (FAMSL)
(458.64)	St. Louis Fm Groundwater Elevation (FAMSL)
*	Groundwater Elevation not used for contouring
	Groundwater Flow Direction - Leachate
	Groundwater Flow Direction - Alluvium
	Groundwater Flow Direction - St. Louis Fm
(FAMSL)	Feet above mean sea level

WELL FORMATION DESIGNATIONS

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NOTES:

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2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

Figure 2
Alluvial Groundwater Table and St. Louis FM. Potentiometric Elevation Map
July 8, 2013
West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.

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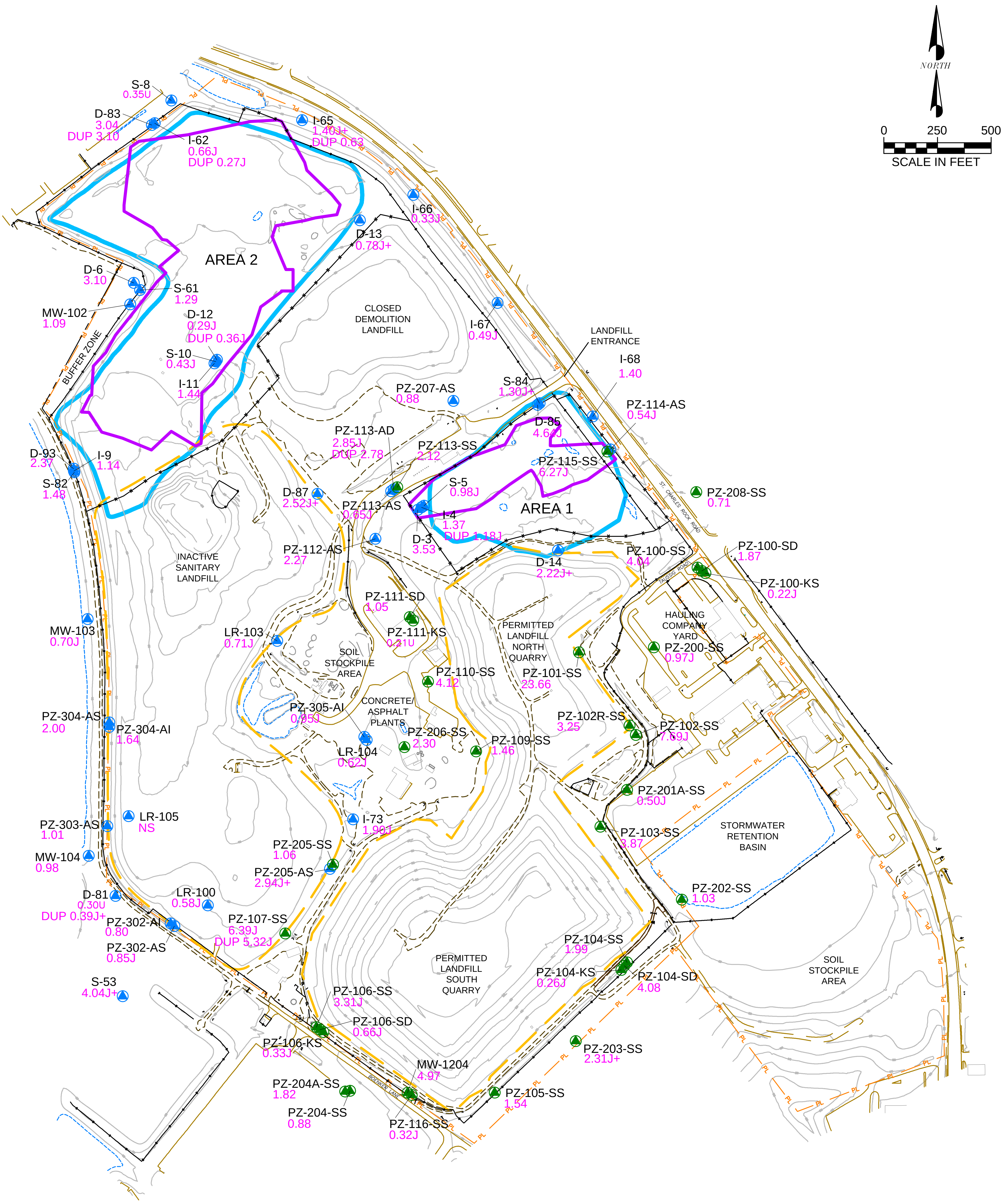

LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

RADIUM EXPLANATION

.092 Radium-226 (pCi/L)
NS Not Sampled

Data Validation Qualifiers:

U = Non-detect at the reported value
UJ = Non-Detect at the estimated reported value
UJ+ = Non-Detect at the estimated reported value which may be biased high
J = Estimated result
J+ = Esitmated result which may be biased high

WELL FORMATION DESIGNATIONS

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NOTES:

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2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

