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May 15, 2015

Mr. George Chow
Department of Toxic Substances Control
700 Heinz Avenue, Building F, Suite 200
Berkeley, CA 94710-2721

**Subject:** Transmittal of the Lendrum Court Remedial Investigation Summary Report and Screening Risk Evaluation
Presidio of San Francisco, California

Dear Mr. Chow:

Attached for your approval is a copy of the Lendrum Court Remedial Investigation Summary Report and Screening Risk Evaluation. This report incorporates your comments on the 30 March 2015 draft report as identified in your May 7, 2015 email. The report includes a summary of data collected by the Trust at this site, with an emphasis on the September 2014 investigation.

Separately, the Trust is preparing a Feasibility Study and Removal Action Work Plan to address residual impacts in the Lendrum Court Area.

If you have questions or need additional information, please contact me at (415) 561-5421 or John DeWitt at (650) 292-9100.

Sincerely,

Nina Larssen
Environmental Remediation Project Manager

Attachments

cc: Denise Tsuji, DTSC (cover letter only)
Bruce Handel, USCOE
Eileen Fanelli, TRC
John DeWitt, EKI

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15 May 2015

Ms. Nina Larssen
Presidio Trust
67 Martinez Street
Post Office Box 29052
San Francisco, California 94129-0052

Subject: Lendrum Court Remedial Investigation Summary Report and Screening Risk Evaluation
Presidio Trust, San Francisco, California
(EKI B00025.07)

Dear Ms. Larssen:

Erler & Kalinowski, Inc. is pleased to present the *Lendrum Court Remedial Investigation Summary Report and Screening Risk Evaluation*. This report provides a summary overview of remedial investigations conducted at Lendrum Court ("Site") in October 2012, June 2013, and September 2014, and evaluates potential risks to human health and the environment from exposure to chemicals in soil at the Site. The report also presents the results of the September 2014 field investigation activities conducted in conformance with the *Additional Sampling Workplan for Lendrum Court,* which was approved by the Department of Toxic Substances Control on 29 August 2014.

If you have any questions please do not hesitate to call.

Very truly yours,

ERLER & KALINOWSKI, INC.

John T. DeWitt, P.E.
Project Manager


original 5/15/15

# LENDRUM COURT
# REMEDIAL INVESTIGATION SUMMARY REPORT AND SCREENING RISK EVALUATION

PRESIDIO OF SAN FRANCISCO, CALIFORNIA

*Prepared for:*
The Presidio Trust
San Francisco, CA

*Prepared by:*
Erler & Kalinowski, Inc.
Burlingame, California
EKI B00025.07

May 2015

# LENDRUM COURT
# REMEDIAL INVESTIGATION SUMMARY REPORT AND SCREENING RISK EVALUATION

Presidio of San Francisco, California

## TABLES



## FIGURES



## APPENDICES

# 1 INTRODUCTION

On behalf of the Presidio Trust ("Trust"), Erler & Kalinowski, Inc. ("EKI") has prepared this Remedial Investigation Summary Report and Screening Risk Evaluation. The report provides a summary overview of remedial investigations conducted in October 2012, June 2013, and September 2014, at Lendrum Court in the Presidio of San Francisco ("Site") and evaluates potential risks to human health and the environment from exposure to chemicals in soil at the Site. The report also presents the results of the September 2014 field investigation activities conducted in conformance with the *Additional Sampling Workplan for Lendrum Court* ("Workplan") (EKI, 2014d), which was approved, with comment, in an email from Department of Toxic Substances Control ("DTSC") on 29 August 2014 and finalized incorporating DTSC comments on 30 August 2014. A copy of the Workplan is included as Appendix A.

# 2 BACKGROUND

## 2.1 Site Description

Lendrum Court is located in the northwest corner of the Presidio, north of Doyle Drive, in the North Fort Scott Area (Figure 1). The North Fort Scott neighborhood includes 17 residential buildings containing 42 units housing approximately 110 residential tenants.

Army-era debris and incinerator ash are present in subsurface soils in the area of Buildings 1257, 1258, 1259, 1278, 1279, 1280, and 1282, all of which abut Lendrum Court. The area generally slopes to the northeast in a series of terraces, likely graded as building pads for the residential units and parking lot area. The sloping areas between the terraces are generally landscaped with grass and shrubs. The northeastern slope, behind buildings 1259, 1278, and 1279 is historic forest, with a thick understory of small statured trees and shrubs.

## 2.2 Lendrum Court Site Use History

EKI prepared a chronology of land development activities in the Lendrum Court and North Fort Scott areas based on historic maps and photos. Copies of historic maps and photos reviewed and a description of significant historical features observed in these maps and photos are provided in the Workplan (Appendix A).

Of note, a 1921 Presidio map indicates the presence of an incinerator approximately 150 feet southeast of present day Lendrum Court (see Figure 1) within the right-of-way of present-day Doyle Drive. This incinerator is not shown on other available Presidio maps. Aerial photographs dated 1922 and 1929 show a vague feature at the location of the incinerator identified in the 1921 map; this feature is not present on later aerial photos following construction of Doyle Drive in the early 1930s. [1]

[1] The Doyle Drive / Presidio Parkway construction project encountered the foundation of the former incinerator in January 2015 while excavating the hook-ramp area at the interchange between Highways 1 and

Army historical maps indicate that construction of the current Lendrum Court residential buildings and parking area began around 1970 and was completed by 1975. A 1987 photograph shows the residential units at Lendrum Court, Armistead Road, Hoffman Street, and Ramsel Court completed.

## 2.3 Lendrum Court Site Investigation and Remediation History

Several phases of site investigation were conducted at the Lendrum Court site in response to tenant complaints of glass fragments in soil surrounding the residential buildings. Debris fill, containing glass, was observed in exploratory trenches excavated by the Trust at the site in October 2010. In February 2013, based on the results of the Trust's exploratory trenching, the DTSC directed the Trust to prepare a Preliminary Endangerment Assessment ("PEA") Workplan (DTSC, 2013a). The Trust prepared the PEA Workplan (EKI, 2013), and upon DTSC approval (DTSC, 2013b), the Trust implemented the work in June 2013.

Findings from the PEA Workplan investigation are summarized in the *Lendrum Court Investigation Summary Report and Screening Risk Evaluation* (EKI, 2014a) (the "PEA Report"). The PEA Report documented the presence of debris fill in subsurface soils and identified lead, PAHs, and dioxin and furans as potential chemicals of concern ("PCOCs"). DTSC approved the PEA Report in a letter dated 7 March 2014 (DTSC, 2014b). In that letter, DTSC stated that further investigation at Lendrum Court was required to determine the extent of debris and to evaluate the risks posed by PCOCs.

Additionally, DTSC sent a letter dated 9 January 2014 (DTSC, 2014a) requiring the Trust to develop a plan for implementation of temporary measures to minimize the potential exposure of residents to PCOCs in site soils. The Trust submitted an implementation plan to DTSC on 24 March 2014 (Trust, 2014) and following DTSC approval, in April and May 2014 the Trust implemented the planned measures. The temporary measures included installation of:

- Post and cable fencing around exposed surface soils in the moderately sloped landscape areas to restrict resident access (approximately 1,875 linear feet of fence to limit access to the majority of the exposed surface area);
- Aggregate base walkways in high-traffic areas connecting doors at the front and sides of residences;
- Sand-set paver patios near select buildings; and,
- Gopher-resistant mesh and sod in specific informal gathering areas.

These combined measures reduced the potential for human exposure to site PCOCs. The temporary measures are shown on Figure 2.

101. Waste debris, including ash, was stockpiled for characterization and off-site disposal, and additional assessment is in progress to determine the extent of any residual contamination. The results of the assessment of this area will be reported to DTSC under separate cover.

Following implementation of the temporary measures, the Trust conducted the additional site investigation in two phases.

As part of Phase I, the Trust prepared and submitted a field investigation plan to evaluate if Army-era debris was present in the broader North Fort Scott and Pilots Row neighborhoods (EKI, 2014b). DTSC approved the plan on 30 April 2014. The field work was completed in May 2014, and a report of findings submitted to the DTSC in July 2014 (EKI, 2014c). The North Fort Scott and Pilots Row investigation report concludes that debris fill is limited to the Lendrum Court neighborhood. In a 24 July 2014 letter, DTSC concurred with the report findings at North Fort Scott and Pilots Row (DTSC, 2014c).

The second phase of investigation focused on delineation and characterization of the debris in the Lendrum Court area as described in the Workplan (Appendix A). The field work was conducted in September 2014 and is described below.

# 3 SEPTEMBER 2014 FIELD INVESTIGATION

## 3.1 Purpose of the Lendrum Court Field Investigation

The goals of the investigation were to:

(1) Evaluate the extent of debris at the Lendrum Court site;

(2) Conduct additional characterization of the debris fill to identify chemicals of concern ("COCs") for the Lendrum Court site and to evaluate the potential risk to human health or the environment; and

(3) Collect data to facilitate evaluation of potential remedial alternatives, such as topography in the area of debris fill.

## 3.2 Field Investigation Activities

To achieve the identified goals, the following activities were performed in general accordance with the Workplan:

- Vegetation clearing in the historic forest area to provide access for equipment and allow observation of the ground surface and site topographic survey. The Trust contracted with Professional Tree Care Company of Berkeley, California ("PTC") to conduct the vegetation clearing work.

- Excavation of approximately 40 potholes and 22 trenches by hand or mini-excavator to define the limits of debris fill. The shallow trenches are listed below and shown on Figure 3.[2]

[2] From this point on, the prefix "1279TP" is generally dropped from the trench and sample labels in this report for ease of review. Note that the full samples IDs, including the prefix "1279TP", are listed in the

| | | | |
|---|---|---|---|
| 1279TP301 | 1279TPA1-2 | 1279TPE1-1 | 1279TPG1-2 |
| 1279TP302 | 1279TPA2-1 | 1279TPE1-2 | 1279TPI1-1 |
| 1279TP303 | 1279TPB1-1 | 1279TPF0-1 | 1279TPI2-1 |
| 1279TP304 | 1279TPC1-1 | 1279TPF2-1 | 1279TPI2-2 |
| 1279TP305 | 1279TPC1-2 | 1279TPG1-1 | 1279TPK-1 |
| 1279TPA1-1 | 1279TPD1-1 | | |

Not all trenches were sampled; however, they were logged for visual presence of debris, and if debris was present, the nature, extent, and depth of the debris layer were noted.

- Collection of debris/ash samples from trenches 304, 305, TPA1-2, TPF0-1, TPF2-1, TPG1-2 to provide additional characterization of the debris fill, including analysis for dioxins and furans to supplement the data set from the June 2013 investigation.
- Collection of shallow surface soil samples to identify the potential limits of chemical impacts associated with debris fill.
- Site topographic survey.
- Installation of erosion control measures to reduce the potential for soil erosion following the field work.

## 3.3 Field Procedures

The following sections describe field procedures implemented during September 2014. Deviations from the Workplan are discussed in Section 3.4. Groundwater was not encountered in the trenches or potholes. No investigation-derived wastes were generated.

### 3.3.1 Clearing Vegetation

PTC removed the underbrush and vegetation smaller than 6 inches in diameter to the east and northeast behind Buildings 1279, 1278, and 1259 and to the west of Building 1257 to allow access for site investigation activities. In addition, three trees were removed in consultation with the Presidio Trust Forestry Department because they were unstable and posed a risk to site workers.

### 3.3.2 Trenching and Potholing

Potholes and trenches were advanced as outline in the Workplan. Potholes were hand- or machine-dug holes to allow a quick assessment of presence or absence of debris in the upper few feet of soil. Potholes were also used within the tree protection zones where

tables. The "TP" prefix is retained for trenches within the lettered grid area to distinguish from potholes demarcated with "SB" for soil boring.

mechanical equipment was excluded.[3] Based on the pothole results, trenches were generally located between areas of known debris and areas expected to be free of debris. Trench lengths varied depending on the lateral extent of debris, presence of tree roots or tree protection zones, and the presence of subsurface utilities. EKI's subcontractor excavated trenches approximately 18 inches wide using a mini-excavator with low ground pressure. Prior to excavation, sod (if present) was cut and removed. Trench spoils were placed on plywood sheets.

Following logging and soil sample collection (if environmental samples were collected), excavated materials were replaced in the trenches and potholes approximately to the same vertical position from which they were excavated. Replaced materials were backfilled and compacted by tamping with the mini-excavator bucket. If present, the sod was restored at ground surface following soil compaction.

EKI established a grid system in the field to track progress and identify specific areas. The grid is shown on Figure 4. In grid areas A through H, potholes were generally hand-dug with a shovel or pick-axe, though some were also dug with the mini-excavator. Potholes were dug to about 12 inches in depth by hand (or to refusal), or about 24-inches if the mini-excavator was used. If debris was encountered, digging stopped, the location was then identified as containing debris and marked for surveying, and a step-out pothole was dug. This process continued until debris fill was not encountered. If the area was accessible to the mini-excavator, a trench was excavated perpendicular to the anticipated edge of debris to confirm the absence of debris at depth and to establish the extent of debris fill. Potholes with visible debris were not sampled.

A similar approach was used in grid areas I, J, K, and M. Initial potholes were dug in each grid to confirm presence or absence of visible debris. With the exception of Area K, trenches were excavated only if debris was observed in the potholes. In Area K, because debris had previously been encountered in a trench immediately east of this area, a trench was excavated as close as possible to the previously observed debris outside the tree protection zone. Four potholes were also excavated in Area K.

The number of potholes and trenches within a specific grid area varied based on field conditions, including topography, proximity to tree protection zones, access, and results of other potholes or trenches. EKI discussed the potholing and trenching approach with DTSC representatives in the field on 17 and 24 September 2014. Copies of trench logs and select photos are included in Appendix C.

### 3.3.3 Soil Sampling and Analysis

The multi-increment soil sampling method described in the Workplan was employed in the field and by the analytical laboratory. DTSC representatives observed the multi-increment sampling at trench TPF0-1 on 24 September 2014.

[3] The Trust Forestry Department imposed a 20-foot radius tree protection zones around all trees that remained. Within the tree protection zones, mechanical equipment access was limited and digging restricted.

Soil samples collected from the debris layer of the trenches were submitted for chemical analysis to provide additional characterization of the debris. An analytical matrix for the samples collected is provided in Table 1. Debris layer samples were analyzed for the following:

- PAHs using U.S. EPA Method 8270C with selected ion monitoring;
- Title 22 Metals using U.S. EPA Method 6020/7471A;
- Dioxins and furans using U.S. EPA Method 1613; and
- Percent moisture.

Soil samples collected from the surface layer of the trenches and potholes where debris was not encountered were submitted for limited chemical analysis to provide an assessment of potential extent of chemical impacts associated with the debris. These samples are identified in Table 1 and were analyzed for lead using U.S. EPA Method 6020 and percent moisture.

A total of 51 multi-increment soil samples plus 3 duplicate samples were submitted to Curtis & Tompkins, Ltd. ("Curtis & Tompkins") for sample preparation. Curtis & Tompkins is certified in Incremental Sampling Methodology ("ISM") preparation protocol capable of processing multi-increment samples. The analytical laboratory employed an ISM preparation protocol in which each sample was dried, mixed, and systematically split into subsamples. A small sample from each increment was collected and mixed to create the multi-increment sample used for analysis. ISM-prepared samples were submitted to Vista Analytical Laboratory for analysis of dioxins and furans. Both laboratories are State of California-certified.

Analytical results of September 2014 soil sampling activities are discussed in Section 4.3.

### 3.3.4 Surveying

Trench extents, pothole locations, the grid system, remaining trees, existing utilities, existing improvements, and other significant features of the Lendrum Court area were surveyed by PLS Surveys, Inc., a California licensed land surveyor. Trench and pothole surveying included the ground surface elevation and the horizontal coordinates of each location. Horizontal coordinates are in North American Datum 1927 ("NAD 27"). Vertical coordinates are reported in the North American Vertical Datum 1988 ("NAVD 88"). A copy of the survey map and report are included in Appendix B.

### 3.3.5 Winterizing the Site

Because vegetation removal disturbed the site soils, upon completion of soil sampling and surveying PTC winterized the site to reduce the potential for erosion. The three areas of the site where surface soil was exposed on hillslopes during tree removal and chipping activities include grid areas A2, K, and H1. The winterization process involved removing

loose duff and vegetation that was likely to be unstable on the slope, placing and securing woven coir mats, and installing biodegradable coconut wattles at 10 foot maximum intervals along the slope. Wattles were also placed alongside the stairways next to grid areas A2 and K. Work was installed in general accordance with the California Stormwater Quality Association Construction Best Management Practices.

### 3.4 Deviations from the Work Plan

Field investigations were conducted in general conformance with the Workplan. Specific deviations are described below.

The Workplan indicated that no trees over 6 inches would be removed. However, in coordination with the Trust Forestry Department, three trees with diameters greater than 6 inches were removed to provide access or because the trees were dead and posed a danger to the field team.

The Workplan indicated that potholes would be hand-dug to about 24 inches. In places, compacted or hard soil limited the depth that could be achieved by hand digging to less than 24 inches. When mechanical assistance was feasible (i.e., outside tree protection zones), EKI utilized the contractor's mini-excavator to assist with potholing.

The Workplan indicated that potholes would be dug in grid areas I, J, K, and M, and trenches would only be dug if debris were present in potholes. In grid area K a trench was dug to confirm findings even though no debris was present in potholes.

The Workplan indicated that potholes would be dug in grid areas J1 through J3 unless the edge of the debris was confirmed in trenches 301 and 302. While no debris was encountered in trenches 301 and 302, as a conservative measure, potholes were dug in grid areas J1 through J3. No debris was observed in these potholes.

The Workplan indicated that the number of potholes or trenches within a specific grid would vary based on field conditions. Because of visible surface ash and debris in grid areas E1 and F1, and the limitations of the root protection zone of the cypress tree in grid area F1, the number of potholes and trenches in these areas was limited. In addition, once surveyed, trench TPE1-2 was determined to be located in grid area E2. Locations west of grid areas 1 were labeled "0", such as trench TPF0-1 and pothole SBH0-1.

The Workplan indicated that duplicate samples would be collected at a rate of approximately 10%. A duplicate was collected and analyzed with the seven debris samples, meeting the 10% goal. Only two duplicates were collected and analyzed with the 44 surface lead samples, rather than the 4 or 5 that would meet the 10% goal. However, because the samples were collected by multi-incremental sampling and prepared for analysis by ISM protocol, these sample results are considered to be representative of the site conditions. As stated above, the RPD for these lead results from soil samples ranged from 3% to 30%, which is a small range for typically heterogeneous soil samples. Therefore, although the total number of duplicate samples did not match the goal set in the

Workplan, the duplicates analyzed demonstrate that the sampling procedure provides consistent results.

# 4 SUBSURFACE CONDITIONS

## 4.1 Site Geology

According to the *Geologic Map of the San Francisco Bay Region*, (USGS, 2006), Lendrum Court is underlain primarily by alluvial fill material, i.e., Quaternary hillslope deposits, and by serpentinite bedrock. Quaternary slope debris is also shown as the surficial deposit at the Lendrum Court area on Figure 6-1 of the *Development of Presidio-Wide Cleanup Levels for Soil, Sediment, Groundwater and Surface Water* ("Cleanup Level Document"; EKI, 2002). Based on a cut and fill map prepared by the Trust representing elevation changes from 1871 to 2000, cuts were made in native material at the Lendrum Court area to accommodate construction of roadways and building pads.

The September 2014 investigation included 22 new trenches, shown on Figure 3; 18 trenches were previously excavated at Lendrum Court (screened back on Figure 3). Trench logs and select photographs for the September 2014 field investigation are included in Appendix C.

The September 2014 investigation confirmed the previous findings at Lendrum Court. Four general layers have been identified in the shallow subsurface at Lendrum Court. These layers are listed below in order from the ground surface; however, not all layers are observed in each trench.

- Overburden, a yellow-brown to brown silty sand with minor gravel,
- Debris layer, a brown silty sand, which includes visible debris and which may or may not include visible ash,
- Bottom layer, a yellow-brown to brown silty sand with no observed debris, and
- Bedrock, a weathered serpentinite.

Overburden: The overburden fill extends to depths ranging between approximately 0.5 and 2.5 feet below ground surface ("ft bgs"), and appears to be consistent with the Colma Formation. The overburden material consists of yellow-brown silty sand and may represent fills of the cut native alluvial material repositioned during previous land-leveling activities. The overburden material generally does not contain debris, although glass has been found in surface soil, often in the spoils pile by gopher holes.

Debris layer: The Army-era debris layer is generally first encountered at depths of approximately 0.5 to 2.5 ft bgs below the overburden layer and is occasionally visible at the surface (trench TPF0-1). The observed thicknesses of the debris layer vary significantly from approximately 3 inches to 5 feet. The subsurface debris layer generally contains abundant glass fragments, melted glass, bottles, ceramics, and terra cotta, as well as lesser quantities of brick, charcoal, wire, metal, small animal bones, and burned wood.

Ash was observed in the debris layer in several of the trenches. Cobbles were also frequently observed in the debris layer.

Visible ash, when encountered, is generally mixed within the debris layer. Ash was observed in trenches T1, 202, 203, 206, 207 208, TPA1-2, TPB1-1, TPC1-1, TPC2-1, TPD1-1, TPE1-1, TPE1-2, TPF0-1, TPF2-1, and TPG1-2. Ash was also observed on the ground surface around the cypress tree in grid cell F1.

Bottom layer: The alluvial fill material observed in the trenches beneath the overburden fill and debris layers is comprised of yellow-brown silty sand and likely represents Quaternary hillslope deposits as identified on the USGS map (USGS, 2006). When encountered in the trenches, it is not always clear whether the alluvial fill is in-place hillslope deposits or re-worked material. Therefore, this unit is referenced as the bottom layer, or base layer of the trench, indicating material generally encountered below the debris layer, regardless of whether this bottom layer is fill material or native formation.

Bedrock: A weathered serpentinite rock was observed in some trenches. There is also a visible outcrop of serpentinite southeast of Building 1258, and mapped serpentinite in the Lendrum Court area, specifically, northeast of Building 1280, northwest of Building 1282, and southwest of Buildings 1257 and 1258 (USGS, 2006).

## 4.2 Observed Lateral and Vertical Extent and Content of Debris Layer

The lateral extent of Army-era debris is shown on Figure 4. Consistent with the findings of previous investigations, the debris layer is typically present at 0.5 to 2.5 ft bgs in the central Lendrum Court area and ranges in thickness from approximately 3 inches to 5 feet. In the area of the historic forest, Army-era debris ranges from a few inches to 5 feet thick and is present from the ground surface to approximately 4 ft bgs in trench TPD1-1.

Based on observations in potholes, test pits, and trenches, Army-era debris is generally bounded to the:

- South by Armistead Road and the embankment of Highway 1 ramp[4] adjacent to the Lendrum Court roadway leading from Lincoln Boulevard to the Site,
- Southwest by Buildings 1257 and 1258,
- West by the footpath between Building 1257 and Area K;
- Northwest by the parking lot and sidewalk to the east of Building 1282, the sidewalk south of the entrance to Building 1280, and the footpath between Buildings 1280 and 1279; and
- North by the approximate break in slope behind Buildings 1280, 1278, and 1259.

While minor amounts of debris consisting of wood, wire, plastic, and rope were found in trench 212 (a previous trench located in Area L), the debris found in this trench was not

[4] The investigation of the former Army incinerator encountered in January 2015 will be reported to DTSC under separate cover. Because the road cut for the street from Lendrum Court to Lincoln Boulevard results in steep topography below the debris layer at Lendrum Court, the September 2014 fieldwork did not specifically investigate or identify a direct connection from Lendrum Court to the former incinerator.

consistent with the Army-era debris in the remaining Site and the soil samples from the debris layer did not contain chemicals above applicable screening levels. The debris is more consistent with random buried trash. This trench is therefore not included in the debris fill area.

Trench TPI2-1 (in Area I) contained gravel fill with fines, cemented rock, and cobble-sized asphalt clasts. This trench is immediately south of the downhill/eastbound portion of Lendrum Court road and just north of the area of the former incinerator. The trench contents appear to be the remains of a former road and, given the presence of this debris and the trench location relative to the incinerator, is included in the debris fill area. The extent of this Army-era road is uncertain.

