



Revised March 23, 2015
Project No. 9061015

Mr. Mark Peabody
Project Manager
Kleinfelder, Inc.
550 West C Street, Suite 1200
San Diego, California 92101

Subject: Statistical Analysis of Lead Concentrations in Soil
On Ramp from State Route 163 to Interstate 8
Caltrans D11 TO25, Kleinfelder Project No. 20153836.001A

Dear Mr. Peabody:

This technical memorandum summarizes the results of our statistical analysis of lead concentrations in soil reported by Kleinfelder from the project ADL survey. The data were provided in Microsoft Excel format.

For questions pertaining to this analysis, please contact the undersigned at 858.513.1469 or by email at sree@thebodhigroup.com.

Sincerely,
The Bodhi Group, Inc.

Sree Gopinath, P.E.
Principal Engineer



3.1. All Excavated Soil Treated as One Stockpile

The table below summarizes the results of the statistical analyses.

Total Concentrations in milligrams per kilogram (mg/kg)								
Depth (ft)	Number of Samples	% of Non Detect	Min. value	Max. value	Mean	Median	Standard Deviation	95% UCL
0.5-3.0	18	0%	3.0	336	67.3	17.1	97.9	132.2

WET Concentrations in milligrams per liter (mg/L)								
Depth (ft)	Number of Samples	% of Non Detect	Min. value	Max. value	Mean	Median	Standard Deviation	95% UCL
0.5-3.0	18	0	0.06	30.9	4.8	1.4	7.7	10.1

WET-DI Concentrations (mg/L)								
Depth (ft)	Number of Samples	% of Non Detect	Min. value	Max. value	Mean	Median	Standard Deviation	95% UCL
0.5-3.0	9	33.3	<0.002	0.15	0.03	0.01	0.05	0.06

TCLP Concentrations (mg/L)								
Depth (ft)	Number of Samples	% of Non Detect	Min. value	Max. value	Mean	Median	Standard Deviation	95% UCL
0.5-1.0	3	0	0.09	0.95	NC	NC	NC	NC

NC: Not calculated due to insufficient distinct values to be statistically significant

pH								
Depth (ft)	Number of Samples	% of Non Detect	Min. value	Max. value	Mean	Median	Standard Deviation	95% UCL
0.5-2.0	4	0	8.1	8.8	NC	NC	NC	NC

NC: Not calculated due to insufficient distinct values to be statistically significant

The representative (or maximum) values of TOTAL, WET, WET-DI, TCLP, and pH concentrations were compared with Variance criteria to evaluate soil classification. The resulting soil classification is “Y1”. The Variance defines “Y1” as hazardous waste, which requires a minimum of 1-foot of clean overburden for reuse on the project site. If taken off-site, the waste will require disposal as hazardous

Location	Depth (ft)	WET (mg/L)	ADL Soil Type
Maintenance Vehicle Pullout	0.5	16.1	Y1
	1.0	30.9	Y1
	3.0	4.6	Y1

The values were distinct and therefore not subject to statistical analysis. As shown above, soil in the 0.5 and 1.0 foot depth were classified as Y1 (hazardous). Even though the sample from 3.0 feet bgs had a WET lead concentration of 4.6 mg/L, it is recommended to treat the soil as Y1 (hazardous) to account for potential uncertainties in sampling and analysis.

Soil from areas other than the MVP area were statistically analyzed to determine if they were part of a distinct population. The results are tabulated below.

Location	Depth (ft)	WET (mg/L)			ADL Soil Type
		Mean	Maximum	95% UCL	
"LW" Areas	All (0.5-3.0)	2.3	8.4	4.9	Y1
All	0.5	3.0	8.2	6.0	Y1
All	1	2.6	8.4	5.8	Y1
All	0.5 and 1 (<=1)	2.8	8.4	6.0	Y1
All	1, 2, and 3 (>=1)	2.0	8.4	6.1	Y1
All	2 and 3 (>1)	1.4	5.2	3.4	X

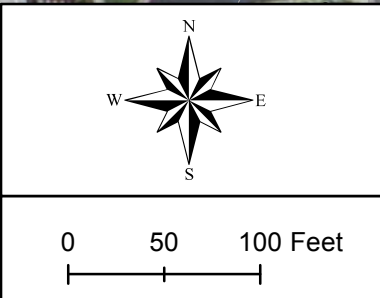
Note: Analysis of fewer than six distinct data values can yield unreliable results

Even though the data set for all depths had a representative WET concentration of 4.9 mg/L, below the Variance threshold (and hazardous waste criteria) of 5.0 mg/L, it is recommended to treat the soil as Y1 (hazardous) to account for potential uncertainties in sampling and analysis.

The results indicate that segregating soil from the MVP area does not result in reclassification of the ADL soil type.



Legend
 Sample Locations



Project No. 9061015
 Date: 02/2015
 Drawn By: SG

Figure 1

**Aerially-Deposited Lead
 Sample Locations
 Ramp from SR163 to I-8**

San Diego, California

Sources: Esri, DeLorme, NAVTEQ, USGS, Intermap, iPC, NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), TomTom, 2013