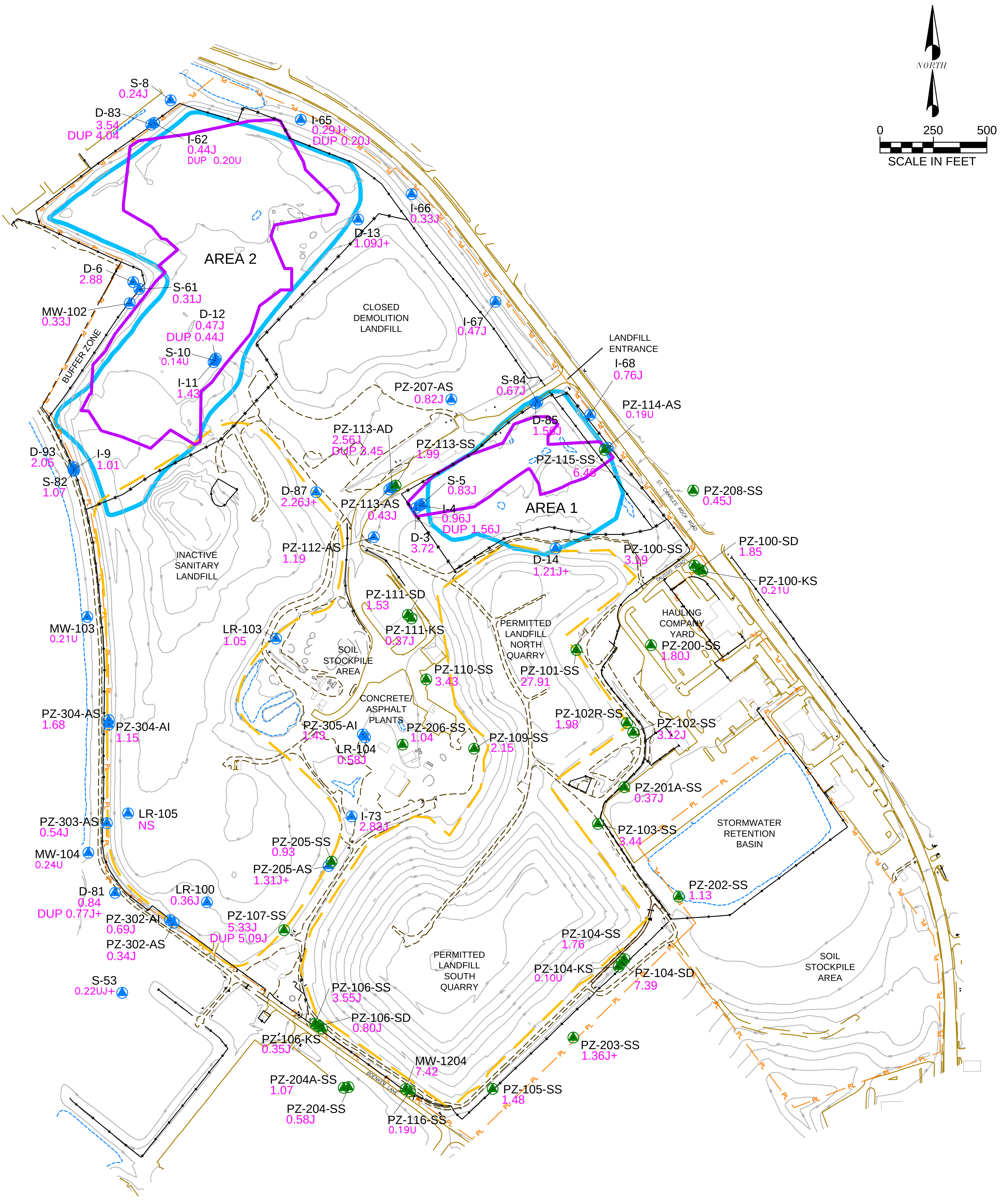
Figure 3

Total Radium-226 in Groundwater
July 2013

West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2013\7-2013\FIG4-WL-RADIUM-DISSOLVED-226_713.DWG-W-TOPO (2) 10/15/2013 3:20PM



LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

RADIUM EXPLANATION

.092 Radium-226 (pCi/L)
NS Not Sampled

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J+ = esitmated result which may be biased high

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NOTES:

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2. Elevations Based on U.S.G.S. Datum.
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4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

Figure 4

Dissolved Radium-226 in Groundwater
July 2013

West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.