In the historic forest, grid areas A1 through H2, removal of the vegetation made possible the demarcation of the debris and the drainages in the densely vegetated area. The debris extends in some drainages to the north (particularly grid area D2), likely from transport by stormwater runoff. As the estimated debris extent moves south through grid areas G and H, the large trees that could not be removed limited the ability to trench in these areas, so more potholes were hand dug. Degraded bedrock cobbles were encountered in hand dug potholes in grid areas G1 and H1, which at first were considered an indication of debris, but upon review of the observed debris extent, are fractured bedrock. Therefore, these potholes are not shown within the debris area on Figure 4. In Area H, the debris extent moves close to Building 1259 and includes trench 305 to the base of the slope along Lendrum Court road, and then trends westward toward Armistead but north of the serpentinite outcrop visible on the north side of intersection of Armistead Road and Lendrum Court.

No Army-era debris was found in the potholes advanced in grid area J.

### 4.3 Chemical Analytical Results

Chemical analytical data results for soil samples collected during the 2014 and earlier investigations are summarized in Tables 2 through 5.[5] Sample results are reported on a dry weight basis. Table 2 presents results of Title 22 metals analysis for select debris samples, and Table 3 presents results for lead analyses for select surface samples. Table 4 presents results for PAHs, as well as results of a calculation of benzo(a)pyrene equivalents for carcinogenic PAHs for each sample. Table 5 presents results for dioxins and furans, as well as dioxin toxic equivalent quotient ("TCDD TEQ") for each sample. The benzo(a)pyrene potency equivalent concentrations are calculated with Toxicity Equivalency Factors for Carcinogenic Polycyclic Aromatic Hydrocarbons from EPA Region IX Regional Screening Levels User's Guide (U.S. EPA, 2013c). For PAHs not included in the EPA guidance, values from the June 2011 Human Health Risk Assessment Note 4, were used as requested by DTSC (DTSC, 2011a). The TCDD TEQ was calculated

[5] Although no Army-era debris was found in potholes advanced in grid area J, shallow soil samples were collected. The results of these soil analyses are included in the data in Appendix D. Since the data collected from Area J appears to have a separate source than the remaining portions of the Site, the data from Area J are not summarized on Tables 2 through 5. These data will be reported under separate cover.

by the analytical laboratory and the results are shown on the analytical laboratory reports. Analytical laboratory reports for the September 2014 investigation are included in Appendix D; benzo(a)pyrene potency equivalent concentration calculations are included in Appendix E.

For evaluation purposes, soil sample results are compared with soil screening levels ("SSLs") identified in the PEA (EKI, 2014a), which are derived from the Cleanup Level Document (EKI, 2002), as amended. For dioxins and furans which are not included in the Cleanup Level Document, a residential soil screening level of 3.5 picograms per gram ("pg/g") was developed by MACTEC for the Trust (MACTEC, 2007). For screening purposes, soil sample results greater than the most stringent residential SSL above the applicable background level are presented in bold type in the tables; sample results greater than the ecological buffer zone SSL above the applicable background level are presented with underlining in the tables.

Sample results from previous investigations are also shown on Tables 3, 4, and 5 to allow comparison with more recent site data.

#### 4.3.1 Summary of Analytical Results for the Debris Layer

Metals: As shown on Table 2, all seven samples detected the presence of lead above the residential SSL of 80 milligrams per kilogram ("mg/kg"), with a maximum concentration of 2,400 mg/kg in trench TPF0-1. Lead data are posted on Figure 5. Arsenic was detected above the Colma formation soil background level of 6.2 mg/kg in five of seven samples, with a maximum concentration of 7.2 mg/kg. Barium, copper, and zinc were also detected above the ecological SSLs in nearly all of these samples.

PAHs: Table 4 shows benzo(a)pyrene was detected above its residential SSL in four of seven samples analyzed from the debris layer; the benzo(a)pyrene equivalent was also above its residential SSL in these four samples. The maximum benzo(a)pyrene and benzo(a)pyrene equivalent concentration were 0.14 mg/kg and 0.20 mg/kg, respectively, (in the sample from trench TPF0-1 from a depth of 1.5 ft bgs), as compared with the residential SSL of 0.046 mg/kg. However, the detected and calculated values for benzo(a)pyrene equivalents are lower than the Northern California upper tolerance limit background concentration for benzo(a)pyrene potency equivalent of 1.5 mg/kg (ENVIRON, et al, 2002). The background concentrations in this study ranged from 0.0027 mg/kg to 2.8 mg/kg.

Table 4 also shows the detection limits for the sample from TPI2-1 are elevated. As stated in the laboratory report narrative (Appendix D, sample 261249-019), due to the dark and viscous nature of the sample extract, the laboratory had to dilute the sample to perform the analysis. The dilution process resulted in the sample detection limits being greater than the benzo(a)pyrene and dibenz(a,h)anthracene residential SSLs; however, at these elevated detection limits PAHs were not detected in this sample. Because no PAHs were detected, the benzo(a)pyrene equivalent concentration could not be calculated for this sample. Review of the trench log for this sample indicates the presence of asphalt clasts, gravel fill with fines, and cemented clasts (Appendix C, Figure C-20). Based on the analytical data

and the field observations, this trench may have encountered a former road or contain debris associated with a former roadway.

Dioxins and Furans: As shown in Table 5, of the seven soil samples analyzed for dioxins and furans from the debris layer, TCDD TEQ concentrations ranged between 1.26 pg/g and 15.7 pg/g. The maximum concentration exceeded the residential SSL of 3.5 pg/g, but the sample results are within the urban background range of 7 pg/g to 20 pg/g (DTSC, 2010).

#### 4.3.2 Summary of Analytical Results for the Overburden

As shown in Table 3, 36 multi-increment soil samples and a duplicate were collected from the surface soils for lead analysis. Of the 37 samples, 16 had lead concentrations that exceed the 80 mg/kg residential SSL. The maximum lead concentration was 490 mg/kg in a sample collected from pothole SBC1-1. The lead data are shown on Figure 5.

### 4.4 Laboratory QA/QC and Field Quality Control Samples

Laboratory quality assurance and quality control ("QA/QC") procedures were performed in accordance with the Presidio-wide Quality Assurance Project Plan (Tetra Tech, 2001), and as amended by the Trust's 23 June 2011 QAPP Addendum (Trust, 2011).

Three field duplicates for soil were collected as part of this investigation. A field duplicate is a sample collected at the same time and from the same source and depth as the associated primary sample. Due to the heterogeneous nature of soil properties and matrix effects, a true soil duplicate sample is difficult to properly subsample. However, use of the multi-increment sampling technique results in collection and analysis of soil samples that are typically more representative of their presence in the field than analysis of individual, discrete samples.

As shown by the analytical results for the three duplicate pairs presented in Tables 2, 3 and 4, the multi-incremental sampling method resulted in consistent data results. Utilizing lead concentrations as an example, relative percentages differences ("RPDs") for the duplicate pairs were 11%, 30%, and 3%. Based on low RPDs for these samples, the analytical results presented herein are considered representative of actual conditions in the field and the observed soil layers are considered well characterized for the chemicals analyzed.

As noted above, the sample from TPI2-1 for PAHs was diluted because the extract was dark and viscous. All other laboratory QA/QC requirements were met as noted in the laboratories' report narratives (Appendix D).

### 4.5 Limits of Debris Fill and Site Delineation

The extent of debris shown on Figure 4 is primarily a function of observed debris in the field, and incorporates the surveyed locations of observations during trenching and potholing. The Site limits are shown on Figure 5. The limits encompass debris fill and

adjacent areas considered to be impacted by historic waste disposal and site grading activities and resultant waste migration. The Site limits are greater than the debris limits, as the Site limits are intended define the area that a contractor may need to conduct a remediation program, as well as gently grade slopes to restore smooth drainage patterns.

Review of the debris extent and chemical data indicate that significant chemical impacts are associated with the debris. Lead analysis outside the debris area, in areas K as well as A through H in particular, demonstrated that the chemical impacts tend to decline rapidly with increasing distance from the debris. Therefore, the analysis that follows in Section 5 considers two subareas of the Site: the area within the debris extents (the interior of the dashed line on Figure 4) and the area outside the debris extents (the area beyond the dashed line on Figure 4).

### 4.6 Grid Area J

Grid Areas J and I were included in the Workplan given the potential for Army-era debris to be present beneath Lendrum Court and Armistead Road. In Area J, although debris was not found in this area, shallow soil samples were collected and analyzed. Area J is adjacent to Highway 101 (see Figure 1). The lead analytical data from Area J indicates the potential for shallow soil impacts from historic use of the highway, specifically, aerial deposited lead ("ADL"). ADL is addressed under different regulatory authority than the Army-era debris fill and the ADL management is subject to agreements between the Presidio Trust and Caltrans for the construction and operation of Doyle Drive. These data and any remedial actions taken will be reported under separate cover to DTSC with copies to the public in conformance with the Trust's current community outreach plan.

## 5 SCREENING RISK EVALUATION

Potential risks to human and ecological receptors from exposure to PCOCs in soil at the site are evaluated in this section. The data collected in the September 2014 investigation are generally consistent with the results presented in the February 2014 Investigation Summary Report (EKI, 2014a); the data from that report have been included in Tables 2, 4, and 5. The evaluation in this section reviews the data from all previous investigations.

### 5.1 Potential Chemicals of Concern

Arsenic and lead were detected at concentrations above residential human health SSLs and background concentrations in soil samples at Lendrum Court and are therefore identified as PCOCs. Benzo(a)pyrene was detected above residential human health SSL but the benzo(a)pyrene potency equivalent concentrations, while above the residential SSL, were below the urban background concentration. Similarly, TCDD TEQ concentrations were above residential SSLs but were within the urban background range. These compounds are evaluated as PCOCs in the screening evaluation below.

The ecological PCOCs in soil for Lendrum Court are barium, copper, lead, and zinc due to detections of each of these chemicals above background concentrations and ecological SSLs in the debris layer.

Dibenz(a,h)anthracene, while not detected above its residential human health SSLs in the September 2014 investigation, was identified as a PCOC in the June 2013 investigation, and is therefore evaluated as a PCOC.

## 5.2 Human Health Screening Risk Evaluation

### 5.2.1 Potential Human Receptors and Exposure Pathways

Lendrum Court is an area of multi-unit residential housing. Areas surrounding the buildings are covered by landscaping, paved streets and parking spaces, grasses, and bare soils. Under current and expected future use, residents could be exposed to PCOCs in unpaved surface soil via incidental ingestion of soil and dermal contact with soil.[6] However, to protect the Presidio's cultural, archaeological, and natural features, Trust lease agreements prohibit ground-disturbance activities by tenants such as gardening, mowing, and landscaping, resulting in less potential exposure to soil by residents than the "reasonable maximum exposure" assumed in developing the Presidio residential SSLs.

Construction and maintenance workers could also be exposed to soil at the site via incidental ingestion of soil and dermal contact with soil. Soil PRGs for a commercial/industrial worker considering these exposure pathways were developed in the Cleanup Level Document (EKI, 2002), as amended. For lead, DTSC recommends U.S. EPA's modified adult lead model be used to evaluate industrial exposures to lead. Using U.S. EPA's model with DTSC-default exposure inputs for an industrial worker, the PRG is 320 mg/kg (DTSC, 2011b).

### 5.2.2 Exposure Point Concentrations

Exposure point concentrations ("EPCs") were estimated to represent human health PCOC concentrations to which human receptors at Lendrum Court could be exposed. EPCs are the lesser of the maximum detected concentration and the 95 percent upper confidence limit of the mean ("95UCL") which is an upper-bound average concentration. 95UCLs were calculated for human health PCOCs in soil for shallow (0 to 2.5 ft bgs) and all depths (0 to 6.5 ft bgs) depth intervals.[7] The 95UCLs for human health PCOCs were calculated using ProUCL Version 5.0.00 software. The ProUCL output is presented in Appendix F. Table 6A presents the calculated 95UCLs and corresponding EPCs as well as a comparison of EPCs to residential SSLs and to industrial worker SSLs for areas inside the debris extents. Table 6B presents the same evaluation for data outside the debris extents. Note

[6] Inhalation of re-suspended particulates in ambient air is not considered to be a significant pathway because inhalation of PCOC-containing soil or dust is estimated to result in less than 3 percent of the potential total exposure to PCOCs when compared to the ingestion and dermal absorption pathways (EKI, 2002).

[7] Current practice generally evaluates human exposure in the upper 0 to 2 ft bgs and 0 to 10 ft bgs depth intervals. To be conservative, samples collected at 2.5 feet bgs were included in the shallow data set for a more robust and conservative evaluation. The "all data" set includes samples down to 6.5 ft bgs which is the deepest sample collected in native soil.

that units are in mg/kg for all compounds except dioxins and furan (shown as equivalents or TCDD TEQ), which are expressed in pg/g.

Data from the previous investigation report (EKI, 2014a) were supplemented by the data collected in September 2014, and the 95UCL calculations were rerun with the combined datasets. Tables 6A and 6B are an update of the similar table presented in the previous investigation report (EKI 2014a); recent data has been added to the dataset.

### 5.2.3 Human Health Risks Inside the Debris Area

Within the Army-era debris extents, the human health PCOCs arsenic, lead, benzo(a)pyrene, benzo(a)pyrene equivalents, dibenz(a,h)anthracene, and dioxins and furans have EPCs exceeding the SSLs, shown in Table 6A and described as follows:

- Arsenic: The EPCs for arsenic are 6.3 mg/kg and 6.0 mg/kg for the shallow and all depth intervals, respectively. Arsenic SSLs are driven by the background concentration, rather than residential or industrial worker SSLs. The shallow EPC value exceeds the background level of 6.2 mg/kg, while the all depth EPC value is less than the background level.
- Lead: The EPCs for lead are 1,023 mg/kg and 856 mg/kg for the shallow and all depth intervals, respectively. These concentrations exceed the residential SSL of 80 mg/kg. The EPCs also exceed the industrial worker SSL of 320 mg/kg.
- Benzo(a)pyrene: The EPC for benzo(a)pyrene for the all depth interval is 0.057 mg/kg, exceeding the residential SSL of 0.046 mg/kg. However, the EPC for the shallow depth interval is 0.046 mg/kg, which is equal to the residential SSL. The EPCs are below the industrial worker SSL of 0.38 mg/kg.
- Benzo(a)pyrene equivalents: The EPCs for benzo(a)pyrene equivalents for the shallow depth interval and the all depth interval are 0.074 mg/kg and 0.221 mg/kg, respectively, exceeding the residential SSL of 0.046 mg/kg. The EPCs are below the industrial worker SSL of 0.38 mg/kg.
- Dibenz(a,h)anthracene: The EPC for dibenz(a,h)anthracene for the all depth interval is 0.063 mg/kg, slightly exceeding the residential SSL of 0.046 mg/kg. However, the EPC for the shallow depth interval is 0.012 mg/kg which is below the residential SSL. The EPCs are below the industrial worker SSL of 0.38 mg/kg.
- Dioxins and Furans: The EPC for TCDD TEQ for the all depth interval is 11 pg/g, exceeding the residential SSL of 3.5 pg/g; however, this value is within the background range (DTSC, 2010) as discussed below.

The EPC for arsenic in the shallow depth interval exceeds the residential SSL. Therefore, arsenic is retained as a COC.

The lead EPCs exceed the residential SSL of 80 mg/kg, which was derived by DTSC using the Leadspread 8 model (DTSC, 2011b). Therefore, lead concentrations in soil at Lendrum Court could pose a risk to residents under the "reasonable maximum exposure" parameters assumed in the Leadspread 8 model.

The lead EPCs also exceed the industrial worker SSL of 320 mg/kg, which was derived using U.S. EPA's adult lead model and is recommended by DTSC to evaluate industrial exposures to lead (DTSC, 2011b). This model assumes a high degree of exposure to soils beneath landscaping and pavement and would apply for subgrade construction work such as utility trenching or repairs. Therefore, lead is retained as a COC.

The EPC for benzo(a)pyrene equivalents in the shallow depth interval exceeds the residential SSL. The EPCs for the full depth range of benzo(a)pyrene, dibenz(a,h)anthracene, and benzo(a)pyrene equivalents also exceed the residential SSL. Although the benzo(a)pyrene or benzo(a)pyrene equivalent concentrations do not exceed the Northern California upper tolerance limit background concentration of 1.5 mg/kg, the higher concentrations detected are in samples from the debris layer. These PAHs are therefore retained as COCs.

Based on the TCDD TEQ, dioxins and furans are slightly greater than the residential SSL. Although the TCDD TEQ equivalent concentrations are within the background range of 7 pg/g to 20 pg/g (DTSC, 2010), the higher concentrations are generally found in samples containing ash. Therefore, dioxins and furans are conservatively retained as COCs.

#### 5.2.4 Human Health Risks Outside the Debris Area

Outside the Army-era debris extents, of the human health PCOCs arsenic, lead, benzo(a)pyrene, benzo(a)pyrene equivalents, and dibenz(a,h)anthracene,[8] only lead has an EPC exceeding the SSLs.

- Lead: The EPCs for lead are 170 and 167 mg/kg for the shallow and all depth intervals, respectively. The EPCs for lead are less than the industrial worker SSL of 320 mg/kg, although they exceed the residential SSL of 80 mg/kg. The majority of the Site outside the debris extents is Historic Forest; because human health risks in these areas are more comparable to recreational land use than residential land use, a recreational human health screening level should be considered for this area.[9]

### 5.3 Ecological Screening Risk Evaluation

Based on the Trust's Cleanup Level Document (EKI, 2002), the Historic Forest northeast of the Lendrum Court residential area is considered a special status ecological area. Much of the area on Figures 4 and 5 outside the estimated extent of debris is Historic Forest. The central portion of Lendrum Court is a landscaped zone, and as a conservative measure, ecological buffer zone screening levels are considered applicable.

[8] Sampling for lead outside the debris extents was a focus of the September 2014 investigation; a sample from trench TPI2-1 was also analyzed for metals and PAHs. Samples from previous investigations collected metals and PAH data from trenches TP211, TP212, and TP213; these trenches are all outside the debris area. As no debris was found, no dioxin or furan analyses were conducted on these samples.

[9] The recreational human health SSL for lead in the Cleanup Level Document is 500 mg/kg. As noted below, the ecological special status SSL for lead is 160 mg/kg; thus the ecological SSL would be more stringent than the recreational SSL in the Historic Forest.

### 5.3.1 Ecological Screening Inside the Debris Area

To evaluate potential impacts within the extent of debris for ecological species, EPCs for soil from ground surface to 3.5 ft bgs were calculated and are shown in Table 6A.[10]

Table 6A presents a comparison of EPCs to buffer zone ecological SSLs. Of the ecological PCOCs, barium, copper, lead, and zinc have EPCs exceeding the buffer zone ecological SSLs, as follows:

- Barium: The EPC for barium is 538 mg/kg, which exceeds the ecological SSL of 500 mg/kg.
- Copper: The EPC for copper is 145 mg/kg, which exceeds the ecological SSL of 120 mg/kg.
- Lead: The EPC for lead is 948 mg/kg, which exceeds the ecological SSL of 300 mg/kg.
- Zinc: The EPC for zinc is 527 mg/kg, which exceeds the ecological SSL of 50 mg/kg and serpentine background level of 160 mg/kg.

This evaluation demonstrates that barium, copper, lead, and zinc could pose a risk to ecological species at Lendrum Court. Therefore, these chemicals are retained as COCs for ecological risk within the debris extents.

### 5.3.2 Ecological Screening Outside the Debris Area

To evaluate potential impacts outside the extent of debris for ecological species, EPCs for soil from ground surface to 3.5 ft bgs were calculated and are shown in Table 6B. Table 6B also presents a comparison of EPCs to special status ecological SSLs, since the historic forest to the northeast of Lendrum Court is considered a special status ecological zone. Only lead has an EPC that slightly exceeds the special status ecological SSLs; the EPC of 167 mg/kg for lead is slightly greater than the special status value of 160 mg/kg. There are no dioxin or furan data outside the debris extents line.

## 5.4 Summary of Human Health and Ecologic Risks

The human health COCs within the debris extents at Lendrum Court are arsenic, lead, benzo(a)pyrene, benzo(a)pyrene equivalents, dibenzo(a,h)anthracene and TCDD TEQ. These COCs are co-located in soil within the debris area. Lead is the primary COC because it was detected above its residential and industrial worker SSLs in the overburden material.

Lead is the primary human health COC outside the debris extents at Lendrum Court. Because there are no data for TCDD TEQ outside the debris area, confirmation sampling as part of remedial design and construction is recommended.

The Trust's measures installed in the Spring of 2014 (Figure 2) limit the potential physical risk of injury to residents and workers from glass shards on the ground surface.

[10] EPA generally recommends evaluating wildlife exposure in the upper 3 feet of soil. To be conservative, samples collected at 3.5 ft bgs were included in the data set for a more robust and conservative evaluation.

The ecological COCs within the debris extents at the Lendrum Court Site are barium, copper, lead, and zinc, assuming ecological buffer zone cleanup levels. These chemicals are co-located in soil at the site. Lead is the only ecological COC outside the debris extents based on special status species cleanup levels.

# 6 COMMUNITY OUTREACH

Lendrum Court is a residential neighborhood. As an element of public outreach, the Trust maintains a website to keep the public informed about Lendrum Court and to post available documents including reports, meeting summaries, and presentations; the website address is http://www.presidio.gov/about/Pages/Lendrum-Court-Remediation.aspx. The site includes electronic copies of project reports and correspondence between the Trust and DTSC. Summaries are posted from several community meetings held by the Trust for tenants and interested community members; these meetings provided remediation project updates and allowed the Trust to hear community concerns.

The Trust held community meetings on 11 December 2013, 29 January 2014, 5 March 2014, and 26 March 2014; DTSC was invited to and attended several of these meetings.

The Trust plans to continue to hold community meetings at major project milestones as well as post electronic copies of reports and correspondence with the regulatory agencies during the development of response actions that meet the goal of protecting human health and the environment.

# 7 CONCLUSIONS AND RECOMMENDATIONS

Summary of Observations

A layer containing debris, referenced herein as the debris layer, exists beneath much of the Lendrum Court area. The layer, where present, is first encountered at depths of approximately 0.5 to 2.5 feet beneath overburden soil in the central part of Lendrum Court and is exposed at the ground surface in the area of the Historic Forest east of Building 1278. The debris thickness varies from approximately 3 inches to 5 feet. The debris layer extends into the forest area north and east of Lendrum Court, and the lateral and vertical extent varies with topography. The debris layer contains glass and ceramic fragments, with some trenches also containing observable ash. The debris layer and ash are associated with the former incinerator located south of Lendrum Court, as shown on a 1921 Presidio map (Figure 1) and recently exposed during the Doyle Drive construction project. The debris layer was spread by grading activities during the construction of the Lendrum Court residential neighborhood. Glass fragments have been observed on the ground surface at locations indicating burrowing activity of gophers, which can bring debris to the surface.

The forested area at the northern and eastern portions of Lendrum Court includes small ravines that appear to have been modified by previous grading activities. Dense vegetation and trees have grown up within and adjacent to the debris area. After clearing vegetation, the approximate extent of debris entering the vegetated area has been delineated. Visible debris and ash is present on the ground surface in some locations, particularly in grid areas E1 and F1.

The temporary measures installed in April and May 2014, including post-and-cable fences and aggregate base walkways, continue to limit the potential for residents to be exposed to COCs in subsurface and surface soils in these areas. The Trust should maintain these measures until implementation of final remedial measures.

Human Health and Ecological Risks

The screening risk evaluation indicates that arsenic and lead are present in soil within the extent of debris at concentrations that pose a potential risk to residential tenants. Lead also poses a potential risk to industrial workers involved in ground-disturbing activities. Therefore, lead and arsenic are retained as site COCs within the debris extents. PAHs and dioxins and furans are also co-located with the lead, and are retained as site COCs. In addition, glass fragments on the ground surface pose a physical hazard to tenants and workers. There is a potential for continued transport of glass debris and COCs from the debris layer to the surface by rodent activity. These potential risks have been mitigated by temporary measures designed to break the human exposure pathway; however, a final remedial action(s) is anticipated to address these human health risks. Lead and dioxins and furans are also retained as site COCs outside the debris extents.

Barium, copper, lead, and zinc pose a potential risk to ecological receptors within the extent of debris, and are retained as COCs based on risk to ecological receptors in a buffer zone cleanup level area. Lead is the only ecological COCs retained outside the area of debris, where more stringent special status cleanup levels are applicable.

Data Gaps Addressed

The June 2013 and September 2014 investigations addressed the goals of (1) evaluating the extent of debris; (2) conducting debris characterization to identify COCs, and (3) collecting data to evaluate potential remedial alternatives, including topographic surveying. The extent of debris has been delineated by potholing and trenching and is shown on Figure 4. Site COCs have been identified. Finally, the site survey, including topography and extent of debris, provides data for the Trust to develop remedial alternatives.

Recommendations

Based on the available site data and the screening risk evaluation, arsenic, lead, benzo(a)pyrene, benzo(a)pyrene equivalents, dibenzo(a,h)anthracene and TCDD TEQ are present in soil within the debris extents at concentrations that may pose a risk to residents

or workers, assuming soil contact. Additionally, barium, copper, lead and zinc are present in soil within the debris extents at concentrations that may pose a risk to ecologic receptors. Lead is also present outside the debris extents that may pose a risk to residents and special status ecological receptors. Additional data on the presence of TCDD TEQ are recommended outside of the debris area.

EKI recommends the Trust evaluate remedial action alternatives and costs to address the residual chemicals in site soil and associated debris. Existing mitigation measures should be maintained until permanent measures are in place.

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**TABLE 1**
**SOIL SAMPLING ANALYTICAL MATRIX TABLE**
Lendrum Court Area
Presidio of San Francisco, California

| Trench or Grid Area Location (a) | Trench or Pothole | Sample Depth (ft bgs) | Stratigraphic Layer (b) | Sample ID | Laboratory Analyses (c) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Title 22 Metals (EPA 6020) | Lead (EPA 6020) | PAHs (EPA 8270C) | Dioxins & Furans (EPA 1613) |
| 301 | Trench | 0.5 | Surface | 1279TP301-S[0.5] | | ● | | |
| 302 | Trench | 0.5 | Surface | 1279TP302-S[0.5] | | ● | | |
| 303 | Trench | 0.5 | Surface | 1279TP303-S[0.5] | | ● | | |
| 304 | Trench | 3.5 | Debris | 1279TP304-D[3.5] | ● | | ● | ● |
| 305 | Trench | 3.5 | Debris | 1279TP305-D[3.5] | ● | | ● | ● |
| A1 | Trench | 0.5 | Surface | 1279TPA1-1[0.5]S | | ● | | |
| | | 2.0 | Debris | 1279TPA1-2[2.0]D | ● | | ● | ● |
| | Pothole | 0.5 | Surface | 1279SBA1-1[0.5]S | | ● | | |
| A2 | Pothole | 0.5 | Surface | 1279SBA2-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBA2-3[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBA2-4[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBA2-5[0.5]S | | ● | | |
| B1 | Pothole | 0.5 | Surface | 1279SBB1-1[0.5]S | | ● | | |
| C1 | Pothole | 0.5 | Surface | 1279SBC1-1[0.5]S | | ● | | |
| D1 | Pothole | 0.5 | Surface | 1279SBD1-1[0.5]S | | ● | | |
| D2 | Pothole | 0.5 | Surface | 1279SBD2-1[0.5]S | | ● | | |
| E1 | Pothole | 0.5 | Surface | 1279SBE1-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBE1-2[0.5]S | | ● | | |
| F0 | Trench | 1.5 | Debris | 1279TPF0-1[1.5]D | ● | | ● | ● |
| F2 | Trench | 0.0 - 1.0 | Debris | 1279TPF2-1[0.0-1.0]D | ● | | ● | ● |
| | | | | 1279TPF2-1[DUP] | ● | | ● | ● |
| G1 | Trench | 0.5 - 1.5 | Debris | 1279TPG1-2[0.5-1.5]D | ● | | ● | ● |
| G2 | Pothole | 0.5 | Surface | 1279SBG2-1[0.5]S | | ● | | |
| H0 | Pothole | 0.5 | Surface | 1279SBH0-2[0.5]S | | ● | | |
| H1 | Pothole | 0.5 | Surface | 1279SBH1-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBH1-2[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBH1-3[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBH1-4[0.5]S | | ● | | |
| H2 | Pothole | 0.5 | Surface | 1279SBH2-1[0.5]S | | ● | | |
| I1 | Trench | 0.5 | Surface | 1279TPI1-1[0.5]S | | ● | | |
| I2 | Trench | 0.5 | Surface | 1279TPI2-1[0.5]S | | ● | | |
| | | 1.5 | Debris | 1279TPI2-1[1.5]D | ● | | ● | |
| | | 0.5 | Surface | 1279TPI2-2[0.5]S | | ● | | |
| J1 | Pothole | 0.5 | Surface | 1279SBJ1-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBJ1-2[0.5]S | | ● | | |
| J2 | Pothole | 0.5 | Surface | 1279SBJ2-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBJ2-2[0.5]S | | ● | | |
| J3 | Pothole | 0.5 | Surface | 1279SBJ3-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBJ3-2[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBJ3-2[DUP] | | ● | | |
| J4 | Pothole | 0.5 | Surface | 1279SBJ4-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBJ4-2[0.5]S | | ● | | |

**TABLE 1**
**SOIL SAMPLING ANALYTICAL MATRIX TABLE**
Lendrum Court Area
Presidio of San Francisco, California

| Trench or Grid Area Location (a) | Trench or Pothole | Sample Depth (ft bgs) | Stratigraphic Layer (b) | Sample ID | Laboratory Analyses (c) | | | |
|---|---|---|---|---|---|---|---|---|
| | | | | | Title 22 Metals (EPA 6020) | Lead (EPA 6020) | PAHs (EPA 8270C) | Dioxins & Furans (EPA 1613) |
| K | Trench | 0.5 | Surface | 1279TPK-1[0.5]S | | ● | | |
| | Pothole | 0.5 | Surface | 1279SBK-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBK-2[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBK-3[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBK-4[0.5]S | | ● | | |
| L | Pothole | 0.5 | Surface | 1279SBL-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBL-2[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBL-3[0.5]S | | ● | | |
| | | | | 1279SBL-3[DUP] | | ● | | |
| M | Pothole | 0.5 | Surface | 1279SBM-1[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBM-2[0.5]S | | ● | | |
| | | 0.5 | Surface | 1279SBM-3[0.5]S | | ● | | |

**Abbreviations:**
DUP – duplicate sample
EPA – United States Environmental Protection Agency
ft bgs – feet below ground surface
PAHs – polycyclic aromatic hydrocarbons
● – Analyzed
D - Sample taken within observed debris
S - Sample taken within surface soil

**Notes:**
(a) See Figure 3 for Trench Locations and Grid Areas.
(b) Samples were collected from the surface or the layer with observed debris.
(c) Soil samples were analyzed for lead or metals and PAHs by Curtis & Tompkins of Berkeley, California. Soil samples were analyzed for dioxins and furans by Vista Analytical Laboratory of El Dorado Hills, California.
(d) All soil samples were analyzed for percent moisture by ASTM D2216.

# TABLE 2
## SUMMARY OF SOIL RESULTS FOR METALS
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results in mg/kg (a)(b) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Copper | Lead | Mercury | Molybdenum | Nickel | Selenium | Silver | Thallium | Vanadium | Zinc |
| **Samples collected from the Debris Layer** | | | | | | | | | | | | | | | | | | | | | |
| 304 | 1279TP304-D[3.5] | 9/22/2014 | 3.5 | DEBRIS | 0.40 | **3.8** | 280 | 0.51 | 0.66 | 110 | 17 | 83 | **490** | 0.27 | 0.66 | 120 | 0.31 | 0.21 | 0.10 | 55 | 470 |
| 305 | 1279TP305-D[3.5] | 9/22/2014 | 3.5 | DEBRIS | 1.8 | **7.2** | 560 | 0.57 | 1.4 | 190 | 25 | 130 | **950** | 0.53 | 1.1 | 320 | 0.26 | 0.67 | 0.16 | 63 | 1,100 |
| A1 | 1279TPA1-2[2.0]D | 9/23/2014 | 2.0 | ASH | 2.7 | **6.6** | 630 | 0.79 | 1.5 | 55 | 10 | 140 | **1,800** | 1.5 | 1.1 | 58 | 0.32 | 0.92 | 0.14 | 71 | 890 |
| F0 | 1279TPF0-1[1.5]D | 9/24/2014 | 1.5 | ASH | 2.2 | **6.4** | 920 | 0.98 | 1.7 | 55 | 11 | 350 | **2,400** | 1.8 | 1.1 | 58 | 0.26 | 1.7 | 0.19 | 79 | 980 |
| F2 | 1279TPF2-1[0.0-1.0]D | 9/24/2014 | 1.0 | ASH | 1.8 | **6.0** | 830 | 1.0 | 1.5 | 100 | 18 | 160 | **1,500** | 2.1 | 1.1 | 130 | 0.28 | 1.5 | 0.18 | 84 | 740 |
| | 1279TPF2-1[DUP] | 9/24/2014 | 1.0 | DUP | 3.8 | **6.5** | 810 | 1.1 | 1.4 | 96 | 14 | 170 | **1,700** | 1.9 | 1.2 | 110 | 0.33 | 1.4 | 0.19 | 86 | 790 |
| G1 | 1279TPG1-2[0.5-1.5]D | 9/24/2014 | 1.5 | ASH | 1.9 | **6.6** | 520 | 0.60 | 0.94 | 260 | 29 | 230 | **1,300** | 0.57 | 0.86 | 450 | <0.25 | 0.83 | 0.13 | 65 | 610 |
| **Sample collected from the Asphalt Debris Layer** | | | | | | | | | | | | | | | | | | | | | |
| I2 | 1279TPI2-1[1.5]D | 9/26/2014 | 1.5 | Asphalt | <0.14 | **3.9** | 120 | 0.24 | <0.16 | 290 | 40 | 30 | **340** | 0.065 | <0.39 | 460 | <0.20 | 0.30 | 0.14 | 47 | 56 |
| | | | | | | | | | | | | | | | | | | | | | |
| **SAMPLES COLLECTED FROM PREVIOUS INVESTIGATIONS** | | | | | | | | | | | | | | | | | | | | | |
| **Samples collected from the Overburden** | | | | | | | | | | | | | | | | | | | | | |
| 201 | 1279TP201-O[0.5] | 6/17/2013 | 0.5 | | 1.5 | 5.7 | 120 | 0.48 | <0.26 | 67 | 13 | 18 | **320** | 0.094 | 0.53 | 50 | <0.22 | <0.13 | 0.25 | 55 | 63 |
| 202 | 1279TP202-O[0.75] | 6/19/2013 | 0.75 | | 0.31 | 4.1 | 130 | 0.43 | <0.27 | 260 | 24 | 36 | **130** | 0.17 | 0.56 | 350 | <0.23 | <0.14 | <0.069 | 56 | 110 |
| 203 | 1279TP203-O[1] | 6/17/2013 | 1 | | 1.6 | 5.3 | 170 | 0.54 | <0.26 | 140 | 19 | 37 | **260** | 0.13 | 0.66 | 180 | 0.42 | 0.13 | 0.17 | 61 | 95 |
| 204 | 1279TP204-O[0.5] | 6/20/2013 | 0.5 | | 0.7 | 5.6 | 260 | 0.44 | 0.38 | 260 | 27 | 88 | **510** | 0.59 | 0.61 | 410 | <0.22 | 0.33 | 0.27 | 58 | 290 |
| 205 | 1279TP205-O[0.5] | 6/17/2013 | 0.5 | | 4.6 | 8 | 130 | 0.44 | <0.25 | 110 | 16 | 26 | **1,000** | 0.11 | 0.54 | 150 | <0.21 | <0.12 | 0.52 | 52 | 75 |
| 206 | 1279TP206-O[0.5] | 6/20/2013 | 0.5 | | 0.68 | 4.3 | 170 | 0.48 | 0.46 | 220 | 23 | 52 | **230** | 0.31 | 0.53 | 330 | <0.21 | 0.22 | 0.11 | 52 | 200 |
| 207 | 1279TP207-O[0.5] | 6/20/2013 | 0.5 | | 1.1 | 6.5 | 290 | 0.41 | 0.63 | 190 | 30 | 89 | **550** | 0.63 | 0.43 | 390 | <0.22 | 0.45 | 0.23 | 44 | 350 |
| 208 | 1279TP208-O[0.5] | 6/19/2013 | 0.5 | | 0.98 | 5.9 | 200 | 0.52 | 0.32 | 200 | 22 | 68 | **250** | 0.5 | 0.62 | 290 | 0.31 | 0.28 | 0.16 | 61 | 190 |
| 209 | 1279TP209-O[0.5] | 6/19/2013 | 0.5 | | 0.31 | 4.5 | 160 | 0.41 | 0.31 | 140 | 23 | 45 | **210** | 0.24 | 0.42 | 280 | <0.22 | 0.18 | <0.067 | 43 | 160 |
| 210 | 1279TP210-O[0.5] | 6/19/2013 | 0.5 | | 0.27 | 5 | 120 | 0.35 | 0.26 | 140 | 19 | 28 | **180** | 0.39 | 0.33 | 230 | 0.28 | <0.13 | <0.065 | 38 | 110 |
| 211 | 1279TP211-O[0.75] | 6/18/2013 | 0.75 | | 0.25 | 2.8 | 89 | 0.3 | <0.25 | 120 | 18 | 15 | 38 | 0.088 | 0.29 | 210 | <0.21 | <0.13 | <0.063 | 35 | 61 |
| 211 | 1279TP211-O[DUP] | 6/18/2013 | 0.75 | DUP | 0.35 | 3.5 | 98 | 0.29 | <0.26 | 120 | 18 | 15 | 32 | 0.071 | 0.3 | 180 | <0.22 | <0.13 | <0.065 | 42 | 51 |
| 212 | 1279TP212-O[0.5] | 6/18/2013 | 0.5 | | <0.23 | 3.3 | 89 | 0.32 | <0.26 | 72 | 13 | 15 | 34 | 0.075 | <0.26 | 88 | <0.22 | <0.13 | <0.065 | 35 | 97 |
| 213 | 1279TP213-O[0.5] | 6/18/2013 | 0.5 | | 0.26 | 3.5 | 96 | 0.38 | <0.26 | 150 | 21 | 20 | 53 | 0.11 | 0.4 | 260 | <0.22 | <0.13 | <0.066 | 41 | 63 |
| 213 | 1279TP213-O[DUP] | 6/18/2013 | 0.5 | DUP | 0.33 | 3.7 | 90 | 0.37 | <0.26 | 170 | 21 | 19 | 60 | 0.12 | 0.44 | 270 | <0.22 | <0.13 | <0.066 | 41 | 81 |
| 214 | 1279TP214-O[0.5] | 6/18/2013 | 0.5 | | 1.5 | 5 | 130 | 0.45 | <0.25 | 86 | 14 | 20 | **160** | 0.09 | 0.42 | 76 | <0.21 | <0.13 | <0.063 | 60 | 54 |
| 215 | 1279TP215-O[0.5] | 6/17/2013 | 0.5 | | 0.6 | 4.9 | 120 | 0.47 | <0.26 | 130 | 19 | 22 | **120** | 0.16 | 0.69 | 170 | <0.22 | <0.13 | <0.066 | 58 | 59 |
| *Residential Soil Screening Level (c)* | | | | | *29* | *0.36* | *5,000* | *140* | *1.7* | *1,200* | *4,000* | *--* | *80* | *20* | *360* | *1,400* | *360* | *360* | *5.7* | *650* | *22,000* |
| *Ecological Buffer Zone Soil Screening Level (c)* | | | | | *5* | *64* | *500* | *10* | *0.23* | *23* | *48* | *120* | *300* | *1.6* | *300* | *71* | *1.1* | *2* | *1* | *5* | *50* |
| *Colma Formation/Serpentinite Presidio Background Metals Concentrations (d)* | | | | | *3/3* | *6.2/5.4* | *180/230* | *0.99/1.1* | *0.8/1.9* | *140/1,700* | *21/170* | *49/85* | *7.5/66* | *0.2/0.2* | *2/2* | *110/4,500* | *0.5/0.5* | *1/1.7* | *1/1* | *90/74* | *79/160* |

**TABLE 2**
**SUMMARY OF SOIL RESULTS FOR METALS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results in mg/kg (a)(b) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Copper | Lead | Mercury | Molybdenum | Nickel | Selenium | Silver | Thallium | Vanadium | Zinc |
| **Samples collected from the Debris Layer** | | | | | | | | | | | | | | | | | | | | | |
| T1 | 1258EX100 | 10/20/2010 | comp(c) | ASH | 2 | 4.7 | 400 | 0.55 | 0.4 | 59 | 12 | 110 | **340** | 0.46 | 1.1 | 93 | 1 | 0.49 | <0.55 | 51 | 200 |
| 202 | 1279TP202-D[5.5] | 6/19/2013 | 5.5 | ASH | 0.85 | 5.9 | 710 | 0.95 | 0.82 | 300 | 35 | 150 | **740** | 0.75 | 1.6 | 530 | 0.43 | 0.66 | 0.42 | 85 | 450 |
| 203 | 1279TP203-D[3.5] | 6/17/2013 | 3.5 | ASH | 0.93 | 4.9 | 480 | 0.87 | **2.7** | 52 | 15 | 150 | **380** | 0.6 | 1.4 | 110 | 0.61 | 0.72 | 0.18 | 67 | 1,000 |
| 204 | 1279TP204-D[2.5] | 6/20/2013 | 2.5 | DEBRIS | 0.74 | 6.1 | 300 | 0.28 | 0.54 | 520 | 50 | 440 | **490** | 0.28 | 0.66 | 960 | <0.22 | 0.56 | 0.27 | 64 | 320 |
| 205 | 1279TP205-D[1] | 6/17/2013 | 1 | DEBRIS | 2.4 | 6 | 210 | 0.57 | 0.31 | 74 | 14 | 120 | **480** | 0.2 | 0.67 | 72 | 0.24 | 0.21 | 0.2 | 58 | 190 |
| 206 | 1279TP206-D[2.5] | 6/20/2013 | 2.5 | ASH | 2.5 | 7.4 | 770 | 0.8 | 1.1 | 97 | 14 | 160 | **1,100** | 0.87 | 0.97 | 120 | 0.35 | 1 | 0.62 | 73 | 700 |
| 207 | 1279TP207-D[1] | 6/20/2013 | 1 | ASH | 3.4 | 8.9 | 580 | 0.6 | 1.4 | 81 | 16 | 190 | **2,100** | 0.88 | 1 | 120 | 0.27 | 1.1 | 1 | 58 | 910 |
| 207 | 1279TP207-D[1]DUP | 6/20/2013 | 1 | ASH/DUP | 3.4 | 10 | 600 | 0.59 | 1.6 | 98 | 22 | 190 | **1,700** | 0.69 | 1.2 | 160 | <0.24 | 1.2 | 0.85 | 63 | 940 |
| 208 | 1279TP208-D[2] | 6/19/2013 | 2 | ASH | 1.3 | 5.7 | 700 | 1.2 | 1.1 | 68 | 13 | 290 | **960** | 1.1 | 1.3 | 64 | 0.57 | 4.1 | 0.61 | 110 | 560 |
| 209 | 1279TP209-D[4] | 6/19/2013 | 4 | DEBRIS | 0.26 | 3.4 | 110 | 0.31 | <0.27 | 180 | 23 | 20 | 59 | 0.19 | 0.29 | 300 | <0.22 | <0.13 | <0.067 | 39 | 90 |
| 210 | 1279TP210-D[1] | 6/19/2013 | 1 | DEBRIS | 0.26 | 3.4 | 140 | 0.3 | <0.26 | 84 | 16 | 23 | **97** | 0.11 | 0.36 | 130 | 0.26 | <0.13 | 0.14 | 40 | 80 |
| 210 | 1279TP210-D[1]DUP | 6/19/2013 | 1 | DUP | <0.24 | 3.4 | 140 | 0.27 | <0.26 | 94 | 17 | 26 | 61 | 0.11 | 0.29 | 140 | 0.22 | <0.13 | <0.066 | 42 | 99 |
| 212 | 1279TP212-D[2] | 6/18/2013 | 2 | | <0.24 | 2.5 | 93 | 0.26 | <0.27 | 59 | 11 | 12 | 24 | 0.074 | 0.56 | 92 | <0.23 | <0.14 | <0.068 | 33 | 51 |
| 214 | 1279TP214-D[2] | 6/18/2013 | 2 | DEBRIS | 2.4 | 6.6 | 390 | 0.52 | 0.31 | 68 | 11 | 61 | **660** | 1.1 | 0.53 | 58 | <0.22 | 0.22 | 0.43 | 58 | 160 |
| 215 | 1279TP215-D[1.25] | 6/17/2013 | 1.25 | DEBRIS | 0.35 | 4.7 | 140 | 0.55 | <0.25 | 82 | 14 | 20 | **120** | 0.094 | 0.44 | 65 | 0.24 | <0.13 | <0.063 | 59 | 59 |
| *Residential Soil Screening Level (c)* | | | | | *29* | *6.2* | *5,000* | *140* | *1.7* | *1,200* | *4,000* | *--* | *80* | *20* | *360* | *1,400* | *360* | *360* | *5.7* | *650* | *22,000* |
| *Ecological Buffer Zone Soil Screening Level (c)* | | | | | *5* | *64* | *500* | *10* | *0.23* | *23* | *48* | *120* | *300* | *1.6* | *300* | *71* | *1.1* | *2* | *1* | *5* | *50* |
| *Colma Formation/Serpentinite Presidio Background Metals Concentrations (d)* | | | | | *3/3* | *6.2/5.4* | *180/230* | *0.99/1.1* | *0.8/1.9* | *140/1700* | *21/170* | *49/85* | *7.5/66* | *0.2/0.2* | *2/2* | *110/4,500* | *0.5/0.5* | *1/1.7* | *1/1* | *90/74* | *79/160* |

**TABLE 2**
**SUMMARY OF SOIL RESULTS FOR METALS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results in mg/kg (a)(b) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Antimony | Arsenic | Barium | Beryllium | Cadmium | Chromium | Cobalt | Copper | Lead | Mercury | Molybdenum | Nickel | Selenium | Silver | Thallium | Vanadium | Zinc |
| **Samples collected from the Base** | | | | | | | | | | | | | | | | | | | | | |
| 201 | 1279TP201-B[2] | 6/17/2013 | 2 | | <0.24 | 4.9 | 120 | 0.52 | <0.27 | 75 | 17 | 19 | 8.4 | 0.042 | 0.55 | 52 | <0.22 | <0.13 | <0.066 | 63 | 42 |
| 202 | 1279TP202-B[6.5] | 6/19/2013 | 6.5 | | <0.25 | 4 | 150 | 0.49 | <0.28 | 890 | 91 | 35 | 50 | 0.08 | 0.66 | 1,800 | <0.23 | <0.14 | <0.069 | 70 | 75 |
| 203 | 1279TP203-B[6] | 6/17/2013 | 6 | | 0.25 | 5.5 | 170 | 0.56 | <0.26 | 130 | 23 | 27 | 23 | 0.063 | 0.77 | 110 | <0.22 | <0.13 | 0.11 | 66 | 65 |
| 206 | 1279TP206-B[3.5] | 6/20/2013 | 3.5 | | 0.25 | 3.6 | 79 | 0.32 | <0.25 | 100 | 14 | 14 | 43 | 0.034 | 0.42 | 83 | <0.21 | <0.13 | <0.063 | 43 | 51 |
| 210 | 1279TP210-B[2.5] | 6/19/2013 | 2.5 | | <0.24 | 4.4 | 97 | 0.45 | <0.26 | 56 | 18 | 13 | 9 | 0.11 | 0.51 | 40 | <0.22 | <0.13 | <0.066 | 53 | 42 |
| 212 | 1279TP212-B[3.5] | 6/18/2013 | 3.5 | | <0.25 | 3.2 | 110 | 0.41 | <0.28 | 58 | 9.3 | 12 | 6.2 | 0.031 | 0.42 | 41 | 0.3 | <0.14 | <0.069 | 50 | 40 |
| *Residential Soil Screening Level (c)* | | | | | *29* | *6.2* | *5,000* | *140* | *1.7* | *1,200* | *4,000* | *--* | *80* | *20* | *360* | *1,400* | *360* | *360* | *5.7* | *650* | *22,000* |
| *Ecological Buffer Zone Soil Screening Level (c)* | | | | | *5* | *64* | *500* | *10* | *0.23* | *23* | *48* | *120* | *300* | *1.6* | *300* | *71* | *1.1* | *2* | *1* | *5* | *50* |
| *Colma Formation/Serpentinite Presidio Background Metals Concentrations (d)* | | | | | *3/3* | *6.2/5.4* | *180/230* | *0.99/1.1* | *0.8/1.9* | *140/1700* | *21/170* | *49/85* | *7.5/66* | *0.2/0.2* | *2/2* | *110/4,500* | *0.5/0.5* | *1/1.7* | *1/1* | *90/74* | *79/160* |

**Abbreviations:**
-- - Not applicable
<0.50 - Compound not detected at or above indicated laboratory reporting limit
ASH - Ash observed in debris layer
Base - Below "Debris layer"
DEBRIS - Army era debris observed in soil
Debris - Debris layer
DUP - duplicate sample
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
Overburden - Overburden layer

**Notes:**
(a) Samples were analyzed by Curtis & Tompkins, Ltd, of Berkeley, California using EPA Method 6020/7471A. Results are reported to two significant figures.
(b) **Bold** value indicates detected concentration exceeds the Residential Soil Screening Level and background metals concentration. Underscored value indicates detected concentration exceeds the Ecological Buffer Zone Screening Level and background metals concentration.
(c) Residential Soil Screening Levels are Residential Human Health Preliminary Remediation Goals ("PRGs") from Table 7-2 of the Cleanup Level Document (EKI, 2002; with updates through 2013).
For lead, the California Human Health Screening Level of 80 mg/kg is applied (DTSC, 2013). Ecological Buffer Zone Soil Screening Levels are PRGs from Table 7-2 of the Cleanup Level Document (EKI, 2002; with updates through 2013).
(d) Site lithology is a mixture of Colma Formation and serpentine. For screening purposes, site concentrations are compared with the higher of the two background values.
(e) This sample is a composite of two discrete samples collected from the ash and debris layer at Trench T1 from depths of 4 and 7 feet below ground surface.