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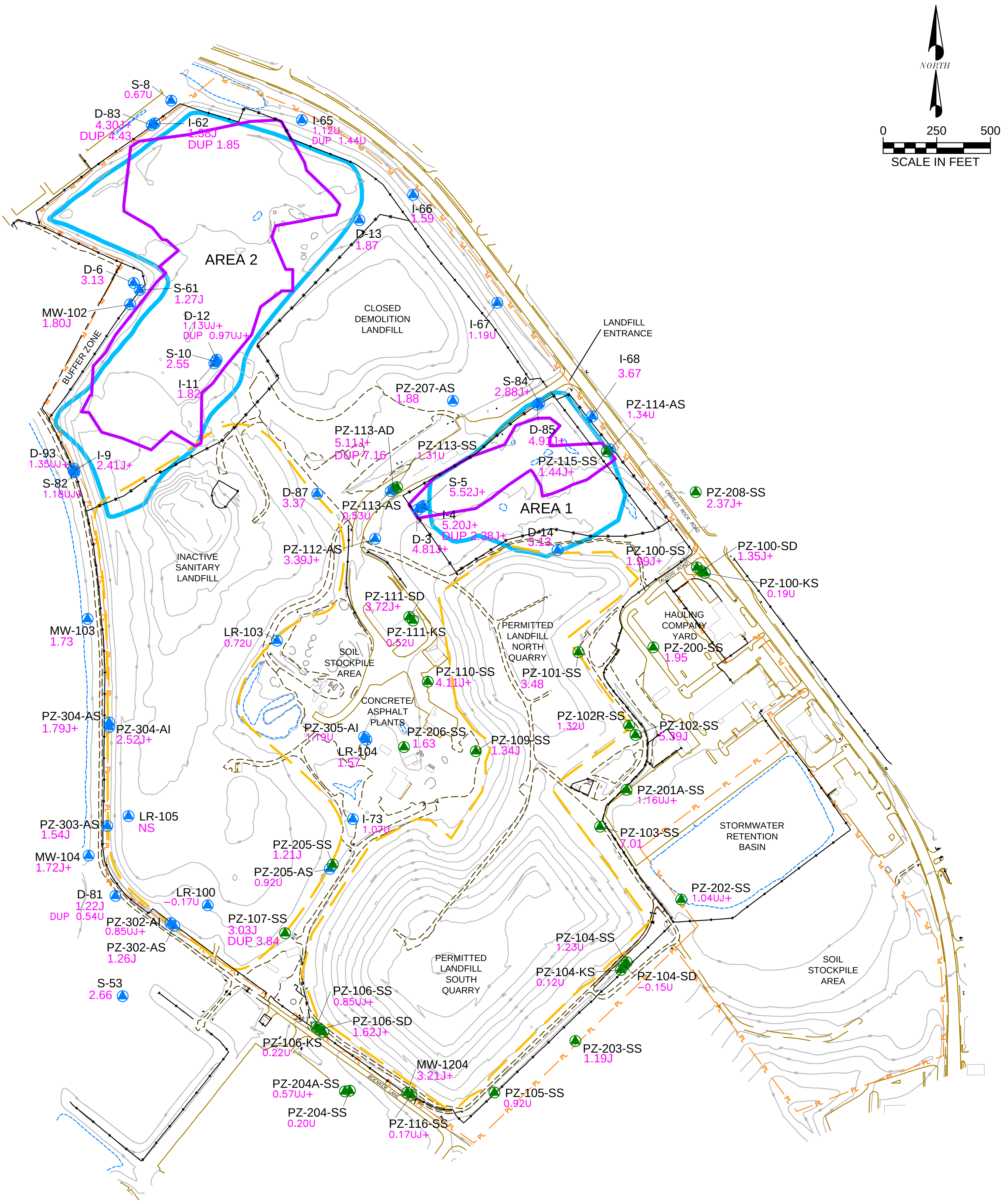

LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

RADIUM EXPLANATION

.092 Radium-228 (pCi/L)
NS Not Sampled

Data Validation Qualifiers:

U = Non-detect at the reported value
UJ = Non-Detect at the estimated reported value
UJ+ = Non-Detect at the estimated reported value which may be biased high
J = Estimated result
J+ = esitmated result which may be biased high

WELL FORMATION DESIGNATIONS

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NOTES:

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2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