**TABLE 3**
**SUMMARY OF SOIL RESULTS FOR LEAD**
Lendrum Court Area
Presidio of San Francisco, California

| Sample Location (a) | Trench or Pothole | Sample ID | Sample Date | Sample Depth (ft bgs) | Lead (mg/kg) (b) (c) |
|---|---|---|---|---|---|
| 301 | Trench | 1279TP301-S[0.5] | 9/22/2014 | 0.5 | 44 |
| 302 | Trench | 1279TP302-S[0.5] | 9/22/2014 | 0.5 | **110** |
| 303 | Trench | 1279TP303-S[0.5] | 9/22/2014 | 0.5 | 38 |
| A1 | Trench | 1279TPA1-1[0.5]S | 9/23/2014 | 0.5 | 62 |
| | Pothole | 1279SBA1-1[0.5]S | 9/25/2014 | 0.5 | 23 |
| A2 | Pothole | 1279SBA2-1[0.5]S | 9/23/2014 | 0.5 | 43 |
| | | 1279SBA2-3[0.5]S | 9/25/2014 | 0.5 | 16 |
| | | 1279SBA2-4[0.5]S | 9/25/2014 | 0.5 | 28 |
| | | 1279SBA2-5[0.5]S | 9/25/2014 | 0.5 | 26 |
| B1 | Pothole | 1279SBB1-1[0.5]S | 9/23/2014 | 0.5 | **290** |
| C1 | Pothole | 1279SBC1-1[0.5]S | 9/23/2014 | 0.5 | **490** |
| D1 | Pothole | 1279SBD1-1[0.5]S | 9/23/2014 | 0.5 | **270** |
| D2 | Pothole | 1279SBD2-1[0.5]S | 9/24/2014 | 0.5 | 71 |
| E1 | Pothole | 1279SBE1-1[0.5]S | 9/23/2014 | 0.5 | **220** |
| | | 1279SBE1-2[0.5]S | 9/23/2014 | 0.5 | 50 |
| G2 | Pothole | 1279SBG2-1[0.5]S | 9/24/2014 | 0.5 | **110** |
| H0 | Pothole | 1279SBH0-2[0.5]S | 9/24/2014 | 0.5 | **160** |
| H1 | Pothole | 1279SBH1-1[0.5]S | 9/24/2014 | 0.5 | **110** |
| | | 1279SBH1-2[0.5]S | 9/24/2014 | 0.5 | 66 |
| | | 1279SBH1-3[0.5]S | 9/24/2014 | 0.5 | **94** |
| | | 1279SBH1-4[0.5]S | 9/24/2014 | 0.5 | **170** |
| H2 | Pothole | 1279SBH2-1[0.5]S | 9/24/2014 | 0.5 | 7 |
| I1 | Trench | 1279TPI1-1[0.5]S | 9/26/2014 | 0.5 | **150** |
| I2 | Trench | 1279TPI2-1[0.5]S | 9/26/2014 | 0.5 | 54 |
| | | 1279TPI2-2[0.5]S | 9/26/2014 | 0.5 | 54 |
| K | Trench | 1279TPK-1[0.5]S | 9/25/2014 | 0.5 | **230** |
| | Pothole | 1279SBK-1[0.5]S | 9/25/2014 | 0.5 | **81** |
| | | 1279SBK-2[0.5]S | 9/25/2014 | 0.5 | **83** |
| | | 1279SBK-3[0.5]S | 9/25/2014 | 0.5 | **94** |
| | | 1279SBK-4[0.5]S | 9/25/2014 | 0.5 | **340** |

**TABLE 3**
**SUMMARY OF SOIL RESULTS FOR LEAD**
Lendrum Court Area
Presidio of San Francisco, California

| Sample Location (a) | Trench or Pothole | Sample ID | Sample Date | Sample Depth (ft bgs) | Lead (mg/kg) (b) (c) |
|---|---|---|---|---|---|
| L | Pothole | 1279SBL-1[0.5]S | 9/25/2014 | 0.5 | 37 |
| | | 1279SBL-2[0.5]S | 9/25/2014 | 0.5 | 69 |
| | | 1279SBL-3[0.5]S | 9/26/2014 | 0.5 | 54 |
| | | 1279SBL-3[DUP] | 9/26/2014 | 0.5 | 52 |
| M | Pothole | 1279SBM-1[0.5]S | 9/25/2014 | 0.5 | 67 |
| | | 1279SBM-2[0.5]S | 9/25/2014 | 0.5 | 52 |
| | | 1279SBM-3[0.5]S | 9/25/2014 | 0.5 | 67 |
| *Residential Soil Screening Level (d)* | | | | | *80* |
| *Ecological Buffer Zone Soil Screening Level (d)* | | | | | *300* |

**Abbreviations:**
DUP - duplicate sample
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram

**Notes:**
(a) See Figure 3 for Trench Locations and Grid Areas.
(b) Samples were analyzed by Curtis & Tompkins, Ltd, of Berkeley, California using EPA Method 6020. Results are reported to two significant figures.
(c) **Bold** value indicates detected concentration exceeds the Residential Soil Screening Level and background metals concentration. Underscored value indicates detected concentration exceeds the Ecological Buffer Zone Screening Level and background metals concentration.
(d) Residential Soil Screening Level is the California Human Health Screening Level of 80 mg/kg (DTSC, 2013). Ecological Buffer Zone Soil Screening Level is the PRG from Table 7-2 of the Cleanup Level Document (EKI, 2002; with updates through 2013).

**TABLE 4**
**SUMMARY OF SOIL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results (mg/kg) (a)(b) Polycyclic Aromatic Hydrocarbons | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | B(a)P Equivalents (c) |
| **Samples collected from the Debris Layer** | | | | | | | | | | | | | | | | | | | | | |
| 304 | 1279TP304-D[3.5] | 9/22/2014 | 3.5 | DEBRIS | <0.021 | <0.021 | <0.021 | <0.021 | <0.021 | 0.03 | <0.021 | <0.021 | 0.024 | <0.021 | 0.035 | <0.021 | <0.021 | <0.021 | <0.021 | 0.031 | 0.026 |
| 305 | 1279TP305-D[3.5] | 9/22/2014 | 3.5 | DEBRIS | <0.021 | <0.021 | <0.021 | 0.045 | **0.049** | 0.076 | 0.028 | <0.021 | 0.06 | <0.021 | 0.076 | <0.021 | 0.023 | <0.021 | 0.032 | 0.072 | **0.074** |
| A1 | 1279TPA1-2[2.0]D | 9/23/2014 | 2.0 | ASH | <0.021 | <0.021 | <0.021 | 0.066 | **0.068** | 0.10 | 0.036 | 0.030 | 0.085 | <0.021 | 0.15 | <0.021 | 0.031 | <0.021 | 0.11 | 0.13 | **0.099** |
| F0 | 1279TPF0-1[1.5]D | 9/24/2014 | 1.5 | ASH | 0.020 | 0.017 | 0.059 | 0.15 | **0.14** | 0.18 | 0.043 | 0.068 | 0.17 | 0.017 | 0.30 | 0.031 | 0.043 | 0.022 | 0.25 | 0.29 | **0.20** |
| F2 | 1279TPF2-1[0.0-1.0]D | 9/24/2014 | 1.0 | ASH | <0.011 | <0.011 | <0.011 | 0.024 | 0.031 | 0.048 | 0.018 | 0.015 | 0.036 | <0.011 | 0.047 | <0.011 | 0.014 | <0.011 | 0.033 | 0.05 | 0.045 |
| | 1279TPF2-1[DUP] | 9/24/2014 | 1.0 | DUP | <0.010 | 0.013 | <0.010 | 0.076 | **0.071** | 0.12 | 0.025 | 0.040 | 0.099 | <0.010 | 0.11 | <0.010 | 0.023 | 0.011 | 0.075 | 0.12 | **0.098** |
| G1 | 1279TPG1-2[0.5-1.5]D | 9/24/2014 | 1.5 | ASH | <0.010 | <0.010 | <0.010 | 0.015 | 0.016 | 0.027 | <0.010 | <0.010 | 0.020 | <0.010 | 0.023 | <0.010 | <0.010 | <0.010 | 0.013 | 0.024 | 0.026 |
| **Sample collected from the Asphalt Debris Layer** | | | | | | | | | | | | | | | | | | | | | |
| I2 | 1279TPI2-1[1.5]D | 9/26/2014 | 1.5 | Asphalt | <0.10 | <0.10 | <0.10 | <0.10 | **<0.10** | <0.10 | <0.10 | <0.10 | <0.10 | **<0.10** | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | **ND** |
| *Residential Soil Screening Level (d)* | | | | | *2,700* | *--* | *5,900* | *0.46* | *0.046* | *0.46* | *620* | *4.6* | *res a* | *0.046* | *820* | *770* | *0.46* | *910* | *600* | *620* | *0.046* |
| *Ecological Buffer Zone Soil Screening Level (d)* | | | | | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* |
| *Northern California PAH Background (e)* | | | | | *--* | *--* | *--* | *--* | *1.5* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *1.5* |

**TABLE 4**
**SUMMARY OF SOIL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results (mg/kg) (a)(b) Polycyclic Aromatic Hydrocarbons: Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | B(a)P Equivalents (c) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **SAMPLES COLLECTED FROM PREVIOUS INVESTIGATIONS** | | | | | | | | | | | | | | | | | | | | | |
| **Samples collected from the Overburden** | | | | | | | | | | | | | | | | | | | | | |
| 201 | 1279TP201-O[0.5] | 6/17/2013 | 0.5 | | <0.0052 | <0.0052 | <0.0052 | 0.0091 | 0.012 | 0.017 | 0.0099 | <0.0052 | 0.011 | <0.0052 | 0.018 | <0.0052 | 0.01 | <0.0052 | 0.0076 | 0.015 | 0.018 |
| 202 | 1279TP202-O[0.75] | 6/19/2013 | 0.75 | | <0.0055 | <0.0055 | <0.0055 | <0.0055 | 0.0061 | 0.011 | 0.0055 | <0.0055 | 0.0091 | <0.0055 | 0.0094 | <0.0055 | <0.0055 | <0.0055 | 0.006 | 0.0075 | 0.011 |
| 203 | 1279TP203-O[1] | 6/17/2013 | 1 | | <0.0053 | <0.0053 | <0.0053 | 0.02 | 0.023 | 0.037 | 0.013 | 0.0089 | 0.022 | 0.0053 | 0.03 | <0.0053 | 0.014 | <0.0053 | 0.013 | 0.026 | 0.036 |
| 204 | 1279TP204-O[0.5] | 6/20/2013 | 0.5 | | <0.0052 | <0.0052 | <0.0052 | 0.019 | 0.021 | 0.042 | 0.014 | 0.011 | 0.024 | 0.0056 | 0.032 | <0.0052 | 0.016 | 0.0065 | 0.014 | 0.028 | 0.034 |
| 205 | 1279TP205-O[0.5] | 6/17/2013 | 0.5 | | <0.0052 | <0.0052 | 0.011 | 0.059 | **0.064** | 0.095 | 0.037 | 0.023 | 0.062 | 0.018 | 0.1 | <0.0052 | 0.043 | 0.015 | 0.047 | 0.076 | **0.10** |
| 206 | 1279TP206-O[0.5] | 6/20/2013 | 0.5 | | <0.0052 | <0.0052 | <0.0052 | 0.015 | 0.024 | 0.037 | 0.02 | 0.01 | 0.018 | 0.0075 | 0.031 | <0.0052 | 0.021 | <0.0052 | 0.02 | 0.026 | 0.039 |
| 207 | 1279TP207-O[0.5] | 6/20/2013 | 0.5 | | <0.0053 | 0.0082 | <0.0053 | 0.017 | 0.02 | 0.026 | 0.014 | 0.036 | 0.022 | <0.0053 | 0.034 | 0.01 | 0.016 | 0.008 | 0.022 | 0.028 | 0.029 |
| 208 | 1279TP208-O[0.5] | 6/19/2013 | 0.5 | | <0.0052 | <0.0052 | <0.0052 | 0.011 | 0.012 | 0.018 | 0.0085 | <0.0052 | 0.014 | <0.0052 | 0.018 | <0.0052 | 0.0076 | <0.0052 | 0.011 | 0.013 | 0.018 |
| 209 | 1279TP209-O[0.5] | 6/19/2013 | 0.5 | | <0.0054 | <0.0054 | <0.0054 | 0.0073 | 0.0083 | 0.013 | <0.0054 | <0.0054 | 0.0092 | <0.0054 | 0.0095 | <0.0054 | <0.0054 | <0.0054 | 0.006 | 0.013 | 0.013 |
| 210 | 1279TP210-O[0.5] | 6/19/2013 | 0.5 | | <0.0053 | <0.0053 | <0.0053 | 0.0095 | 0.01 | 0.017 | 0.0053 | <0.0053 | 0.011 | <0.0053 | 0.019 | <0.0053 | <0.0053 | <0.0053 | 0.012 | 0.014 | 0.016 |
| 211 | 1279TP211-O[0.75] | 6/18/2013 | 0.75 | | <0.0053 | <0.0053 | <0.0053 | 0.0077 | 0.0097 | 0.021 | <0.0053 | 0.0062 | 0.0095 | <0.0053 | 0.014 | <0.0053 | <0.0053 | <0.0053 | 0.0061 | 0.011 | 0.016 |
| 211 | 1279TP211-O[DUP] | 6/18/2013 | 0.75 | DUP | <0.0053 | <0.0053 | <0.0053 | 0.0054 | 0.0054 | 0.0087 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.0072 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.0065 | 0.01 |
| 212 | 1279TP212-O[0.5] | 6/18/2013 | 0.5 | | <0.0052 | <0.0052 | <0.0052 | 0.0071 | 0.008 | 0.012 | <0.0052 | <0.0052 | 0.0086 | <0.0052 | 0.013 | <0.0052 | <0.0052 | <0.0052 | 0.0062 | 0.012 | 0.013 |
| 213 | 1279TP213-O[0.5] | 6/18/2013 | 0.5 | | <0.0052 | 0.006 | <0.0052 | 0.0057 | 0.006 | 0.025 | <0.0052 | 0.013 | 0.0089 | <0.0052 | 0.0099 | 0.01 | <0.0052 | <0.0052 | <0.0052 | 0.0089 | 0.012 |
| 213 | 1279TP213-O[DUP] | 6/18/2013 | 0.5 | DUP | <0.011 | <0.011 | <0.011 | 0.016 | 0.014 | 0.046 | <0.011 | 0.025 | 0.018 | <0.011 | 0.032 | <0.011 | <0.011 | <0.011 | 0.013 | 0.027 | 0.027 |
| 214 | 1279TP214-O[0.5] | 6/18/2013 | 0.5 | | <0.0053 | <0.0053 | <0.0053 | 0.0065 | 0.0079 | 0.012 | 0.0063 | <0.0053 | 0.0079 | <0.0053 | 0.011 | 0.051 | 0.0062 | <0.0053 | 0.0061 | 0.01 | 0.013 |
| 215 | 1279TP215-O[0.5] | 6/17/2013 | 0.5 | | <0.0051 | <0.0051 | <0.0051 | <0.0051 | <0.0051 | 0.0084 | <0.0051 | <0.0051 | <0.0051 | <0.0051 | 0.0061 | <0.0051 | <0.0051 | <0.0051 | <0.0051 | 0.0056 | 0.006 |
| *Residential Soil Screening Level (d)* | | | | | *2,700* | *--* | *5,900* | *0.46* | *0.046* | *0.46* | *620* | *4.6* | *46.0* | *0.046* | *820* | *770* | *0.46* | *910* | *600* | *620* | *0.046* |
| *Ecological Buffer Zone Soil Screening Level (d)* | | | | | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* |
| *Northern California PAH Background (e)* | | | | | *--* | *--* | *--* | *--* | *1.5* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *1.5* |

**TABLE 4**
**SUMMARY OF SOIL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results (mg/kg) (a)(b) Polycyclic Aromatic Hydrocarbons: Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | B(a)P Equivalents (c) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Samples collected from the Debris Layer** | | | | | | | | | | | | | | | | | | | | | |
| T1 | 1258EX100 | 10/20/2010 | comp (f) | ASH | <0.18 | <0.37 | <0.018 | 0.22 | **0.31** | 0.29 | 0.67 | 0.15 | 0.25 | **0.69** | 0.38 | <0.037 | **0.59** | <0.18 | 0.18 | 0.34 | **1.1** |
| 202 | 1279TP202-D[5.5] | 6/19/2013 | 5.5 | ASH | <0.0054 | <0.0054 | <0.0054 | 0.023 | 0.026 | 0.049 | 0.0075 | 0.012 | 0.027 | <0.0054 | 0.035 | <0.0054 | 0.0086 | 0.0095 | 0.02 | 0.039 | 0.037 |
| 203 | 1279TP203-D[3.5] | 6/17/2013 | 3.5 | ASH | <0.0056 | 0.0079 | 0.014 | 0.086 | **0.12** | 0.23 | 0.098 | 0.046 | 0.079 | 0.036 | 0.09 | <0.0056 | 0.16 | <0.0056 | 0.037 | 0.077 | **0.20** |
| 204 | 1279TP204-D[2.5] | 6/20/2013 | 2.5 | | <0.0053 | <0.0053 | <0.0053 | 0.011 | 0.01 | 0.021 | 0.0092 | 0.0058 | 0.014 | <0.0053 | 0.021 | <0.0053 | 0.0095 | <0.0053 | 0.0093 | 0.017 | 0.017 |
| 205 | 1279TP205-D[1] | 6/17/2013 | 1 | | <0.0051 | <0.0051 | <0.0051 | 0.016 | 0.017 | 0.033 | 0.012 | 0.0079 | 0.023 | 0.0052 | 0.029 | <0.0051 | 0.014 | 0.0085 | 0.013 | 0.024 | 0.029 |
| 206 | 1279TP206-D[2.5] | 6/20/2013 | 2.5 | ASH | <0.0051 | 0.0068 | 0.0068 | 0.035 | **0.049** | 0.069 | 0.026 | 0.019 | 0.039 | 0.011 | 0.069 | <0.0051 | 0.03 | 0.016 | 0.044 | 0.055 | **0.074** |
| 207 | 1279TP207-D[1] | 6/20/2013 | 1 | ASH | <0.0052 | <0.0052 | 0.0057 | 0.045 | **0.057** | 0.094 | 0.032 | 0.024 | 0.047 | 0.013 | 0.049 | <0.0052 | 0.038 | 0.011 | 0.022 | 0.047 | **0.088** |
| 207 | 1279TP207-D[1]DUP | 6/20/2013 | 1 | ASH/DUP | <0.0057 | <0.0057 | 0.0058 | 0.063 | **0.097** | 0.092 | 0.067 | 0.017 | 0.064 | **0.056** | 0.041 | <0.0057 | 0.05 | 0.018 | 0.025 | 0.039 | **0.17** |
| 208 | 1279TP208-D[2] | 6/19/2013 | 2 | ASH | <0.0053 | 0.0059 | 0.0065 | 0.035 | 0.038 | 0.057 | 0.008 | 0.014 | 0.04 | <0.0053 | 0.065 | <0.0053 | 0.0099 | 0.0071 | 0.031 | 0.065 | **0.051** |
| 209 | 1279TP209-D[4] | 6/19/2013 | 4 | | <0.0054 | 0.0085 | <0.0054 | 0.012 | 0.012 | 0.063 | <0.0054 | 0.02 | 0.013 | <0.0054 | 0.023 | 0.015 | 0.0083 | <0.0054 | 0.012 | 0.016 | 0.023 |
| 210 | 1279TP210-D[1] | 6/19/2013 | 1 | | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.0088 | <0.0053 | <0.0053 | 0.0058 | <0.0053 | 0.0067 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.007 |
| 210 | 1279TP210-D[1]DUP | 6/19/2013 | 1 | DUP | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.0075 | 0.0055 | <0.0053 | 0.0055 | <0.0053 | 0.0071 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.0056 | 0.007 |
| 212 | 1279TP212-D[2] | 6/18/2013 | 2 | | <0.011 | <0.011 | <0.011 | <0.011 | <0.011 | 0.015 | <0.011 | <0.011 | <0.011 | <0.011 | 0.012 | <0.011 | <0.011 | <0.011 | <0.011 | <0.011 | 0.014 |
| 214 | 1279TP214-D[2] | 6/18/2013 | 2 | | <0.0053 | 0.012 | 0.01 | 0.064 | **0.079** | 0.15 | 0.066 | 0.034 | 0.074 | 0.025 | 0.1 | <0.0053 | 0.091 | 0.0096 | 0.045 | 0.09 | **0.13** |
| 215 | 1279TP215-D[1.25] | 6/17/2013 | 1.25 | | <0.01 | <0.01 | <0.01 | <0.01 | 0.014 | 0.018 | 0.011 | <0.01 | <0.01 | <0.01 | 0.011 | <0.01 | <0.01 | <0.01 | <0.01 | 0.012 | 0.022 |
| *Residential Soil Screening Level (d)* | | | | | *2,700* | *--* | *5,900* | *0.46* | *0.046* | *0.46* | *620* | *4.6* | *46.0* | *0.046* | *820* | *770* | *0.46* | *910* | *600* | *620* | *0.046* |
| *Ecological Buffer Zone Soil Screening Level (d)* | | | | | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* |
| *Northern California PAH Background (e)* | | | | | *--* | *--* | *--* | *--* | *1.5* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *1.5* |

**TABLE 4**
**SUMMARY OF SOIL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results (mg/kg) (a)(b) Polycyclic Aromatic Hydrocarbons: Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene | B(a)P Equivalents (c) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Samples collected from the Base** | | | | | | | | | | | | | | | | | | | | | |
| 201 | 1279TP201-B[2] | 6/17/2013 | 2 | | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | ND |
| 202 | 1279TP202-B[6.5] | 6/19/2013 | 6.5 | | <0.0055 | <0.0055 | <0.0055 | 0.012 | 0.017 | 0.019 | 0.0072 | <0.0055 | 0.014 | <0.0055 | 0.017 | <0.0055 | 0.007 | <0.0055 | 0.013 | 0.023 | 0.024 |
| 203 | 1279TP203-B[6] | 6/17/2013 | 6 | | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.0054 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | <0.0053 | 0.006 |
| 206 | 1279TP206-B[3.5] | 6/20/2013 | 3.5 | | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | <0.0052 | ND |
| 210 | 1279TP210-B[2.5] | 6/19/2013 | 2.5 | | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | <0.0054 | ND |
| 212 | 1279TP212-B[3.5] | 6/18/2013 | 3.5 | | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | <0.0055 | ND |
| *Residential Soil Screening Level (d)* | | | | | *2,700* | *--* | *5,900* | *0.46* | *0.046* | *0.46* | *620* | *4.6* | *46.0* | *0.046* | *820* | *770* | *0.46* | *910* | *600* | *620* | *0.046* |
| *Ecological Buffer Zone Soil Screening Level (d)* | | | | | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* | *40* |
| *Northern California PAH Background (e)* | | | | | *--* | *--* | *--* | *--* | *1.5* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *--* | *1.5* |

Abbreviations:

-- - Not applicable
<0.50 or ND - Compound not detected at or above indicated laboratory reporting limit
ASH - Ash observed in debris layer
B(a)P - Benzo(a)pyrene
Base - Below "Debris layer"
Debris - Debris layer
DUP - duplicate sample
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
Overburden - Overburden layer

Notes:

(a) Samples were analyzed by Curtis & Tompkins, Ltd, of Berkeley, California using EPA Method 8270C-SIM for PAHs. Results are reported to two significant figures.
(b) **Bold** value indicates detected concentration exceeds its respective Residential Soil Screening Level.
(c) Benzo(a)pyrene equivalents calculated with Toxicity Equivalency Factors for Carcinogenic Polycyclic Aromatic Hydrocarbons from EPA Region 9 Regional Screening Levels User's Guide, November 2013. For PAHs not included in the November 2013 User's Guide, values from the June 2011 HHRA Note Number 4 were used, as requested by DTSC. Values of one half the detection limit are used for results below the detection limit.
(d) Residential Soil Screening Levels are Residential Human Health Preliminary Remediation Goals ("PRGs") from Table 7-2 of the Cleanup Level Document (EKI, 2002; with updates through 2013).
Ecological Buffer Zone Soil Screening Levels are PRGs from Tables 7-2 and 7-5 of the Cleanup Level Document (EKI, 2002; with updates through 2013).
(e) Northern California upper tolerance limit background concentration for benzo(a)pyrene potency equivalent is from ENVIRON, et al., 2002. The background concentrations in this study ranged from 0.0027 mg/kg to 2.8 mg/kg.
(f) This sample is a composite of two discrete samples collected from the ash and debris layer at Trench T1 from depths of 4 and 7 feet below ground surface.

**TABLE 5**
**SUMMARY OF SOIL RESULTS FOR DIOXINS AND FURANS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Note | Analytical Results (pg/g) (a) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 2,3,7,8-Tetrachlorodibenzo-p-dioxin | 1,2,3,4,7,8,9-Heptachlorodibenzofuran | 1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin | 1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin | 1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin | 1,2,3,7,8,9-Hexachlorodibenzofuran | 1,2,3,7,8-Pentachlorodibenzo-p-dioxin | 1,2,3,7,8-Pentachlorodibenzofuran | 1,2,3,6,7,8-Hexachlorodibenzofuran | 1,2,3,4,7,8-Hexachlorodibenzofuran | 2,3,7,8-Tetrachlorodibenzofuran | 2,3,4,6,7,8-Hexachlorodibenzofuran | 2,3,4,7,8-Pentachlorodibenzofuran | Octachlorodibenzofuran | 1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin | Octachlorodibenzo-p-dioxin | 1,2,3,4,6,7,8-Heptachlorodibenzofuran | TCDD TEQ (b) |
| **Samples collected from the Debris Layer** | | | | | | | | | | | | | | | | | | | | | | |
| 304 | 1279TP304-D[3.5] | 9/22/2014 | 3.5 | DEBRIS | <1.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | 1.63 | <5.00 | <5.00 | <10.0 | <5.00 | 23.2 | <5.00 | 1.26 |
| 305 | 1279TP305-D[3.5] | 9/22/2014 | 3.5 | DEBRIS | <1.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | 4.97 | 6.01 | 5.49 | <10.0 | <5.00 | 29.2 | 16.2 | 4.90 |
| A1 | 1279TPA1-2[2.0]D | 9/23/2014 | 2.0 | ASH | <1.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | 7.91 | 6.66 | 6.71 | 12.5 | 7.99 | 11.9 | 14.5 | 9.39 | 32.4 | 29.8 | 9.53 |
| F0 | 1279TPF0-1[1.5]D | 9/24/2014 | 1.5 | ASH | 1.05 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | 9.50 | 9.54 | 10.2 | 15.5 | 12.3 | 17.8 | 17.3 | 14.2 | 34.8 | 50.1 | 15.7 |
| F2 | 1279TPF2-1[0.0-1.0]D | 9/24/2014 | 1.0 | ASH | <1.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | 7.55 | 7.07 | 7.12 | 12.3 | 9.17 | 13.5 | 24.6 | 18.0 | 99.9 | 34.1 | 12.0 |
| | 1279TPF2-1[DUP] | 9/24/2014 | 1.0 | DUP | 1.14 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | 8.12 | 7.61 | 7.58 | 14.6 | 9.53 | 14.0 | 15.0 | 19.6 | 85.8 | 32.4 | 13.2 |
| G1 | 1279TPG1-2[0.5-1.5]D | 9/24/2014 | 1.5 | ASH | <1.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | <5.00 | 6.73 | 7.28 | 6.18 | 8.95 | 8.38 | 20.6 | 22.7 | 95.1 | 37.8 | 8.04 |
| | | | | | | | | | | | | | | | | | | | | | | |
| **SAMPLES COLLECTED FROM PREVIOUS INVESTIGATIONS** | | | | | | | | | | | | | | | | | | | | | | |
| **Sample collected from the Overburden** | | | | | | | | | | | | | | | | | | | | | | |
| 203 | 1279TP203-O[1] | 6/17/2013 | 1 | Overburden | 1.79 | <5 | <5 | <5 | <5 | <5 | <5 | 6.12 | 7.58 | 7.72 | 9.24 | 9.39 | 10.5 | 11 | 12.8 | 28.4 | 37.9 | 14 |
| **Samples collected from the Debris Layer** | | | | | | | | | | | | | | | | | | | | | | |
| T1 | 1258EX100 | 10/20/2010 | comp (c) | | 4.26 J | 3.42 J | 4.94 J | 7.90 J | 7.16 J | 0.66 J | 4.40 J | 6.29 J | 7.78 J | 11.8 J | 21.7 | 6.15 J | 9.09 J | 22.9 J | 36 | 39 | 42 | 17.8 |
| 202 | 1279TP202-D[5.5] | 6/19/2013 | 5.5 | Debris | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 1.26 | <5 | <5 | <10 | <5 | 20.9 | <5 | 0.738 |
| 203 | 1279TP203-D[3.5] | 6/17/2013 | 3.5 | Debris | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 2.14 | <5 | <5 | <10 | <5 | <10 | <5 | 1.11 |
| 204 | 1279TP204-D[2.5] | 6/20/2013 | 2.5 | Debris | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <1 | <5 | <5 | <10 | <5 | <10 | <5 | 0.0033 |
| **Sample collected from the Base** | | | | | | | | | | | | | | | | | | | | | | |
| 203 | 1279TP203-B[6] | 6/17/2013 | 6 | Base | <1 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | <5 | 3.13 | <5 | <5 | 50.5 | 44.8 | 331 | 22.3 | 4.04 |
| *Residential Soil Screening Level (d)* | | | | | | | | | | | | | | | | | | | | | | *3.5* |
| *TCDD TEQ Background Range (DTSC, 2010)* | | | | | | | | | | | | | | | | | | | | | | *7 to 20* |

# TABLE 5
## SUMMARY OF SOIL RESULTS FOR DIOXINS AND FURANS
Lendrum Court Area
Presidio of San Francisco, California

**Abbreviations:**
<0.50 - Compound not detected at or above indicated laboratory reporting limit
ASH - Ash observed in debris layer
DUP - duplicate sample
ft bgs - feet below ground surface
J - Estimated concentration
pg/g - picograms per gram
TCDD - 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ - toxic equivalent quotient

**Notes:**
(a) Samples collected in 2013 and 2014 were analyzed by Vista Analytical Laboratory of El Dorado Hills, California using EPA Method 1613B for dioxins and furans.
(b) TCDD TEQ value calculated by the analytical laboratory using 2005 World Health Organization Toxicity Equivalent Factors. See laboratory sheets for details.
(c) This sample is a composite of two discrete samples collected from the ash and debris layer at Trench T1 from depths of 4 and 7 feet below ground surface. Composite sample was analyzed by Maxxam Analytics of Ontario, Canada using EPA Method 8290.
(d) Residential Preliminary Remediation Goal from Technical Memorandum, Human Health Soil Preliminary Goals and Toxic Equivalency Values for Dioxins and Furans, Presidio of San Francisco, California (MACTEC, 2007) [update to the Presidio Cleanup Level Document (EKI, 2002)].

**Reference:**
DTSC, 2010. Memorandum from Kimiko Klein to Virginia Lasky regarding *Screening Risk Evaluation, Merchant Road Land Fill, The Presidio, San Francisco* , dated 25 August 2010.

**TABLE 6A**
**SCREENING RISK EVALUATION FOR CHEMICALS INSIDE THE DEBRIS FILL EXTENTS**
Lendrum Court Area
Presidio of San Francisco, California

| Potential Chemicals of Concern | Sample Depth Range | Summary of Soil Analytical Data | | | 95% Upper Confidence Limit / Exposure Point Concentration (UCL) (b) | | EPA EPC in Soil | Applicable Presidio-Wide Soil Screening Levels (d) | | | | | Does EPC Exceed Residential Screening Level and Background Level? | Does EPC Exceed Industrial Worker Screening Level and Background Level? | Does EPC Exceed Ecological Screening Level and Background Level? | Does PAH EPC Exceed Northern California Background Level? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of Samples Detected / Number of Samples Analyzed | Minimum Detected Concentration | Maximum Detected Concentration | | | | Colma Background Levels (e) | Serpentinite Background Levels (e) | Residential Screening Level | Industrial Worker Screening Level | Ecological Screening Level | | | | |
| | (ft bgs) | | mg/kg (a) | mg/kg (a) | mg/kg (a) | Statistic (c) | mg/kg (a) | mg/kg (a) | mg/kg (a) | mg/kg (a) | mg/kg (a) | mg/kg (a) | | | | |
| **Human Health PCOCs** | | | | | | | | | | | | | | | | |
| Arsenic | 0 to 2.5 | 29 / 29 | 3.4 | 10 | 6.3 | 1 | 6.3 | 6.2 | 5.4 | 0.36 | 3.3 | -- | **Yes** | **Yes** | -- | -- |
| | 0 to 6.5 | 38 / 38 | 3.4 | 10 | 6.0 | 1 | 6.0 | 6.2 | 5.4 | 0.36 | 3.3 | -- | No | No | -- | -- |
| Lead | 0 to 2.5 | 30 / 30 | 8.4 | 2,400 | 1,023 | 2 | 1,023 | 7.5 | 66 | 80 | 320 | -- | **Yes** | **Yes** | -- | -- |
| | 0 to 6.5 | 39 / 39 | 8.4 | 2,400 | 856 | 2 | 856 | 7.5 | 66 | 80 | 320 | -- | **Yes** | **Yes** | -- | -- |
| Benzo(a)pyrene | 0 to 2.5 | 24 / 29 | 0.0061 | 0.14 | 0.046 | 4 | 0.046 | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| | 0 to 6.5 | 30 / 38 | 0.0061 | 0.31 | 0.057 | 3 | 0.057 | -- | -- | 0.046 | 0.38 | -- | **Yes** | No | -- | No |
| B(a)P Equivalents | 0 to 2.5 | 27 / 29 | 0.0065 | 0.20 | 0.074 | 2 | 0.074 | -- | -- | 0.046 | 0.38 | -- | **Yes** | No | -- | No |
| | 0 to 6.5 | 35 / 38 | 0.0064 | 1.1 | 0.221 | 5 (g) | 0.221 | -- | -- | 0.046 | 0.38 | -- | **Yes** | No | -- | No |
| Dibenz(a,h)anthracene | 0 to 2.5 | 10 / 29 | 0.0052 | 0.056 | 0.012 | 6 | 0.012 | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| | 0 to 6.5 | 12 / 38 | 0.0052 | 0.69 | 0.063 | 3 | 0.063 | -- | -- | 0.046 | 0.38 | -- | **Yes** | No | -- | No |
| TCDD TEQ (a) | 0 to 6.5 | 13 / 13 | 0.00332 (pg/g) | 17.8 (pg/g) | 11 (pg/g) | 1 | 11 (pg/g) | 3.5 (f) 7 to 20 (pg/g) | 3.5 (f) 7 to 20 (pg/g) | 3.5 (f) 7 to 20 (pg/g) | -- | -- | No | -- | -- | -- |
| **Ecological PCOCs (Assuming Buffer Zone Cleanup Levels)** | | | | | | | | | | | | | | | | |
| Barium | 0 to 3.5 | 33 / 33 | 79 | 920 | 538 | 5 | 538 | 180 | 230 | -- | -- | 500 | -- | -- | **Yes** | -- |
| Copper | 0 to 3.5 | 33 / 33 | 13 | 440 | 145 | 2 | 145 | 49 | 85 | -- | -- | 120 | -- | -- | **Yes** | -- |
| Lead | 0 to 3.5 | 34 / 34 | 8.4 | 2,400 | 948 | 2 | 948 | 7.5 | 66 | -- | -- | 300 | -- | -- | **Yes** | -- |
| Zinc | 0 to 3.5 | 33 / 33 | 42 | 1,100 | 527 | 2 | 527 | 79 | 160 | -- | -- | 50 | -- | -- | **Yes** | -- |

**TABLE 6B**
**SCREENING RISK EVALUATION FOR CHEMICALS OUTSIDE THE DEBRIS FILL EXTENTS**
Lendrum Court Area
Presidio of San Francisco, California

| Potential Chemicals of Concern | Sample Depth Range | Summary of Soil Analytical Data | | | 95% Upper Confidence Limit / Exposure Point Concentration (UCL) (b) | | EPA EPC in Soil | Applicable Presidio-Wide Soil Screening Levels (d) | | | | | Does EPC Exceed Residential Screening Level and Background Level? | Does EPC Exceed Industrial Worker Screening Level and Background Level? | Does EPC Exceed Ecological Screening Level and Background Level? | Does PAH EPC Exceed Northern California Background Level? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Number of Samples Detected / Number of Samples Analyzed | Minimum Detected Concentration | Maximum Detected Concentration | | | | Colma Background Levels (e) | Serpentinite Background Levels (e) | Residential Screening Level | Industrial Worker Screening Level | Ecological Screening Level | | | | |
| | (ft bgs) | | mg/kg (a) | mg/kg (a) | mg/kg (a) | Statistic (c) | mg/kg (a) | mg/kg (a) | mg/kg (a) | mg/kg (a) | mg/kg (a) | mg/kg (a) | | | | |
| **Human Health PCOCs** | | | | | | | | | | | | | | | | |
| Arsenic | 0 to 2.5 | 7 / 7 | 2.5 | 3.9 | 3.7 | 1 | 3.7 | 6.2 | 5.4 | 0.36 | 3.3 | -- | No | No | -- | -- |
| | 0 to 6.5 | 8 / 8 | 2.5 | 3.9 | 3.6 | 1 | 3.6 | 6.2 | 5.4 | 0.36 | 3.3 | -- | No | No | -- | -- |
| Lead | 0 to 2.5 | 43 / 43 | 7 | 490 | 170 | 5 (g) | 170 | 7.5 | 66 | 80 | 320 | -- | **Yes** | No | -- | -- |
| | 0 to 6.5 | 44 / 44 | 6.2 | 490 | 167 | 5 (g) | 167 | 7.5 | 66 | 80 | 320 | -- | **Yes** | No | -- | -- |
| Benzo(a)pyrene | 0 to 2.5 | 5 / 7 | 0.0054 | 0.014 | 0.011 | 6 | 0.011 | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| | 0 to 6.5 | 5 / 8 | 0.0054 | 0.014 | 0.01 | 6 | 0.01 | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| B(a)P Equivalents | 0 to 2.5 | 6 / 7 | 0.0098 | 0.027 | 0.020 | 1 | 0.020 | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| | 0 to 6.5 | 6 / 8 | 0.0098 | 0.027 | 0.020 | 1 | 0.020 | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| Dibenz(a,h)anthracene | 0 to 2.5 | 0 / 7 | -- | -- | -- | -- | -- | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| | 0 to 6.5 | 0 / 8 | -- | -- | -- | -- | -- | -- | -- | 0.046 | 0.38 | -- | No | No | -- | No |
| TCDD TEQ (a) | 0 to 6.5 | 0 / 0 | -- | -- | -- | -- | -- | 3.5 (f) 7 to 20 (pg/g) | 3.5 (f) 7 to 20 (pg/g) | 3.5 (f) 7 to 20 (pg/g) | -- | -- | No Data | -- | -- | -- |
| **Ecological PCOCs (Assuming Special Status Cleanup Levels)** | | | | | | | | | | | | | | | | |
| Barium | 0 to 3.5 | 8 / 8 | 89 | 120 | 106 | 1 | 106 | 180 | 230 | -- | -- | 320 | -- | -- | No | -- |
| Copper | 0 to 3.5 | 8 / 8 | 12 | 30 | 21 | 1 | 21 | 49 | 85 | -- | -- | 30 | -- | -- | No | -- |
| Lead | 0 to 3.5 | 44 / 44 | 6.2 | 490 | 167 | 5 (g) | 167 | 7.5 | 66 | -- | -- | 160 | -- | -- | **Yes** | -- |
| Zinc | 0 to 3.5 | 8 / 8 | 40 | 97 | 75 | 1 | 75 | 79 | 160 | -- | -- | 4 | -- | -- | No | -- |

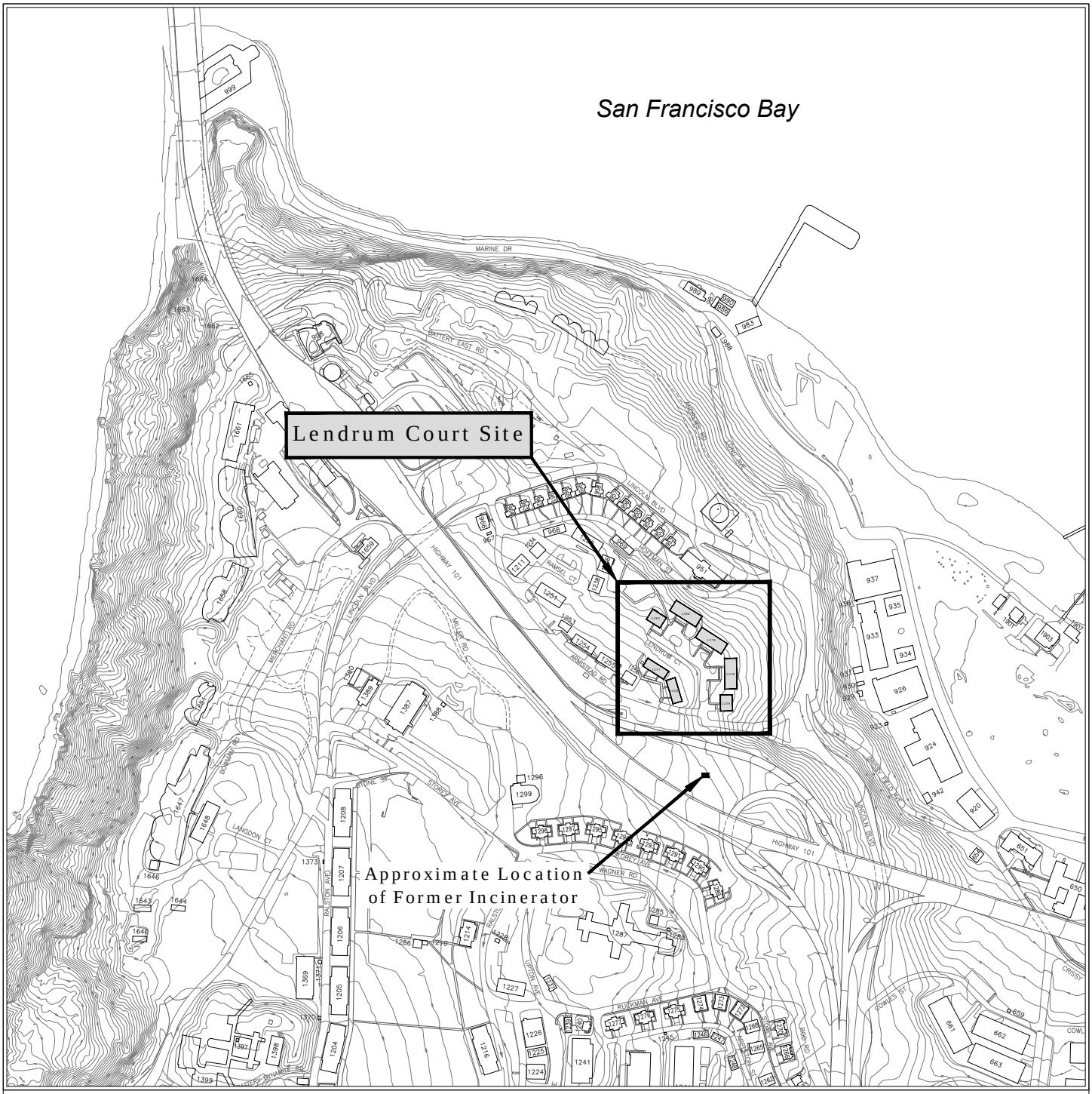
**TABLE 6A AND 6B NOTES**
**SCREENING RISK EVALUATION FOR CHEMICALS INSIDE AND OUTSIDE THE DEBRIS FILL EXTENTS**
Lendrum Court Area
Presidio of San Francisco, California

**Abbreviations:**
-- - Not applicable
B(a)P - Benzo(a)pyrene
EPA - United States Environmental Protection Agency
EPC - exposure point concentration
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram
PCOC - Potential Chemicals of Concern
pg/g - picograms per gram
TCDD - 2,3,7,8-tetrachlorodibenzo-p-dioxin
TEQ - toxic equivalent quotient
UCL - upper confidence limit

**Notes:**
(a) Units are in mg/kg, with the exception of TCDD TEQ. For TCDD TEQ, units are in pg/g.
(b) The 95% UCL was calculated using EPA's ProUCL software, version 5.0.00 (EPA, 2013b). EPCs are the lesser of the maximum detected concentration and the 95% UCL.
(c) UCLs and EPCs are based on the following statistics:

| | |
|---|---|
| 1 - Student's-t UCL | 4 - 95% Adjusted Gamma KM - UCL |
| 2 - 95% Adjusted Gamma UCL | 5 - 95% Chebyshev (Mean, Sd) UCL |
| 3 - 95% KM (BCA) UCL | 6 - 95% KM(t) UCL |

(d) Residential Soil Screening Levels are Residential Human Health Preliminary Remediation Goals ("PRGs") from Table 7-2 of the Cleanup Level Document (EKI, 2002; with updates through 2013). For lead, the DTSC's residential and industrial risk screening levels of 80 and 320 mg/kg, respectively, are applied (DTSC, 2011). Residential PRGs for dioxin TCDD TEQ are from Technical Memorandum, Human Health Soil Preliminary Goals and Toxic Equivalency Values for Dioxins and Furans, Presidio of San Francisco, California (MACTEC, 2007) (see Table 5). Ecological Buffer Zone Soil Screening Levels are PRGs from Table 7-2 of the Cleanup Level Document (EKI, 2002; with updates through 2013).
(e) Site lithology is a mixture of Colma Formation and serpentine. Chemical concentrations are compared to the higher of the two background values.
(f) Residential screening level of 3.5 pg/g from Technical Memorandum, Human Health Soil Preliminary Goals and Toxic Equivalency Values for Dioxins and Furans, Presidio of San Francisco, California (MACTEC, 2007). The TCDD TEQ Background Range of 7 to 20 pg/g from DTSC 2010 is discussed in the report text.
(g) ProUCL suggested use of a 95% H-UCL; however, the text immediately below the suggested value states in bold that "It is … recommended to avoid the use of the H-statistic based on 95% UCLs." Therefore, for these cases the 95% Chebyshev (Mean, Sd) UCL was used. The UCLs used are highlighted in the output files provided in Appendix F.




Reference: Basemap source: Presidio Trust, 2006.

Note:

1. All locations are approximate.

N

0 500 1000

(Approximate Scale in Feet)

**Erler & Kalinowski, Inc.**

Site Location Map

Lendrum Court Area
The Presidio Trust
San Francisco, CA
May 2015
EKI B00025.07

Figure 1

20150515.13292407 G:\B00025.07\2015-05\Figure 1.dwg Figure 1


N

0 40 80

(Approximate Scale in Feet)

## Legend:

- Building
- Paved Areas

**Landscape Areas**

- Fencing

**Informal Gathering Areas**

- Sod

**High-Traffic Areas**

- Sand-Set Pavers
- Aggregate Base
- Wood Chips on Erosion Control Fabric

## Notes:

1. All locations are approximate.
2. Survey source: PLS Surveys, Inc., dated 9 July 2013. California State Plane Coordinates NAD1927.