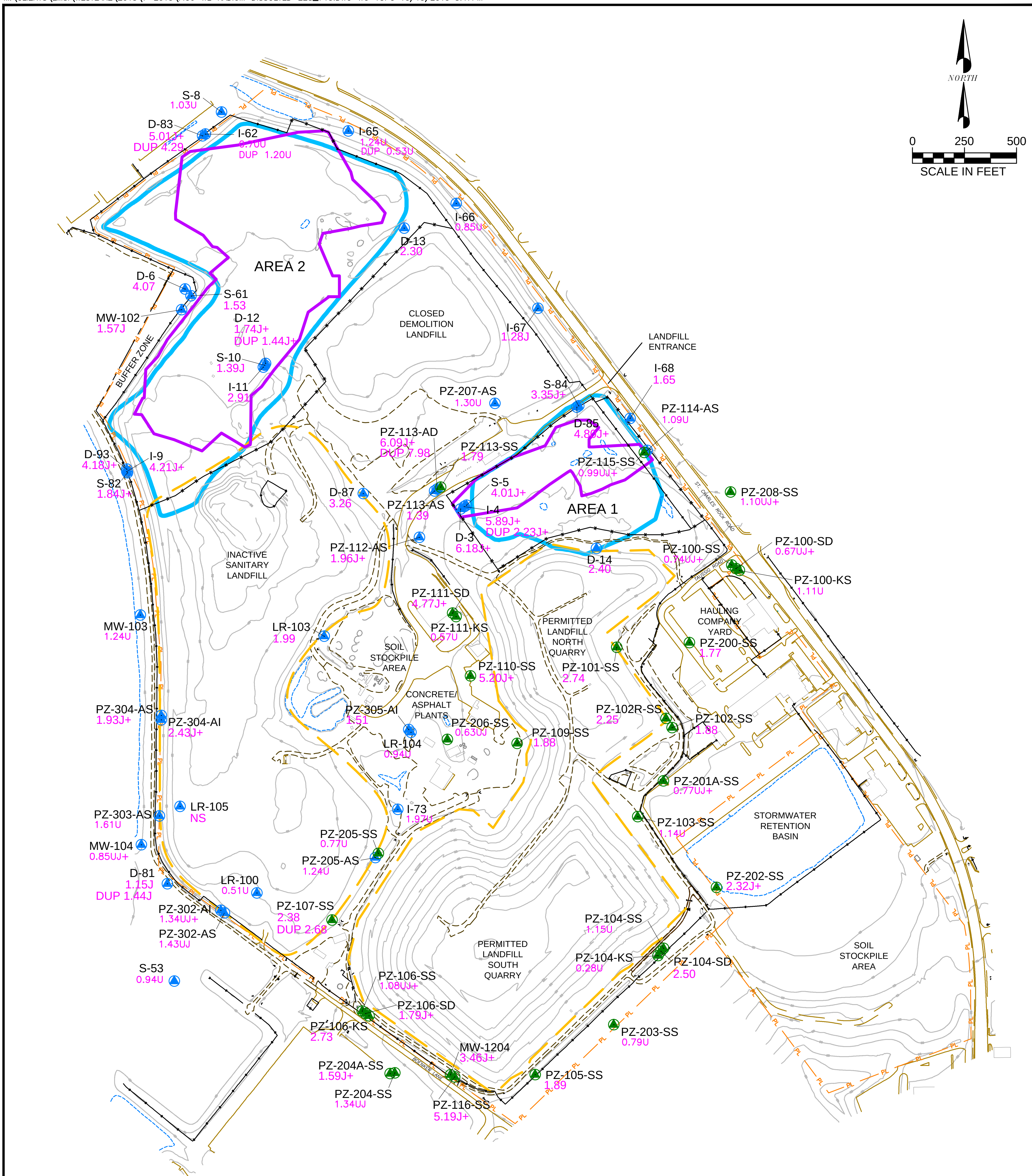
Figure 5

Total Radium-228 in Groundwater
July 2013

West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2013\7-2013\FIG6-WL-RADIUM-DISSOLVED-228_713.DWG-WO-TOPO 10/15/2013 3:47PM



LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

RADIUM EXPLANATION

.092 Radium-228 (pCi/L)
NS Not Sampled

Data Validation Qualifiers:

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UJ = Non-Detect at the estimated reported value
UJ+ = Non-Detect at the estimated reported value which may be biased high
J = Estimated result
J+ = esitimated result which may be biased high

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NOTES:

1. Horizontal Coordinates Based on State Plane Missouri East Zone NAD 27
2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