**Erler & Kalinowski, Inc.**

Temporary Measures Installed at Lendrum Court in Spring 2014

Lendrum Court Area

The Presidio Trust
San Francisco, CA

May 2015
EKI B00025.07

Figure 2

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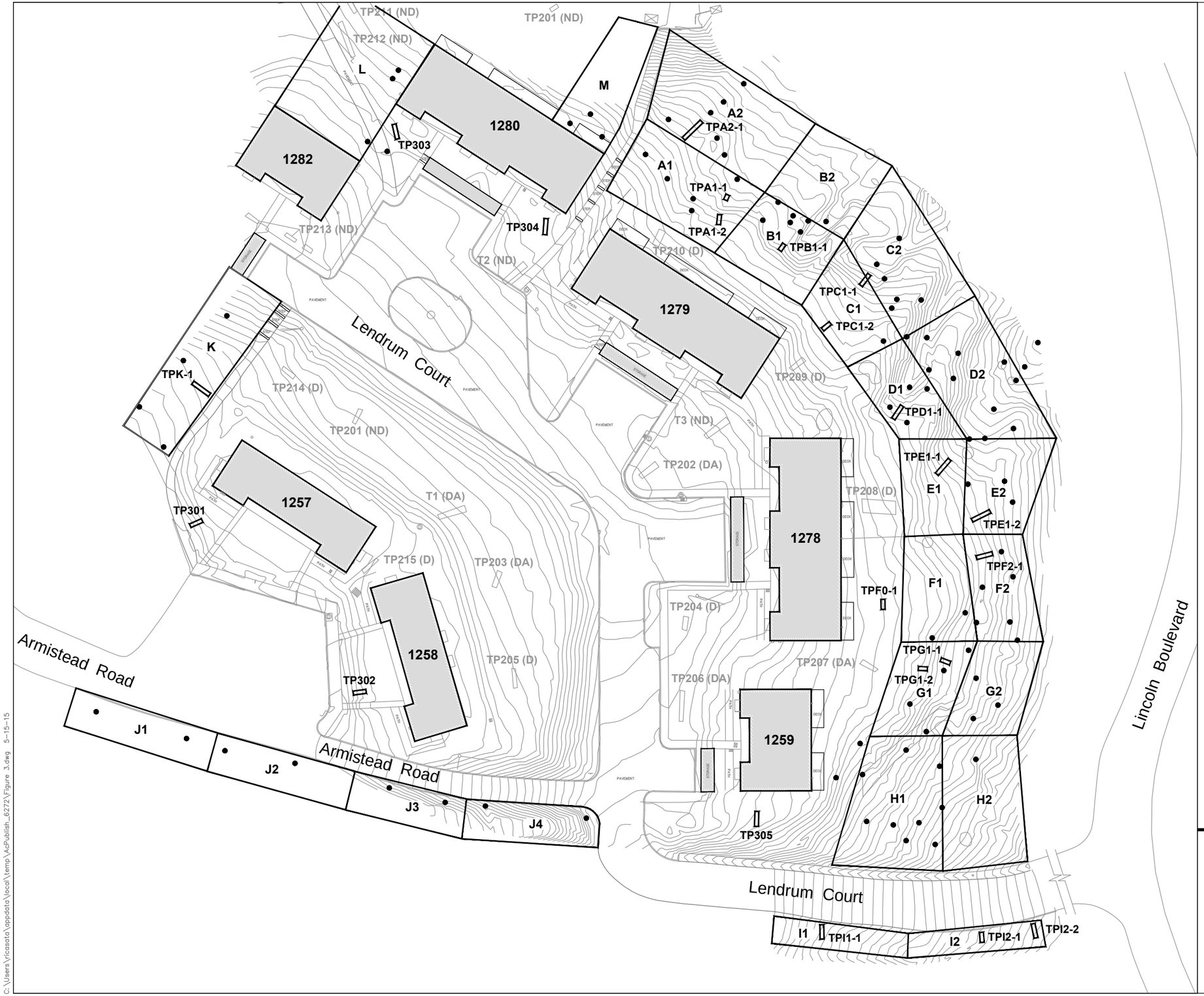


N

0 50 100

(Approximate Scale in Feet)

## Legend:

- 1280 — Building with Building Number
- Existing Contour
- A1 — Grid Area with Grid Number
- September 2014 Trench Locations
- Pothole Location

Exploratory Historic Trench

- (ND) No Debris or Ash Observed
- (D) Debris Observed
- (DA) Debris and Ash Observed

## Notes:

1. All locations are approximate.
2. Lendrum Court Area: by PLS Surveys, Inc., dated October 2014, California State Plane Coordinate NAD27.
3. Sample results in Grid Areas J1, J2, J3, and J4 will be reported separately.

**Erler & Kalinowski, Inc.**

September 2014 Sampling Locations

Lendrum Court Area
The Presidio Trust
San Francisco, CA
May 2015
EKI B00025.07
Figure 3

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0 50 100

(Approximate Scale in Feet)

N

## Legend:

- 1280 — Building with Building Number
- Existing Contour
- A1 — Grid Area with Grid Number
- September 2014 Trench Locations
- Historic Trench Locations (Note 3)
- Pothole Location
- Lead Concentration Greater Than 80 mg/kg
- **TP305 (NS/950)** — Lead Concentrations in Overburden/Debris Layer (mg/kg) from Trenches
- **(1,500;1,700-D)** — Duplicate Sample Lead Concentrations (mg/kg)
- **SBD1-1 (270)** — Lead Concentration in Surface Sample (mg/kg)
- Estimated Extent of Debris Fill
- Approximate Site Boundary

## Abbreviations:

mg/kg = milligrams per kilogram

NS = not sampled

## Notes:

1. All locations are approximate.
2. Lendrum Court Area: by PLS Surveys, Inc., dated October 2014, California State Plane Coordinate NAD27.
3. This figures shows trenches excavated in October 2010, June 2013, and September 2014. Potholes were excavated in September 2014.
4. Lead concentrations in surface soil, overburden, and debris greater than the Residential Screening Level of 80 mg/kg are **bolded**.

**Erler & Kalinowski, Inc.**

# Lead Concentrations in Surface Soil and Debris Layers at Lendrum Court

Lendrum Court Area

The Presidio Trust

San Francisco, CA

May 2015

EKI B00025.07

Figure 5

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# Appendices

Appendices provided on attached CD-ROM

# Appendix A

Additional Sampling Workplan for Lendrum Court, August 2014

Presidio Trust

103 Montgomery Street
P.O. Box 29052
San Francisco, CA 94129-0052
T (415) 561-5300
www.presidio.gov

September 2, 2014

Mr. George Chow
Department of Toxic Substances Control
700 Heinz Avenue
Berkeley, CA 94710

Subject: Transmittal of the *Additional Sampling Workplan for Lendrum Court, Presidio of San Francisco, California*

Dear Mr. Chow:

Enclosed is the final *Additional Sampling Workplan for Lendrum Court, Presidio of San Francisco, California.* The workplan was revised as discussed with you and Dr. Kimi Klein on our August 22 call.

The objective of the investigation activities is to determine the extent of Army-era debris fill at the Lendrum Court Site, conduct additional characterization of the debris fill, and collect engineering data to facilitate evaluation of potential remedial alternatives. The investigation is in response to your March 7, 2014 letter indicating further investigation was required at the Lendrum Court site.

Please feel free to contact me (415) 561-4259 or John DeWitt (650) 292-9100, ext. 355, if you need any additional information.

Sincerely,

Eileen Fanelli

Eileen Fanelli
Environmental Remediation Program Manager

Enclosures

cc: Denise Tsuji, DTSC
Bruce Handel, Army

Erler & Kalinowski, Inc.
Consulting Engineers and Scientists
1870 Ogden Drive
Burlingame, CA 94010
(650) 292-9100
Fax (650) 552-9012

30 August 2014

Ms. Eileen Fanelli
Presidio Trust
67 Martinez Street
Post Office Box 29052
San Francisco, California 94129-0052

Subject: Additional Sampling Workplan for Lendrum Court
Presidio Trust, San Francisco, California
(EKI B00025.07 T 4C)

Dear Ms. Fanelli:

Erler & Kalinowski, Inc. ("EKI") is pleased to present this Additional Sampling Workplan for Lendrum Court. EKI is prepared this workplan for the Presidio Trust to determine the extent of Army-era debris and evaluate risks posed by potential chemicals of concern. EKI is prepared to implement this workplan upon your authorization.

If you have any questions please do not hesitate to call.

Very truly yours,

ERLER & KALINOWSKI, INC.

John J. DeWitt

John DeWitt, P.E.
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# ADDITIONAL SAMPLING WORKPLAN FOR LENDRUM COURT

PRESIDIO OF SAN FRANCISCO, CALIFORNIA

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San Francisco, CA

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Presidio of San Francisco, California

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# 1 INTRODUCTION

On behalf of the Presidio Trust ("Trust"), Erler & Kalinowski, Inc. ("EKI") has prepared this Additional Sampling Workplan for field investigation of Lendrum Court ("Site") in the North Fort Scott Area, located in the northwest corner of the Presidio of San Francisco (Figure 1). This Workplan has been prepared for the Trust to address data gaps identified in the February 2014 *Lendrum Court Investigation Summary Report and Screening Risk Evaluation* ("Investigation Summary Report and Screening Risk Evaluation"; EKI, 2014a) and, as directed by the Department of Toxic Substances Control ("DTSC") (DTSC, 2014a), to determine the extent of debris and to evaluate the risks posed by potential chemicals of concern ("COCs").

# 2 BACKGROUND

## 2.1 Site Description

Lendrum Court is located in the northwest corner of the Presidio, north of Doyle Drive, in the North Fort Scott Area of the Presidio (Figure 1). The Lendrum Court Site is comprised of residential Buildings 1259, 1278, 1279, 1280, and 1282. Building 1257 and 1258 are located along Armistead Road, but for purposes of this investigation are considered part of the Site as the backyards open onto Lendrum Court.

This area is comprised of residential units, paved streets and parking areas, and vegetated landscape areas.

## 2.2 Lendrum Court Site Investigation History

In December 2012, the Trust notified the DTSC of the likely presence of debris fill beneath Lendrum Court on the basis of visible broken glass and ash observed in limited trenching activities (Trust, 2012). In February 2013, the DTSC requested the Trust prepare a Preliminary Endangerment Assessment ("PEA") Workplan (DTSC, 2013a). The Trust prepared the PEA Workplan (EKI, 2013) and upon DTSC approval (DTSC, 2013b), the Trust implemented the work in June 2013. Findings from the PEA Workplan investigation are summarized in the Investigation Summary Report and Screening Risk Evaluation (EKI, 2014a). DTSC approved the PEA in a letter dated 7 March 2014 (DTSC, 2014a). In that letter the DTSC stated that further investigation at Lendrum Court was required to determine the extent of debris and to evaluate the risks posed by potential COCs.

In April 2014, the Trust submitted a workplan to determine if Army-era debris was present in the broader North Fort Scott and Pilots Row neighborhoods. DTSC approved that work plan on April 30, 2014. The work was completed in May 2014 and a report of findings submitted to the DTSC on July 8, 2014 (EKI, 2014b). The investigation report documents that debris fill is limited to the Lendrum Court neighborhood. In a July 24, 2014 letter, DTSC concurred with the report findings at North Fort Scott and Pilots Row (DTSC, 2014b).

This Additional Sampling Workplan was prepared as a second phase of investigation, to determine the extent of debris fill and estimate the health and environmental risk associated with the debris fill in the Lendrum Court Area.

## 2.3 Site Use History

A summary of the site chronology from available maps and aerial photos is provided in Table 1. Appendix A contains copies of the maps and photos.

### 2.3.1 Lendrum Court

*Features Identified Before 1936*

- Reservoir: An 80,000-gallon water reservoir is shown on maps from 1896 through 1921 in the vicinity Building 1282. Based on aerial photos of the area in 1936, the reservoir appears overgrown and is assumed to be no longer in use as of 1936.

- Coal House: Historical maps and aerial photographs from the 1920s to approximately 1932 show a coal house located southeast of Lendrum Court; around 1933, the coal house was replaced by the Storey Avenue houses.

- Incinerator: A Presidio map dated 1921 indicates the presence of an incinerator approximately 150 feet south of present day Lendrum Court; the incinerator is not shown on any later maps. The approximate historical location of the incinerator is shown on Figure 2. A structure that may potentially be the incinerator is visible in an aerial photo from 1929; in a subsequent photo of the same area from 1932, the structure is no longer visible.

- Fill: An aerial photo from 1929 shows the addition of fill or grading in the present day location of Buildings 1278 and 1279; this feature is visible in almost all subsequent aerial photos of the area.

*Features Identified from 1936 to 1946*

- Soil Movement: Aerial photos from 1936 show significant soil handling activities conducted in the vicinity of the current Buildings 1253 through 1258 for the construction of Highway 101 in preparation for the connection to the Golden Gate Bridge.

- Pipe Excavation: An excavation apparently for the former Fuel Distribution System ("FDS") passes underneath Highway 101 towards Building 951, beneath the present day locations of Buildings 1255 and 1282. The portion of this pipeline passing underneath Building 1282 was removed prior to 1996 and the portion of the pipeline passing underneath Building 1255 was abandoned in place (IT Corporation, 1999; Montgomery Watson, 1999). The remainder of the FDS

pipeline passing through the Lendrum Court area was removed during 1996 and 1997.

- Road Construction: Between 1939 and 1946, entrance and exit ramps for Highway 101 were constructed south of Lendrum Court in the vicinity of the former incinerator.

*Features Identified After 1946*

- Residential Construction: Aerial photographs and Army historical maps indicate that the current Lendrum Court residential buildings and parking areas were constructed in 1970.

### 2.3.2 Armistead Road, Hoffman Street, and Ramsel Court

While this sampling workplan focuses on activities in Lendrum Court, the air photos in Appendix A include the surrounding Fort Scott area. Residential construction in these areas occurred at the same time as at Lendrum Court.

### 2.3.3 Locations of Existing Buildings

Figure 2 shows the locations of the present day Lendrum Court, Armistead Road, and Ramsel Court Buildings superimposed on an aerial photo from 1938 using Google Earth.

- Buildings 1259, 1278, and 1279 are approximately located near the edge of the fill and grading that was observed in the 1922 aerial photo;

- Buildings 1253 through 1256 appear to be located near the edge of the area disturbed by the construction of Highway 101 in 1936;

- Buildings 1257 and 1258 are located slightly down slope (northeast) of area disturbed by the construction of Highway 101;

- The FDS pathway visible in the 1936 aerial photo appears to pass underneath Building 1255 and beneath Building 1282; Building 1282 also appears to be located at approximately the same location as the former 80,000 gallon reservoir that is observed on maps from 1896 through 1921 and is visible in aerial photos up to 1934;

- The present day Armistead Playground appears to be located at the same location as the tennis court that was installed around 1936; and,

- Buildings 1236 and 1238 appear to be located just west of the former tennis court.

# 3 INVESTIGATION PURPOSE AND OBJECTIVES

This section identifies the purposes and objectives of the field investigation.

## 3.1 Field Investigation Purpose

The goals for this Additional Sampling Workplan are to:

(1) Determine the extent of debris at the Lendrum Court Site;

(2) Conduct additional characterization of the debris fill to identify COCs for the Site and to better evaluate the potential risk to human health or the environment; and

(3) Collect engineering data to facilitate evaluation of potential remedial alternatives, such as topography in the area of debris fill.

## 3.2 Field Investigation Objectives

To achieve the goals identified above, the following objectives have been established:

- Clear dense vegetation in the northeastern and eastern portion of the site to allow access for inspection, sampling, and surveying.
- Find the limits of the debris fill using a combination of potholes and trenches. The potholing and trenching strategy is described in more detail in Section 4.
- Examine the debris encountered for visual evidence of ash. If ash is encountered, the ash will be documented and sampled as described in Section 4.
- Collect additional samples to complete characterization of the debris fill.
- Collect soil samples to confirm debris limits. Collect confirmation samples to confirm limits of soil impacts associated with debris fill. Samples will be analyzed for lead as an indicator of potential impacts outside of debris fill limits.
- Survey the area containing debris fill. As described above, this field event is intended to gather details for remedial design such as thickness of debris, potential for consolidating or covering the edges of the debris (such as thickness at edges, topography at debris edges, and ability to anchor cover materials), and the extent of trees that are present within the debris.

Groundwater is not expected to be encountered and therefore no groundwater samples will be collected as part of this investigation.

# 4 FIELD INVESTIGATIVE APPROACH

This Section describes the approach to completing the field investigation.

## 4.1 Site Vegetation Clearing

Dense vegetation is present along the suspected perimeter of debris fill, to the east and northeast behind Buildings 1279, 1278 and 1259; to the south of Building 1259 and to the west of Building 1257. Vegetation in this area will be removed to allow access for site investigation activities. Although no trees will be removed, shrubs and ground cover less than 6-inches in diameter will be cut close to the ground surface and removed from site.

The extent of vegetation removal varies but is greatest in the area east and northeast of Buildings 1279, 1278, and 1259, where debris fill is anticipated to extend approximately 50 to 70 feet behind the buildings based on the historic photos of grading activity and visual observation of debris on the ground surface. Vegetation removal to the west and south will be less extensive and completed as needed to allow potholes and trenches to be advanced and to complete a topographic survey of the area.

The topographic survey is needed to complete the next phases of remediation, including the feasibility study and remedial design. Removing vegetation as part of this investigation will facilitate the remedial process by completing soil disturbing work in dry weather and by avoiding bird nesting season. The site will be winterized to prevent erosion following the investigation.

## 4.2 Combined Potholing and Trenching Strategy Rationale in Grid Areas

This investigation is designed to confirm the extent of debris fill to facilitate completion of a feasibility study and remedial action planning. The estimated extent of debris fill is shown on Figure 3. The debris fill boundary is anticipated to roughly coincide with the break in slope to the northeast and east of Buildings 1259, 1278, and 1279; Lendrum Court Road to the south of Building 1259; Armistead Road to the south of Buildings 1257 and 1258; the walking path to the west of Building 1257 leading to Building 1282; and the walking path between Building 1280 and 1279.

Sampling grids will be established at the presumed boundaries of the debris fill around the perimeter of Lendrum Court (see Figure 3). The grid system will provide a frame of reference in the field so potholes, trenches, and sample locations can be measured from known grid corners, using physical landmarks such as the edge of houses as visual reference points.

Potholes and trenches will be used together to confirm this boundary. Potholes allow quick assessment of presence or absence of debris in the upper few feet of soil. Because they are hand dug, the potential damage to tree roots is limited. Potholes will be used to identify the probable boundaries of debris fill. Trenches, excavated perpendicular to the assumed debris fill edge based on potholing, will be used to confirm the boundary of the debris fill. Trenches will be excavated approximately eight feet in length and two feet wide. In addition, shorter trenches, up to five feet in length, will be excavated in known debris fill areas in order to collect samples for chemical characterization as described below.

In grids A though H, potholes will be hand dug with a shovel or mattock. Potholes will be dug to about 24 inches in depth. Once debris is encountered, digging will stop, the location will be identified as containing debris, and a step-out pothole will be excavated. This process will continue until debris fill is not encountered. At that point a trench will be excavated perpendicular to the anticipated edge of debris to confirm the absence of debris at depth and to establish the extent of debris fill.

A similar approach will be used in grids I, J, K, and M. Based on historical photo review and topography, debris is not anticipated to be encountered in these grid cells. Initial potholes will be dug in each grid to confirm presence or absence of debris. Trenches will be excavated only if debris is present in the potholes.

In the vicinity of grid L (near Building 1282 on Figure 3), the June 2013 investigation found debris in trench 1279TP212, but the sample results from soil in the debris layer did not contain chemicals of concern above applicable screening levels. Potholing in this grid is intended to focus on the presence of debris and, if encountered, whether or not the debris is chemically impacted or inert.

The number of potholes or trenches within a specific grid area will vary based on field conditions, including topography, access, and results of other potholes or trenches. The number of potholes and trenches per grid area will be determined in consultation with DTSC once vegetation is removed and site surface conditions can be observed.

### 4.3 Rationale for Trench Locations 301, 302, 303, 304, and 305

Trenches 1279TP301 through 1279TP305 are located within the Lendrum Court landscaped area.

1279TP301, 1279TP302, and 1279TP305 are intended to confirm the southern and southwestern boundary of debris fill. These trenches will be excavated to depths sufficient to identify native material below any debris fill encountered. The maximum proposed depth of these trenches is approximately 8 feet below ground surface ("bgs"), the reach of the backhoe, or bedrock, whichever is shallower. Additional pot holes or trenches to the south of Armistead Road will be excavated in grid area J4 to confirm the southern boundary of the debris fill. Potholes will also be excavated in grid areas J1 through J3 and I1 through I2 unless the edge of debris fill is confirmed in Trenches 1279TP301, 1279TP302, and 1279TP305.

1279TP303 and 1279TP304 are intended to delineate the extent of the debris fill material in the vicinity of Buildings 1280 and 1282. The length of these trenches will vary depending on utilities and other subsurface structures. They may be extended or supplemented in the field to define the limits or edge of any observed debris.

As with the North Fort Scott investigation, all trenches will be photographed and logged. Debris will be inspected for the presence of ash. Samples will be collected as described below.

## 4.4 Sample Strategy

### 4.4.1 Waste Characterization

In the February 2014 Investigation Summary Report and Screening Risk Evaluation (EKI, 2014a), lead was identified as a chemical of concern ("COC") and polycyclic aromatic hydrocarbons ("PAHs"), dioxins, and furans were identified as potential chemicals of concern ("PCOCs") pending additional site investigation and analysis. This investigation is intended to provide additional data to statistically evaluate whether PAHs, dioxins, and furans are Site COCs.

Based on previous surface sample results at Lendrum Court (EKI, 2014a), soil samples collected from the debris layer overburden were found to contain lead above residential screening levels; therefore, in this investigation the overburden soil above the debris layer is assumed to be chemically impacted and will not be sampled. With the exception of confirmation samples described below, sample collection will focus on debris fill.

To create a statistically significant data set, a minimum of seven soil samples will be collected and submitted to the laboratory for analysis for metals, PAHs, and dioxins and furans for analysis as potential COCs. These data will be evaluated with previous sample results to complete the human and ecologic risk assessment.

Because dioxins and furans are associated with incinerator wastes, samples of debris fill containing ash will be preferentially collected and analyzed for dioxin and furans by EPA Method 1613B. To maintain comparability to sampling from the June 2013 investigation, samples from the debris fill layer will be collected using multi-increment sampling (see Section 4.7).

Waste characterization samples will be collected from trenches only. The trenches will be excavated in areas of known debris fill. In grid areas A1 though H2, trenches for sample collection will be located based on potholes and perimeter trench observations. If debris containing ash cannot be identified in seven distinct locations in the grid area and trenches 1279TP301 through 1279TP305, then additional trenches will be excavated. The additional trenches are shown on Figure 3 in areas anticipated to contain debris with ash based on previous trenching. Trenches will be excavated as needed to obtain sufficient samples for statistical analysis of PAHs, dioxins, and furans. Additional trenches will be numbered sequentially beginning with 1279TP306.

### 4.4.2 Confirmation Sampling

Soil samples will be collected from the area outside the observed perimeter of debris fill to confirm waste boundaries. Samples will be collected at a frequency of approximately one sample every 100 feet along the waste boundary perimeter. Surficial soil samples (0 to 0.5 feet bgs) will be collected from potholes or trenches as appropriate to the location. For example, if trenches 1279TP301 through 1279TP305 do not contain debris, a surface soil confirmation sample will be collected from these trenches rather than a debris sample.

Based on previous surface sample results at Lendrum Court (EKI, 2014a), lead was the primary COC detected in shallow soil, even when other COCs were present. Therefore confirmation samples will be analyzed only for lead as the indicator of waste impact.

### 4.5 Pothole, Trench, and Sample Identification

In accordance with the *Presidio-Wide Quality Assurance Project Plan and Sampling and Analysis Plan* ("QAPP"; Tetra Tech, 2001) and its Addendum (Trust, 2011), sample location identification codes for trench samples are based on "1279" for Building 1279, a central building within Lendrum Court; "TP" for test pit (trench); and sequential numbering starting at 301 to indicate that this is the Trust's third round of sampling for the Lendrum Court Area. The media sampled (soil) will be marked on the chain of custody form and input into the media field in the Trust database when the data are uploaded. Identifiers highlighting the material sampled and the sample depth will be appended to the sample name to identify the material the sample represents and the depth from which it was collected; "S" will be used to identify shallow or overburden soil samples, "D" will be used to identify debris or debris and ash materials, and "B" will be used to identify native material below the debris or debris and ash layers. In keeping with the QAPP, an overburden soil sample collected at 2 feet bgs from trench 1279TP301 will be designated as 1279TP301-S[2]; similarly, a debris and ash sample collected at 3.5 feet bgs from trench 1279TP309 will be designated as 1279TP309-D[3.5].