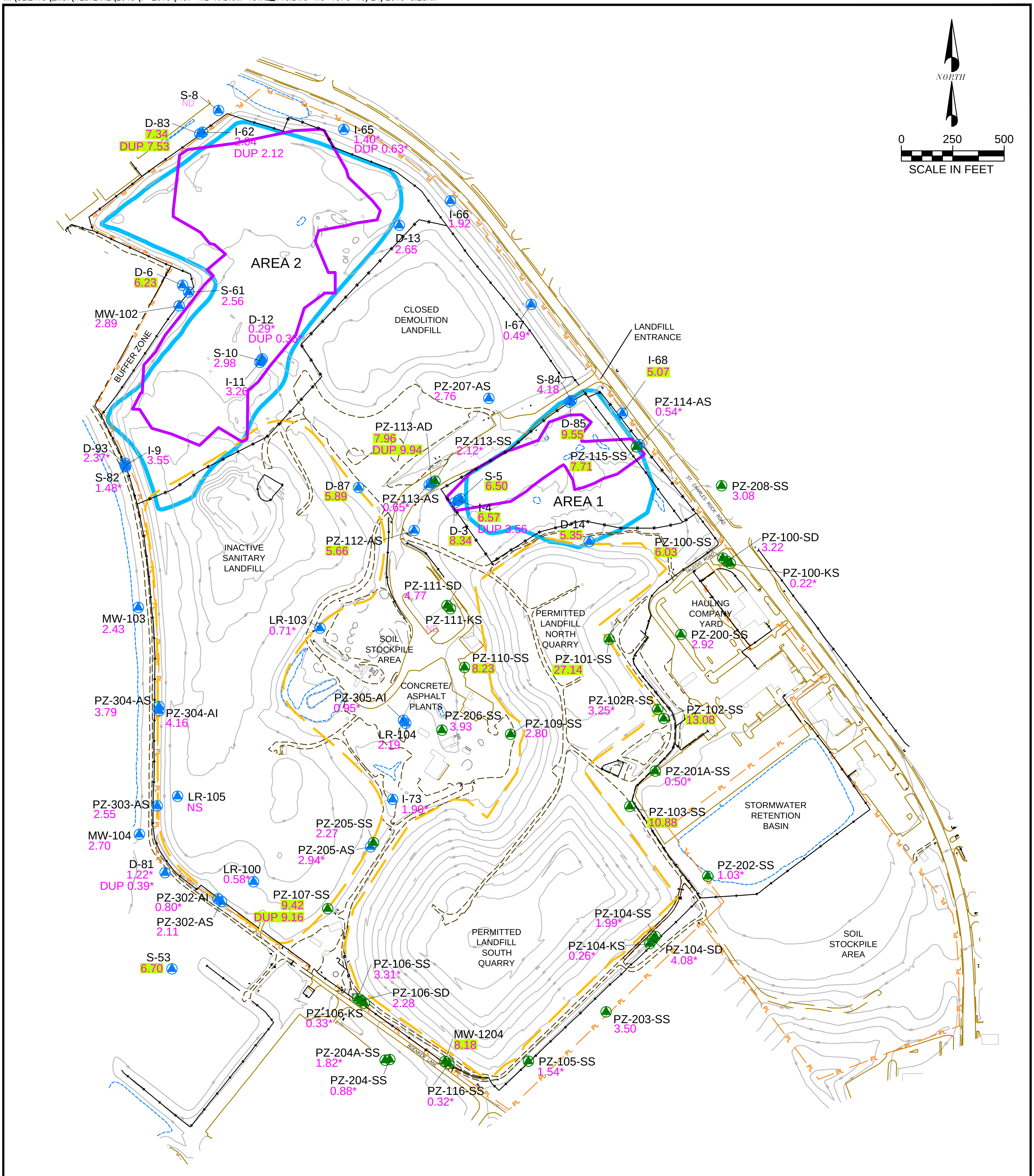
Figure 6

Dissolved Radium-228 in Groundwater
July 2013

West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2013\7-2013\FIG7-WL-RADIUM-TOTAL_713.DWG-WO-TOPO 10/24/2013 8:28AM



LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

RADIUM EXPLANATION

1.72 Total Radium result that is less than the Maximum Contaminant Level of 5 pCi/L for combined Radium-226 and Radium-228

4.50* Combined Ra-226 and Ra-228 results unless one of results was non-detect, in which case only the detected result is shown and the value is flagged with a *

6.10 Total Radium greater than the Maximum Contaminant Level of 5 pCi/L for combined Radium-226 and Radium-228

ND Both Radium-226 and Radium-228 were non-detect

NS Not Sampled

WELL FORMATION DESIGNATIONS

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NOTES:

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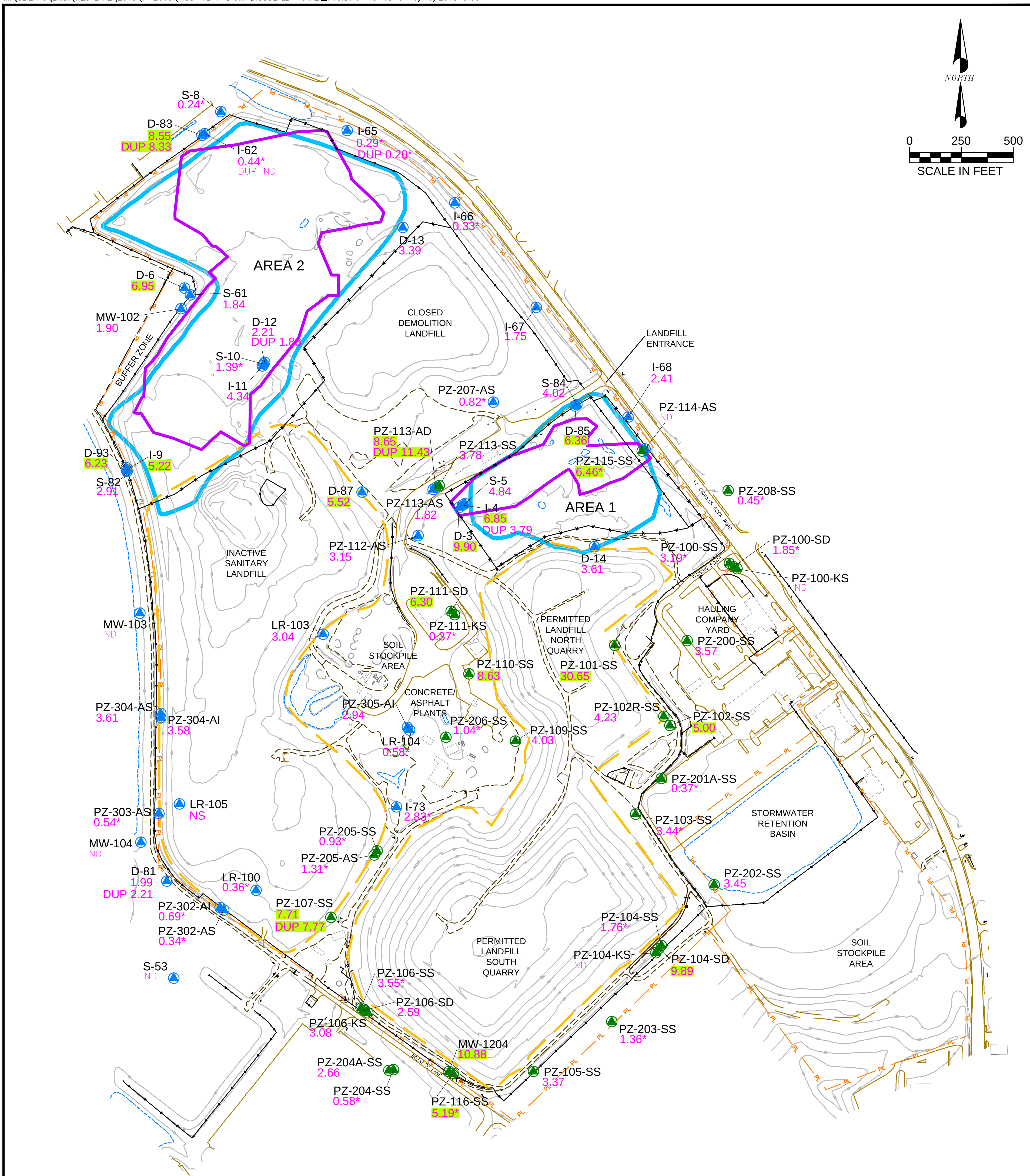
2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

Figure 7
Combined
Total Radium-226 + Total Radium-228
in Groundwater
July 2013
West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.



LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

RADIUM EXPLANATION

.092	Total Dissolved Radium that is less than the Maximum Contaminant Level of 5 pCi/L for combined Radium-226 and Radium-228
1.08*	Combined Ra-226 and Ra-228 results unless one of results was non-detect, in which case only the detected result is shown and the value is flagged with a *
5.20	Total Dissolved Radium greater than the Maximum Contaminant Level of 5 pCi/L for combined Radium-226 and Radium-228
ND	Both Radium-226 and Radium-228 were non-detect
NS	Not Sampled

WELL FORMATION DESIGNATIONS

LR or MW: Undifferentiated
S or AS: Alluvial Shallow Well
I or AI: Alluvial Intermediate Well
D or AD: Alluvial Deep Well
SS: St. Louis Formation Well
SD: Salem Formation Well
KS: Keokuk Formation Well

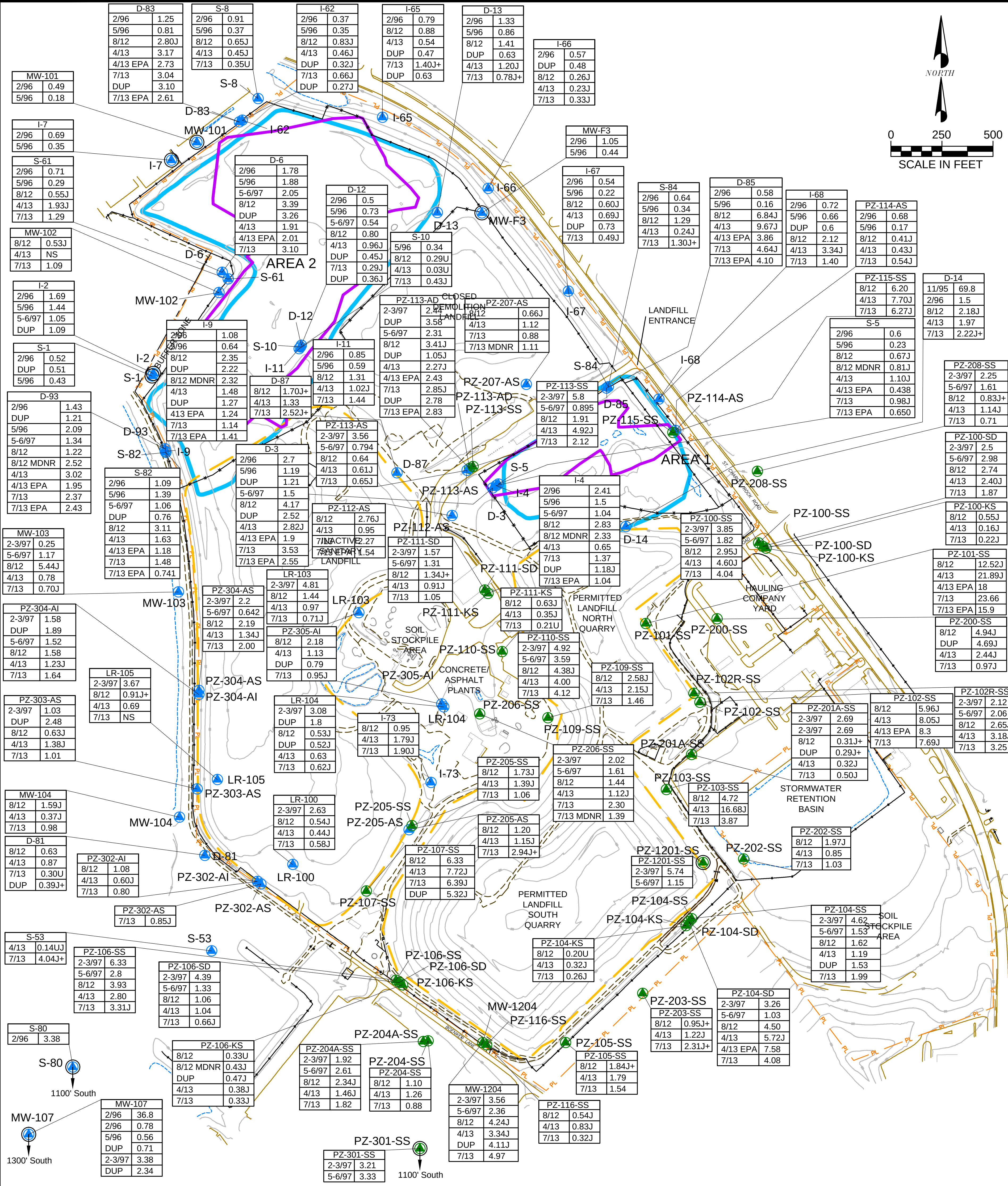
NOTES:

1. Horizontal Coordinates Based on State Plane Missouri East Zone NAD 27
2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

Figure 8
Combined
Dissolved Radium-226 + Dissolved Radium-228
in Groundwater
July 2013
West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2013\7-2013\FIG9-WL-TOT-RADIUM-226_713.DWG-WO-TOPO 11/26/2013 3:12PM



LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- RI/FS Groundwater Well That No Longer Exists
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

Well Number
Date Sampled — MW-1204 | 2-3/97 | 3.56 — Total Radium-226 Concentration in (pCi/L)

RADIUM EXPLANATION

EMSI has concluded that D-14 results are not vaild due to extreme variations between filtered and unfiltered results and extreme variations among sampling events.

OU-1 Wells Sampled 11/95, 2/96, 5/96, 5/97, 3/04, 5/04, 8/12, 4/13 and 7/13
OU-2 Wells Sampled 2-3/97 and 5-6/97, 8/12, 4/13 and 7/13

Data from either OU-1 RI (EMSI, 2000), OU-2 RI (Herst & Associates, 2000), or 2004 Data for OU-1 FS Effort.

Data Validation Qualifiers:

U = Non-detect at the reported value
UJ = Non-Detect at the estimated reported value
UJ+ = Non-Detect at the estimated reported value which may be biased high
J = Estimated result
J+ = esitmated result which may be biased high

WELL FORMATION DESIGNATIONS

LR or MW: Undifferentiated
S or AS: Alluvial Shallow Well
I or AI: Alluvial Intermediate Well
D or AD: Alluvial Deep Well
SS: St. Louis Formation Well
SD: Salem Formation Well
KS: Keokuk Formation Well

NOTES:

1. Horizontal Coordinates Based on State Plane Missouri East Zone NAD 27
2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