Potholes will be labeled with "SB" to indicated soil boring, their grid location, such as A2-1 for the first pothole in grid cell A2. If a sample is collected from 1 foot deep from a pothole from grid A2, the sample labeling will follow the QAPP and be designated as 1279SBA2-1[1].

### 4.6 Trench Excavation and Logging

Trenches will be excavated with a subcontractor-operated backhoe. Proposed trench locations are shown on Figure 3. The locations of the trenches will be finalized in the field with representatives of the Trust and DTSC, and will depend upon the presence of surface, subsurface, and overhead obstructions, as well as site topography.

A qualified person will log soil lithology during trenching, and document trench sidewalls with photographs. Potholes will also be photographed. Logging will include observation of trench sidewalls as well as excavation spoils. Field personnel will log percentage of debris present, if any debris is encountered. Field personnel will coordinate with the Trust Archeology Department if debris is encountered.

Trenches will be backfilled and compacted by wheel rolling by the backhoe on the same day they are excavated.

### 4.7 Sampling Method

Soil samples from trenches will be collected using a backhoe bucket or manually, if the excavation is less than four feet deep and can be safely entered. Soil samples will

generally be collected in the center of the horizon being sampled. A multi-increment sampling method (ITRC, 2012) will be employed in the field and at the analytical laboratory as a recent U.S. EPA publication indicates that multi-incremental sampling can provide more reproducible results (U.S. EPA, 2013) and because the use of multi-incremental sampling is specifically recommended by U.S. EPA for dioxin site assessment (U.S. EPA, 2011; U.S. EPA, 2013). The field multi-increment sampling method involves the collection of approximately 20 to 30 subsamples from the specific layer being sampled along all sidewalls of the trench or pothole. For multi-increment sampling of the debris layer, only the debris layer will be sampled. If the trench crosses the edge of the debris layer and debris is only present on one end and part of the two sides, only the visibly apparent debris layer will be sampled to avoid potential sample dilution by including non-debris layer material. As described in the ITRC guidance, a simple random sampling pattern will be used to collect samples, as constructing a sample gridding on the interior trench sidewalls would be difficult. Incremental samples will be collected in new one-gallon Ziploc bags, labeled, and placed on ice for delivery to the analytical laboratory under chain-of-custody procedures.

Multi-increment sampling will be collected from trenches and potholes. Sampling will be conducted in accordance with the Presidio QAPP and its Addendum, including approximately 10% duplicates.

### 4.8 Site Survey

The topography of the site, inclusive of the area of debris fill will be made following site investigation activities. The site survey will be used in engineering evaluations completed as part of the feasibility analysis and remedial action plans.

## 5 ADDITIONAL FIELD PROCEDURES

Standard field methods and procedures are described in the Trust's Standard Operating Procedures ("SOPs") included in the QAPP. The SOPs include the methods and procedures for collecting soil samples, surveying sample locations, sample preservation and transportation, and general equipment decontamination. Laboratory QA/QC procedures are also described in the QAPP and its Addendum.

### 5.1 Preparation for Field Work

EKI, in consultation with the Trust, and a representative of the DTSC, if present, will select locations in the field for trenches.

The Trust has notified Lendrum Court residents; a copy of the notification letter distributed on 22 August 2014 is included as Appendix B.

Prior to initiation of field activities, EKI will perform the following tasks:

- update its site-specific health and safety plan;

- request and review the results of Trust utility plans and Trust underground utility surveys;
- notify Underground Services Alert ("USA") of planned subsurface work at least 48 hours prior to the initiation of all subsurface work; and
- obtain necessary dig permits from the Trust.

The trenching contractor will rely upon available plans and utility maps provided by the Trust.

### 5.2 Surveying of Investigation Locations

The grid coordinates, potholes, and trench locations will be surveyed by a California licensed land surveyor. The ground surface elevation and the horizontal coordinates of each location will be surveyed. The horizontal coordinates will be reported in NAD 83. The vertical coordinates will be reported in both the North American Vertical Datum 88 ("NAVD 88") as well as 1907 Presidio Lower Low Water ("PLLW") vertical datum. Local benchmarks will be provided by the Trust. Survey data will be used to update maps, and to document sample locations, if collected. Survey data will also be used to prepare design figures, including extent of debris, building corners, sidewalks and utilities, surface topography, trees, and other features that will need to be considered during remedial design.

### 5.3 Management of Investigation-Derived Wastes

Layers of soil will be returned to the trench in the order that they were removed and wheel-rolled to compact. Potholes will be refilled with spoils and vegetation replaced, where practicable. No investigation-derived wastes are expected to be generated as a result of this investigation.

### 5.4 Analytical Methods

The analytical methods planned are generally the same as those conducted at the June 2013 Lendrum Court investigation and include the following:

- PAHs by EPA Method 8270C with selective ion monitoring ("SIM");
- Title 22 metals by EPA Method 6020; and,
- If ash is encountered in debris, up to 7 samples will be analyzed for dioxins and furans by EPA Method 1613B. Any debris and ash containing samples that are not analyzed for dioxins and furans will be stored at 4 degrees Celsius in the event that additional analysis is necessary.

Because lead was a key indicator of chemical impacts in the 2013 Lendrum Court investigation, samples defining the edge of debris will only be analyzed for lead as the edge confirmation samples.

## 5.5 Analytical Laboratory

Soil samples will be submitted to Curtis & Tompkins, Ltd. of Berkeley, California, ("Curtis & Tompkins") for sample preparation using the Incremental Sampling Methodology ("ISM") preparation protocol. In the ISM protocol, each sample is dried, mixed, and systematically split into subsamples; small samples from each increment are then collected and mixed to create the multi-increment sample used for analysis. Samples for TPH, metals, and PAHs will be analyzed by Curtis & Tompkins. After ISM preparation, any samples for dioxins will be sent to Vista Analytical Laboratory of El Dorado Hills, California. Both of these laboratories are certified by the State of California.

Sample handling and analysis will be in accordance with the Presidio QAPP, as amended, with a Level II data report. All samples will be analyzed on a standard turnaround time.

# 6 SCHEDULE FOR IMPLEMENTATION OF THE SAMPLING PLAN

Field work will commence upon DTSC approval of this Additional Sampling Workplan. EKI estimates that approximately two weeks will be required to obtain permits, prepare work authorizations for contractors, mark the sampling locations, and conduct the underground utility surveys. Implementation of this Additional Sampling Workplan is anticipated to require approximately three weeks, which includes some time for vegetation removal and inspecting the site after the vegetation is removed. The results of the investigation will be presented to DTSC in an Additional Sampling Summary Report.

# 7 REFERENCES

DTSC, 2013a. Letter from George Chow to Ms. Eileen Fanelli of the Presidio Trust dated 19 February 2013, requesting preparation of a Preliminary Endangerment Assessment for Lendrum Court.

DTSC, 2013b. Letter from George Chow to Ms. Eileen Fanelli of the Presidio Trust dated 13 June 2013, approval of the *Preliminary Endangerment Assessment Workplan, Presidio of San Francisco, California* dated May 2013.

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# TABLE 1
## Historic Maps and Aerial Photos Reviewed to Develop Lendrum Court, Armistead Road, Hoffman Street, and Ramsel Court Site-Use History

Lendrum Court

Presidio Trust, San Francisco, California

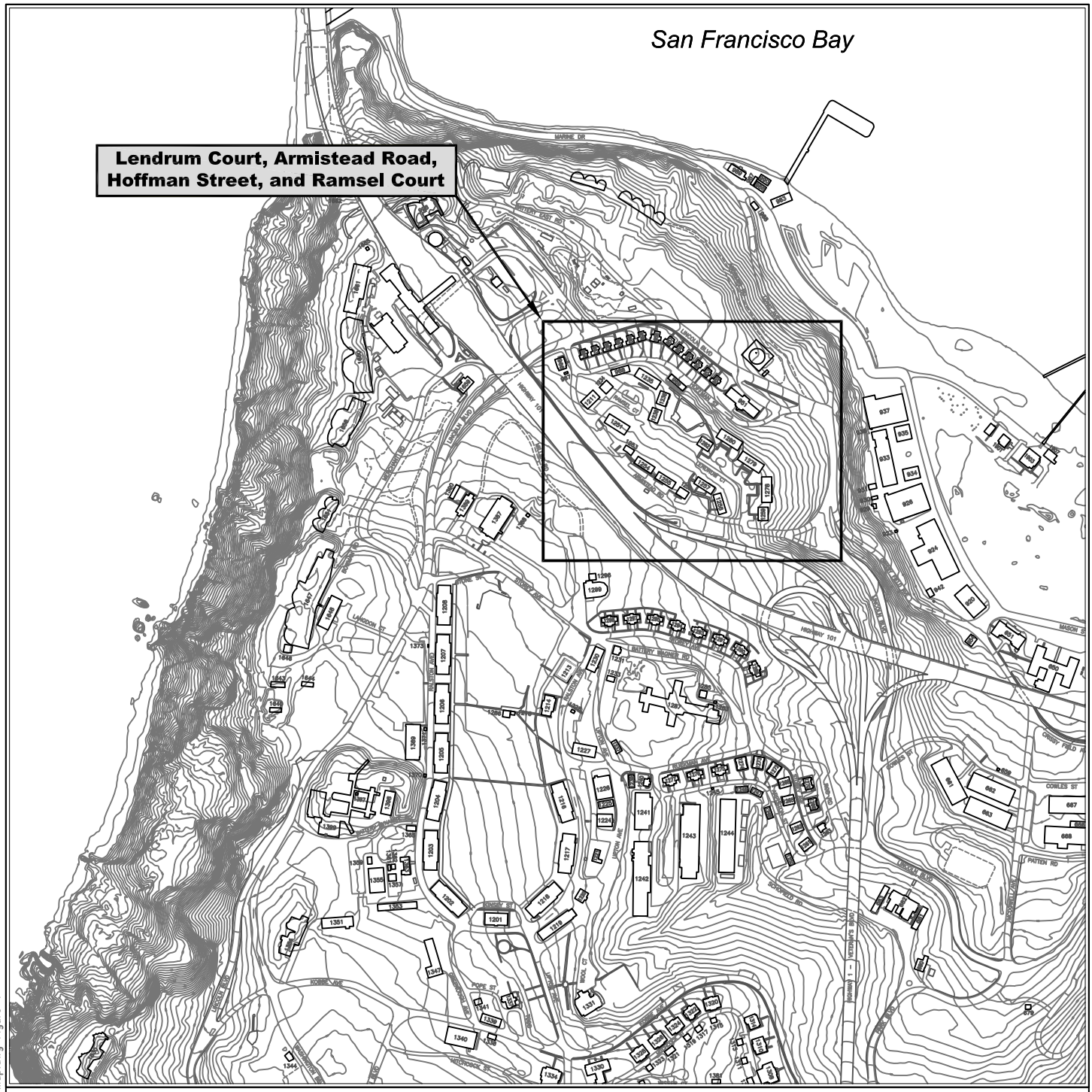
| Date | Document Type | Description |
|---|---|---|
| 1871 | Map | 1871 map shows a large cloud labeled "drifting sands" to the south of the present-day Lendrum Court, Armistead Road, and Ramsel Court area. |
| December 1921 | Map | 1921 map shows an incinerator located near the present-day Lendrum Court, Armistead Road, and Ramsel Court area. Coal shed and 80,000 gal reservoir also shown, with YMCA directly west of Lendrum Court, north of current Building 1208. |
| November 30, 1922 | Photo | 1922 aerial photo shows a coal shed near the future Lendrum Court area, with possible incinerator in the background. Current Building 1208 is present in foreground. |
| April 12, 1929 | Photo | 1929 aerial photo shows a coal shed near the future Lendrum Court area, with possible incinerator in the background. Building 968 is located along Hoffman Street on the left-hand side of the picture. Fill material appears to have been placed southwest (to the right) of Building 951. Reservoir visible. YMCA visible near track. |
| January 10, 1932 | Photo | 1932 aerial photo shows a coal shed near the future Lendrum Court area. No evidence of incinerator. The area of fill identified in the 1929 aerial photo is covered in vegetation. Reservoir and Aboveground Storage Tank 970 visible. An unidentified structure is located east (above and to the right) of Building 968. YMCA visible near track. |
| January 1934 | Photo | 1934 aerial photo shows that coal shed near the future Lendrum Court area has been removed, and replaced by Storey Avenue houses. Reservoir visible. YMCA previously near track removed. |
| 1936 | Photo | 1936 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area from directly above. Highway 101 is under construction and significant ground disturbance is seen alongside the future Highway 101. Outline of reservoir appears overgrown. A portion of the former Fuel Oil Distribution Pipeline passes underneath Highway 101 and cuts through the future Lendrum Court area heading northeast towards Building 951. A tennis court is visible to the south of Building 969. |
| March 28, 1936 | Photo | 1936 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area from above. Hwy 101 access to Golden Gate Bridge has been constructed. Outline of reservoir appears overgrown. Trees appear to have been planted in the Armistead Road and Ramsel Court Area. |
| January 8, 1938 | Photo | 1938 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area from directly above. Highway 101 is in use. A tennis court is visible south of Building 969. Outline of reservoir appears overgrown. |
| January 24, 1939 | Photo | 1939 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area. Highway 101 has been constructed. Trees are visible in the Armistead Road and Ramsel Court Area. |

# TABLE 1
## Historic Maps and Aerial Photos Reviewed to Develop Lendrum Court, Armistead Road, Hoffman Street, and Ramsel Court Site-Use History

Lendrum Court

Presidio Trust, San Francisco, California

| Date | Document Type | Description |
|---|---|---|
| January 24, 1939 | Photo | 1939 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area from directly above. Highway 101 is in use. A tennis court is visible south of Building 969. Trees are visible in the Armistead Road and Ramsel Court Area. |
| January 24, 1939 | Photo | Oblique 1939 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area. Highway 101 is in use. A tennis court is visible south of Building 969. Trees are visible in the Armistead Road and Ramsel Court Area. |
| July 28, 1946 | Photo | Aerial photo showing the future Lendrum Court Area and Ramsel Court Area. Entrance and exit ramps to Highway 101 have been constructed. The approximate location of the former incinerator is shown on the figure. A tennis court is visible south of Building 969. Trees are present in the Armistead Road and Ramsel Court Area. |
| 1940 to 1965 | Maps | Four maps, dated May 29, 1940, October 10, 1958, December 8, 1961, and November 10, 1965 were reviewed. No changes were noted. Maps not reproduced in Appendix. |
| May 20, 1969 | Map | 1969 map shows planned Lendrum Court Area as "under construction" for 1970. |
| March 24, 1975 | Map | 1975 map shows Lendrum Court Area construction finished. |
| ***Aerial Photo Used in to Overlay Locations of Existing Buildings*** | | |
| July 31, 1938 | Photo | 1938 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area from directly above. |
| July 31, 1938 | Photo | 1938 aerial photo shows the future Lendrum Court Area and Armistead Road and Ramsel Court Area from directly above. Google Earth was used to overlay 3-dimensional images of the present day buildings (and building numbers) on the July 1938 aerial photo (for several buildings, only the outline is visible). Buildings 1278 and 1279 appear to be located on the edge of the fill material noted in the 1929 aerial photo. Building 1259 intersects a former dirt road. Building 1282 appears to be in the location of the former 80,000 gallon reservoir. Buildings 1257 and 1258 appear to be located slightly northeast of the materials disturbed during construction of Highway 101 and Buildings 1253 through 1256 appear to be located at the edge of these disturbed materials. A portion of the former Fuel Oil Distribution System pipeline passes underneath Highway 101, Buildings 1255 and 1282, and between Building 951 and Building 952. |




Reference: Basemap source: Presidio Trust, 2006.

Note:

1. All locations are approximate.

N

0 600 1200

(Approximate Scale in Feet)

**Erler & Kalinowski, Inc.**

Site Location Map

North Fort Scott Area
The Presidio Trust
San Francisco, CA
August 2014
EKI B00025.07

Figure 1

20140825.10544163 G:\B00025.07\2014-08\Figure 1 - Site Location Map.dwg Figure 1


N

0 100 200

(Approximate Scale in Feet)

Legend:

1253 Building with Building Number

Notes:

1. All locations are approximate.
2. Aerial photo source: Google Earth Pro, 1938 Aerial Photograph.
3. Overlay of existing buildings from Google Earth Pro and Presidio Trust 2011 Basemap (See Note 3 on Figure 3).

**Erler & Kalinowski, Inc.**

Overlay of Existing Buildings on 1938 Aerial Photograph

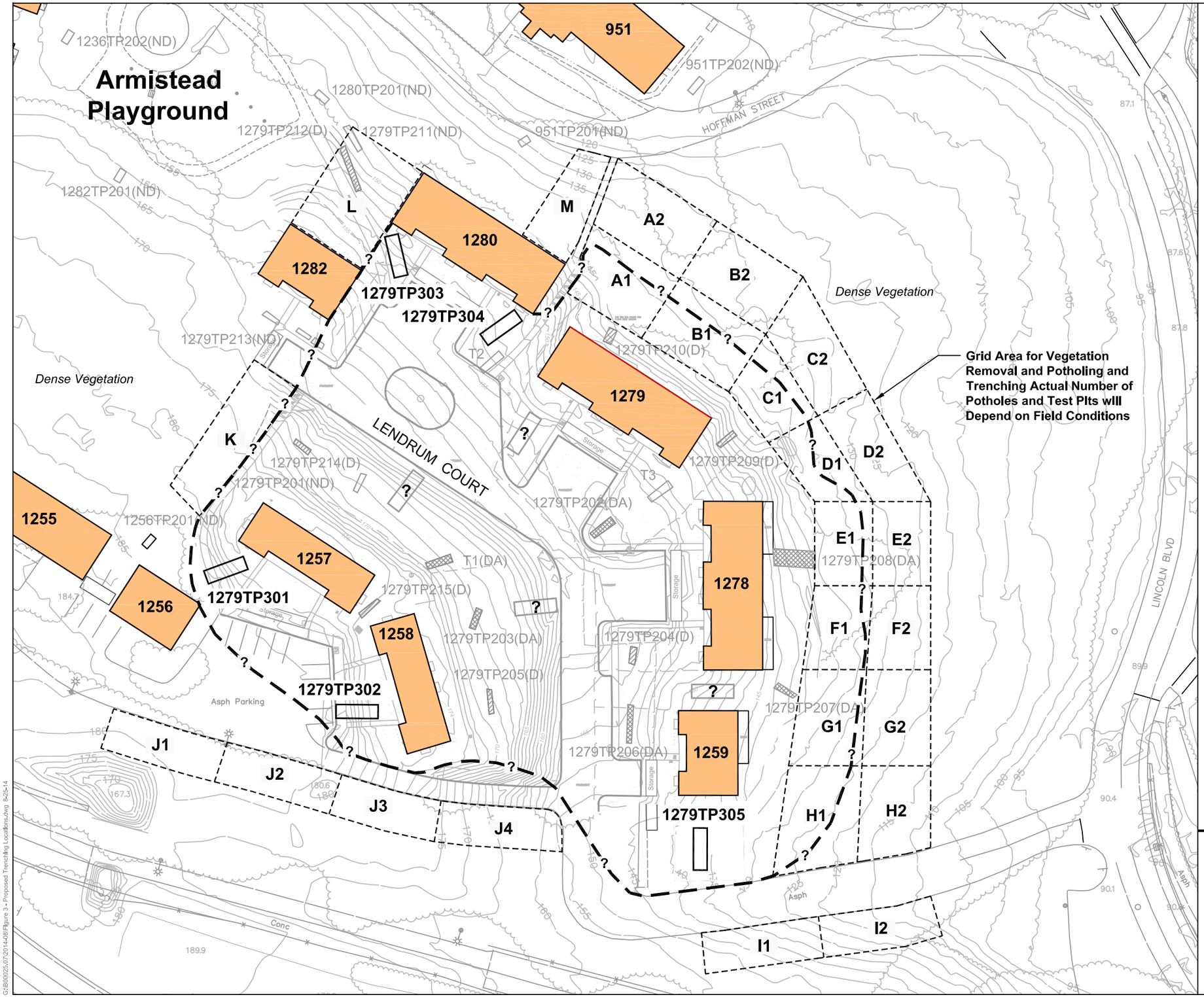
North Fort Scott Area

The Presidio Trust
San Francisco, CA

August 2014
EKI B00025.07

Figure 2

C:\EB00025.07\2014-08\Figure 2 - Overlay of Existing Buildings.dwg 8-25-14




N

0 60 120

(Approximate Scale in Feet)

## Legend:

- 964 — Building with Building Number
- 85 — Existing Contour
- Obscured Areas
- 1279TP301 — Proposed Trench Locations, "?" if Tentative (Not to Scale)
- —?— Estimated Extent of Debris Fill
- A1 — Grid Area with Grid Number

**Existing Exploratory Trenches at Lendrum Court**

- (ND) No Debris or Ash Observed
- (D) Debris Observed
- (DA) Debris and Ash Observed

## Notes:

1. All locations are approximate.
2. Lendrum Court Area: by PLS Surveys, Inc., dated 9 July 2013; California State Plane Coordinate NAD27.
3. Basemap Source: by Presidio Trust, dated 30 April 2011, California State Plane Coordinate NAD83.