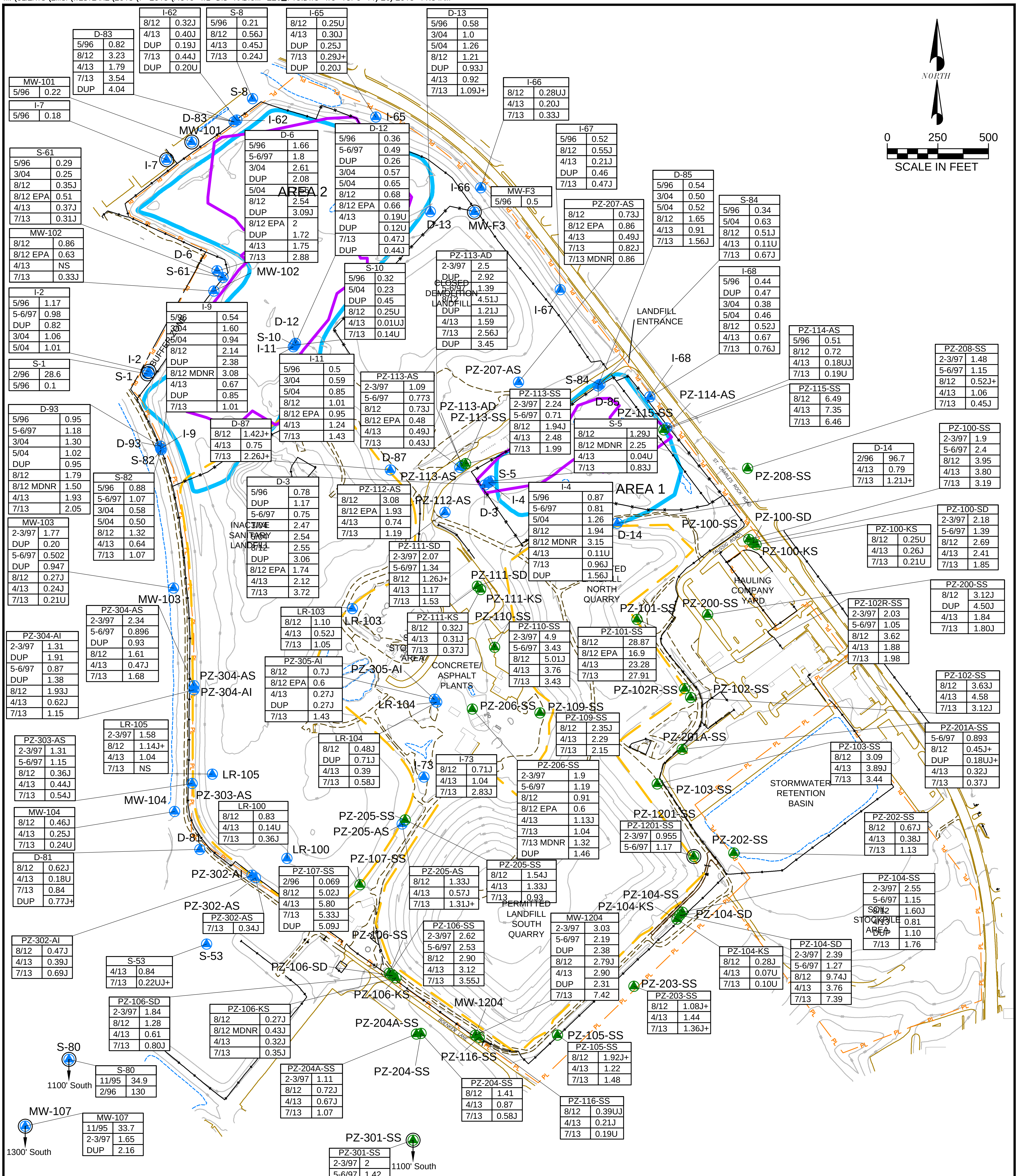
Figure 9

2013, 2012 and RI/FS Results for Total Radium-226 in Groundwater

West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.

M:\CLIENTS\EMSI\WESTLAKE\2013\7-2013\FIG10-WL-DIS-RADIUM-226_713.DWG-WO-TOPO 11/26/2013 11:34AM



LEGEND

- Alluvium Groundwater Well
- Bedrock Groundwater Well
- RI/FS Groundwater Well That No Longer Exists
- Operable Unit-1 Area as Defined By ROD
- Estimated Extent of Radiologically Impacted Material
- Paved Road
- Unpaved Road

WELL FORMATION DESIGNATIONS

LR or MW: Undifferentiated
S or AS: Alluvial Shallow Well
I or AI: Alluvial Intermediate Well
D or AD: Alluvial Deep Well
SS: St. Louis Formation Well
SD: Salem Formation Well
KS: Keokuk Formation Well

Data Validation Qualifiers:

U = Non-detect at the reported value
UJ = Non-detect at the estimated reported value
UJ+ = Non-Detect at the estimated reported value which may be biased high
J = Estimated result
J+ = esitmated result which may be biased high

RADIUM EXPLANATION

Well Number

Date Sampled

MW-1204	
2-3/97	3.03

Dissolved Radium-226 Concentration in (pCi/L)

EMSI has concluded that D-14 results are not vaild due to extreme variations between filtered and unfiltered results and extreme variations among sampling events.

OU-1 Wells Sampled 11/95, 2/96, 5/96, 5/97, 3/04, 5/04, 8/12, 4/13 and 7/13
OU-2 Wells Sampled 2-3/97 and 5-6/97, 8/12, 4/13 and 7/13

Data from either OU-1 RI (EMSI, 2000), OU-2 RI (Herst & Associates, 2000), or 2004 Data for OU-1 FS Effort.

NOTES:

1. Horizontal Coordinates Based on State Plane Missouri East Zone NAD 27
2. Elevations Based on U.S.G.S. Datum.
3. Existing Grade Contours are from the Aerial Survey Completed by the Sanborn Mapping Company on July 20, 2011.
4. Base Map Prepared by Aquaterra Environmental Solutions, Inc.

Figure 10

2013, 2012 and RI/FS Results for Dissolved Radium-226 in Groundwater

West Lake Landfill Operable Unit-1

EMSI Engineering Management Support, Inc.