**Erler & Kalinowski, Inc.**

Proposed Sampling Locations

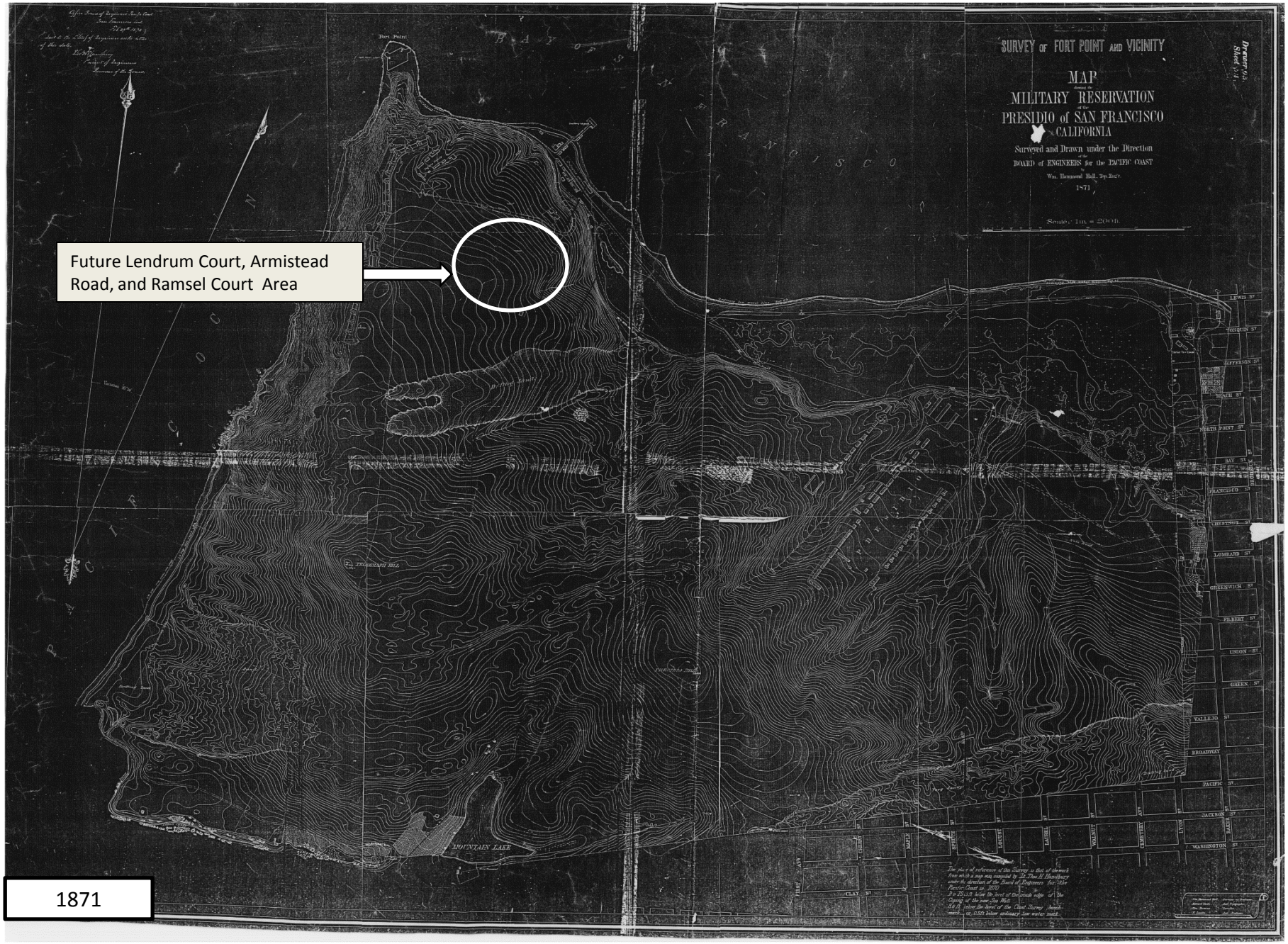
Lendrum Court Area
The Presidio Trust
San Francisco, CA
August 2014
EKI B00025.07
Figure 3

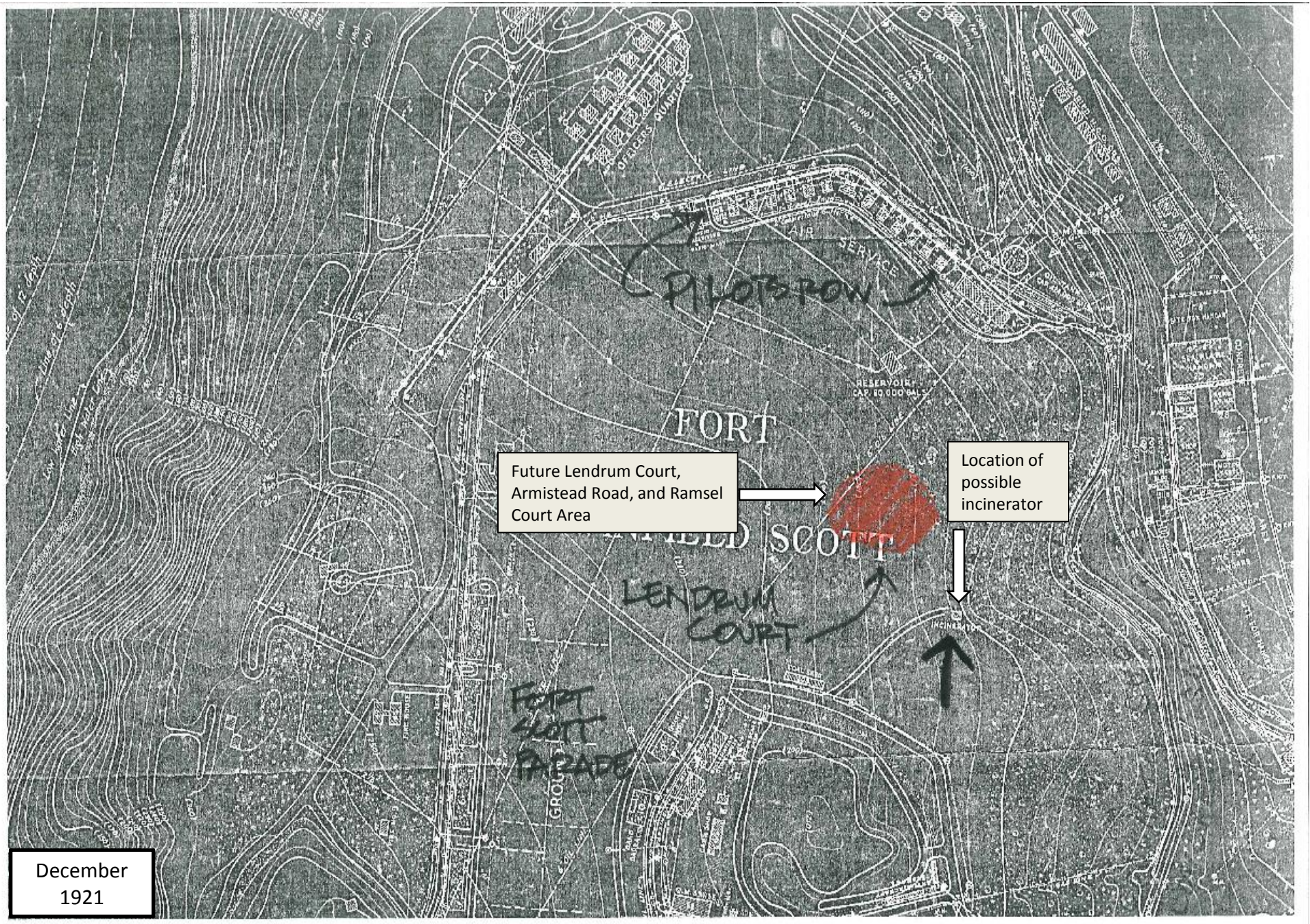
G:\B00025.07\2014-08\Figure 3 - Proposed Trenching Locations.dwg 8-25-14

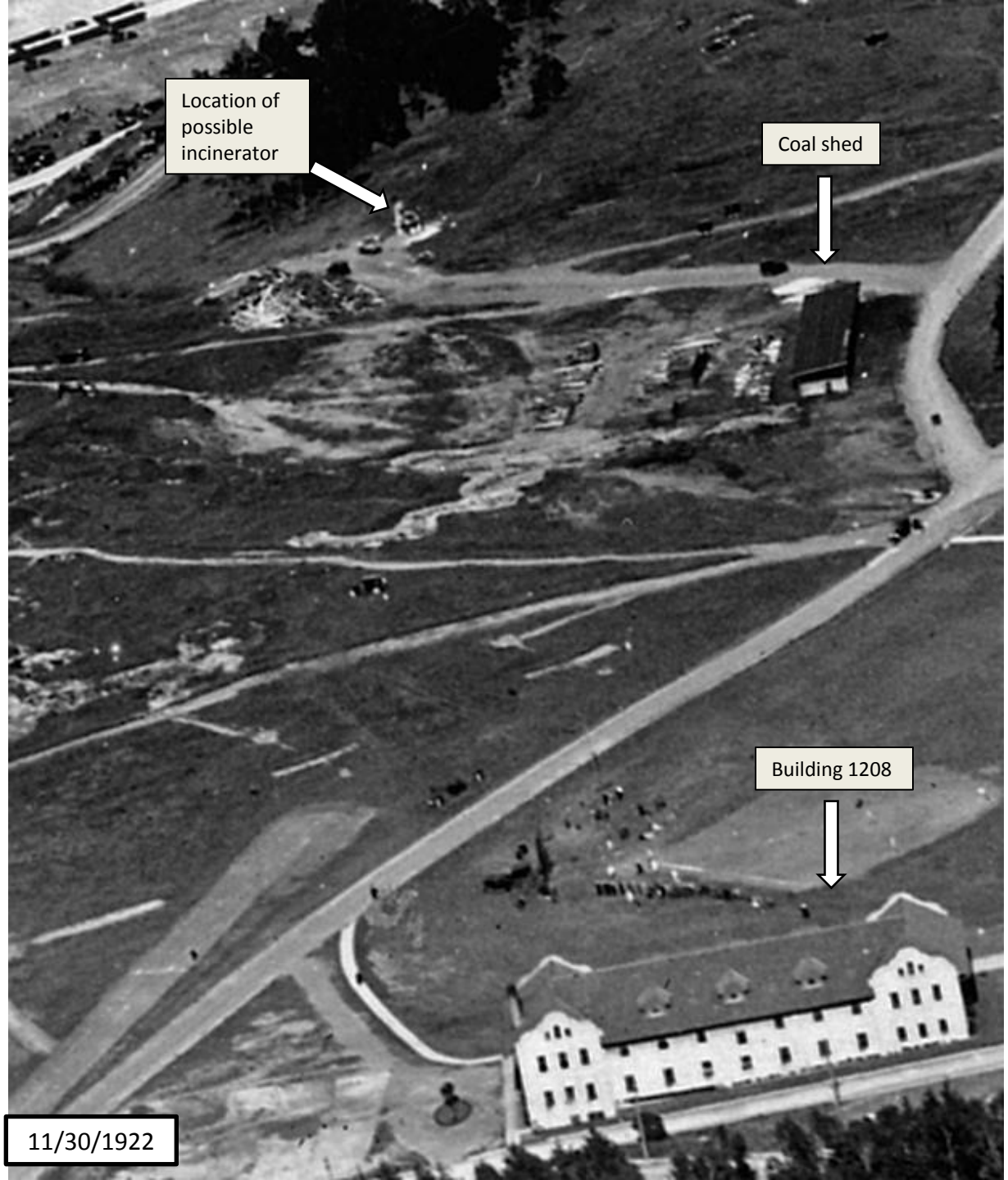
# Appendix A

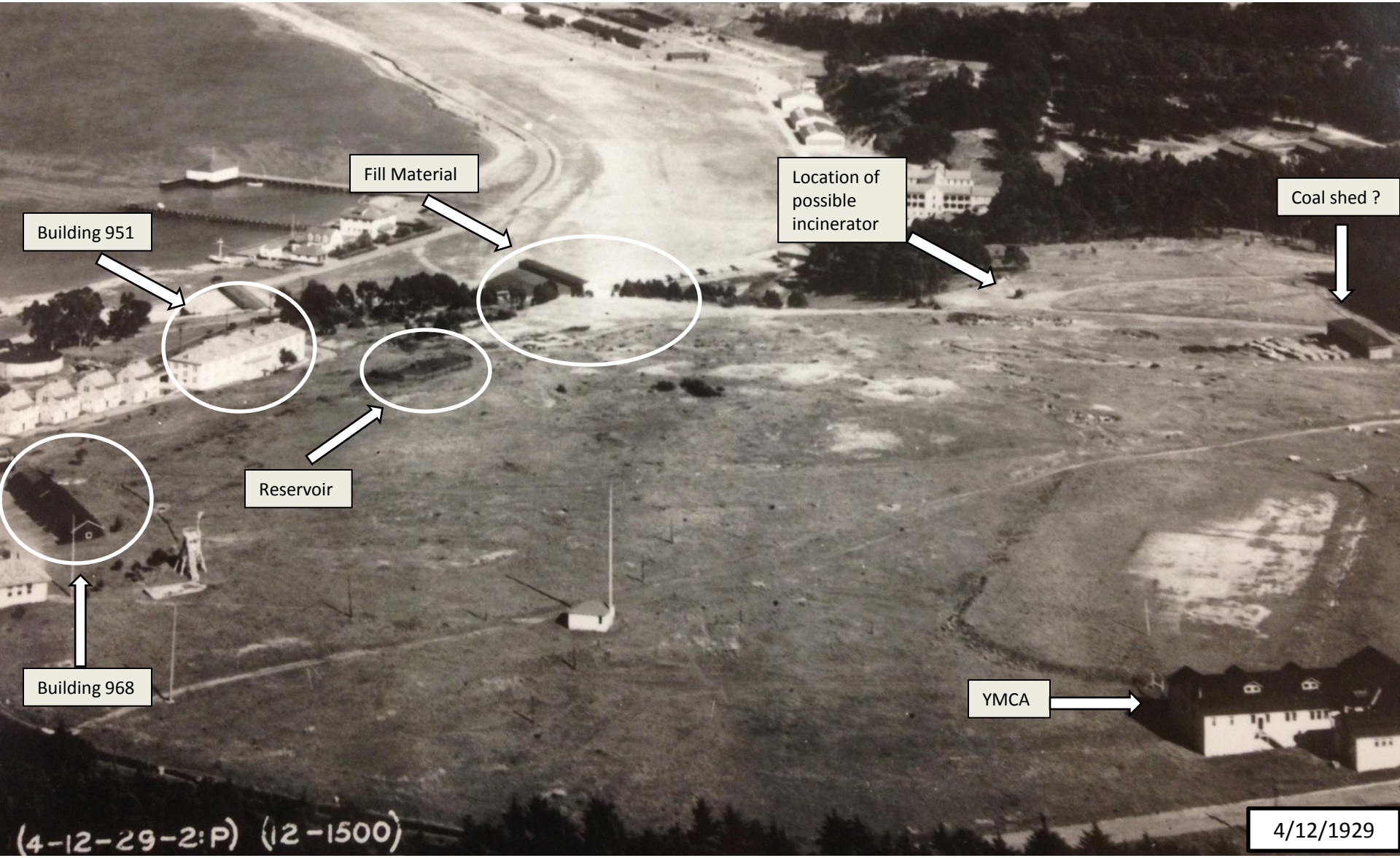
## Copies of Reviewed Maps and Photos of Lendrum Court,

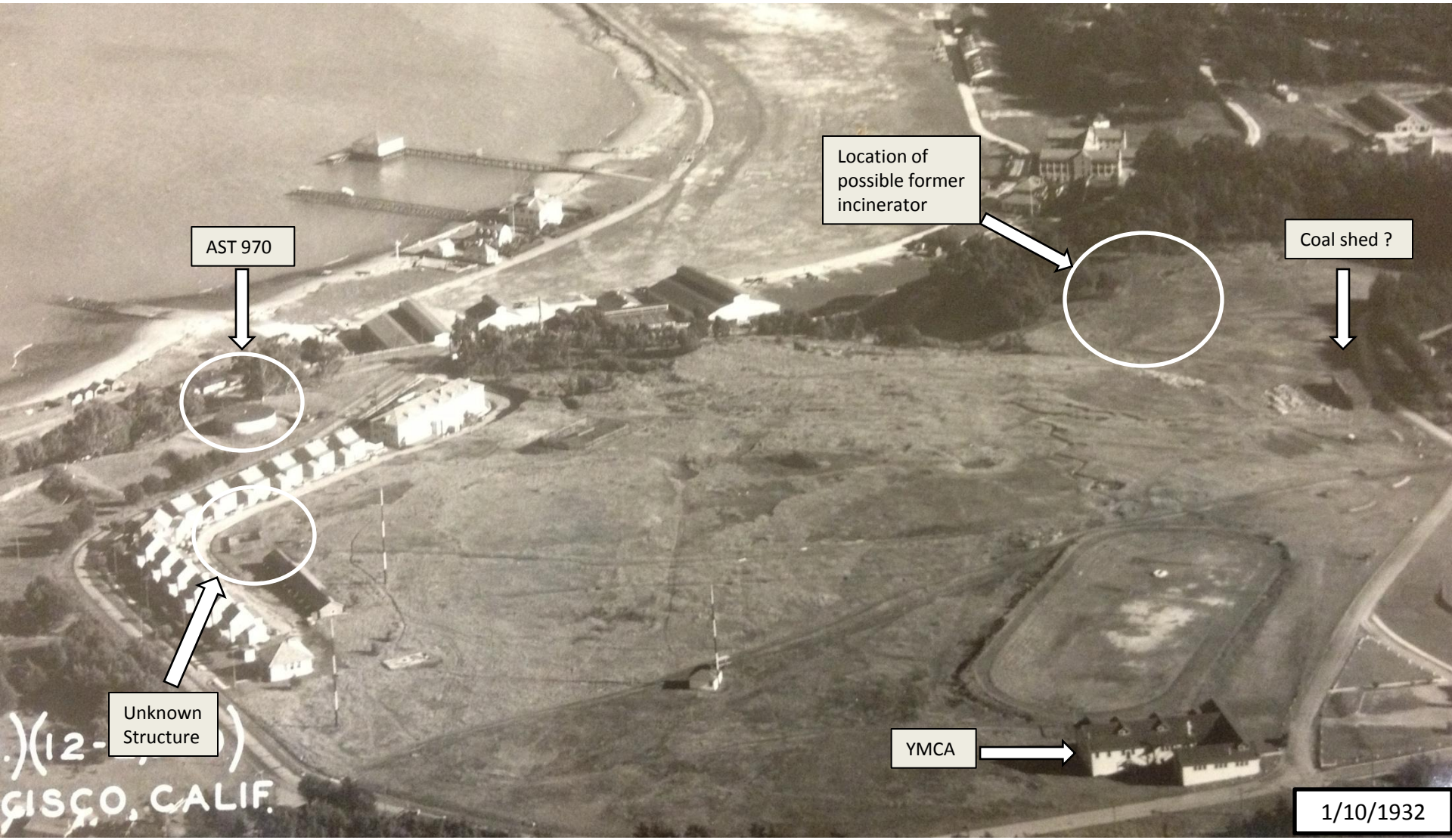
## Armistead Road, and Ramsel Court




PILOTS ROW
FORT
Future Lendrum Court, Armistead Road, and Ramsel Court Area
Location of possible incinerator
LENDRUM COURT
FORT SCOTT PARADE
December 1921


Location of possible incinerator
Coal shed
Building 1208
11/30/1922


Fill Material
Location of possible incinerator
Coal shed ?
Building 951
Reservoir
Building 968
YMCA
(4-12-29-2:P) (12-1500)
4/12/1929

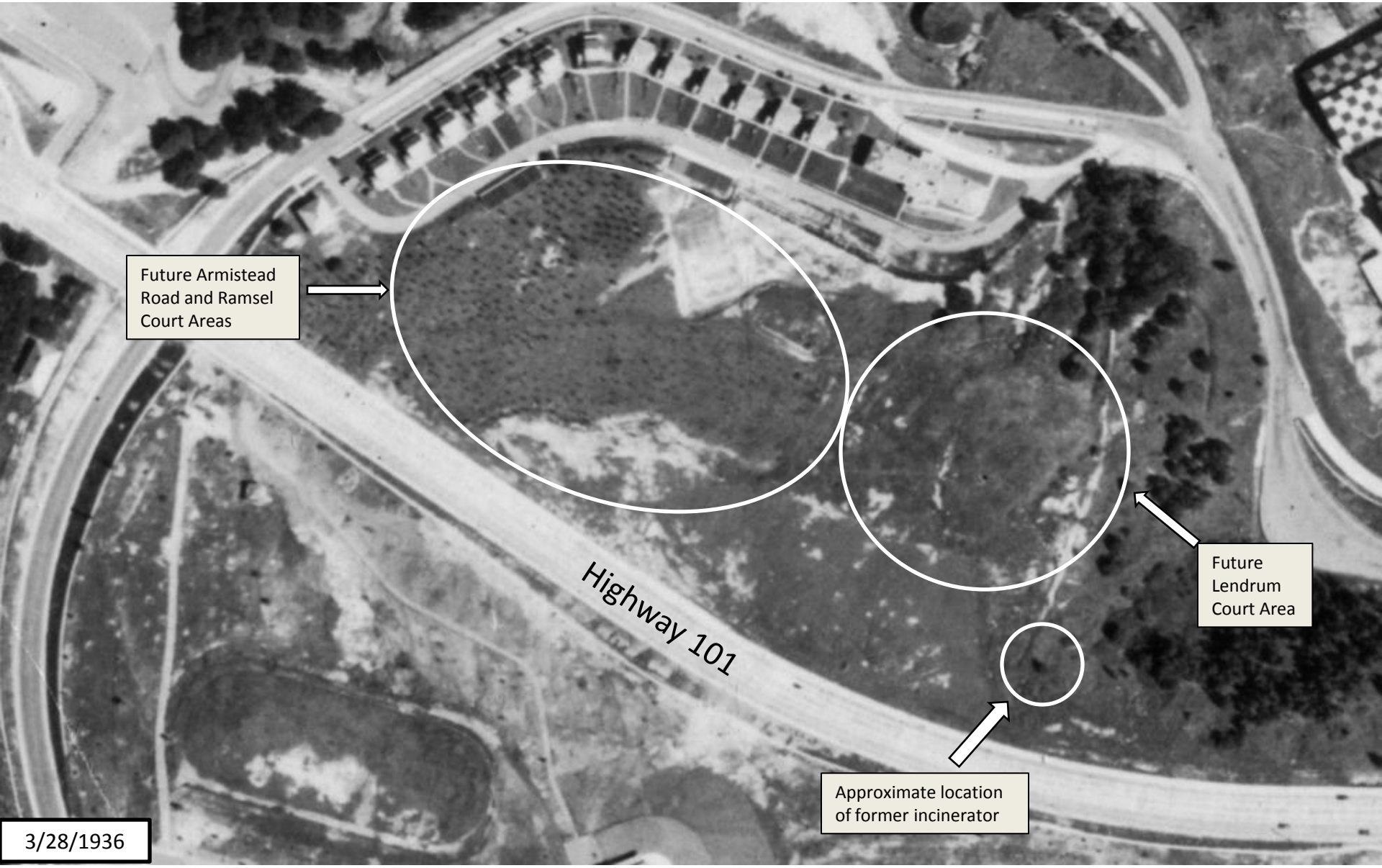

AST 970
Location of possible former incinerator
Coal shed ?
Unknown Structure
YMCA
1/10/1932

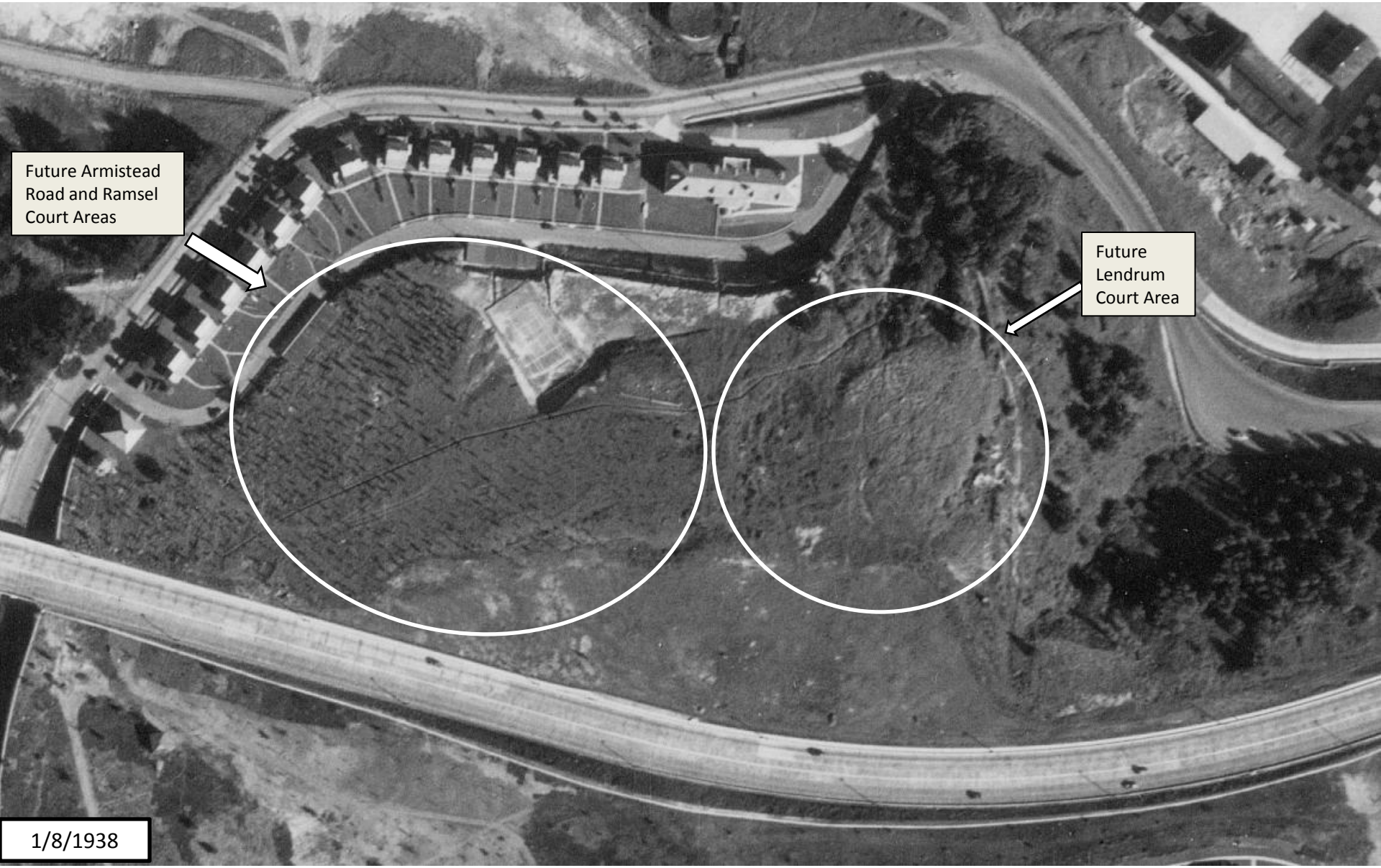

Location of former YMCA
2-1000 CRISSY FIELD SAN FRANCISCO, CALIF.

Jan 1934

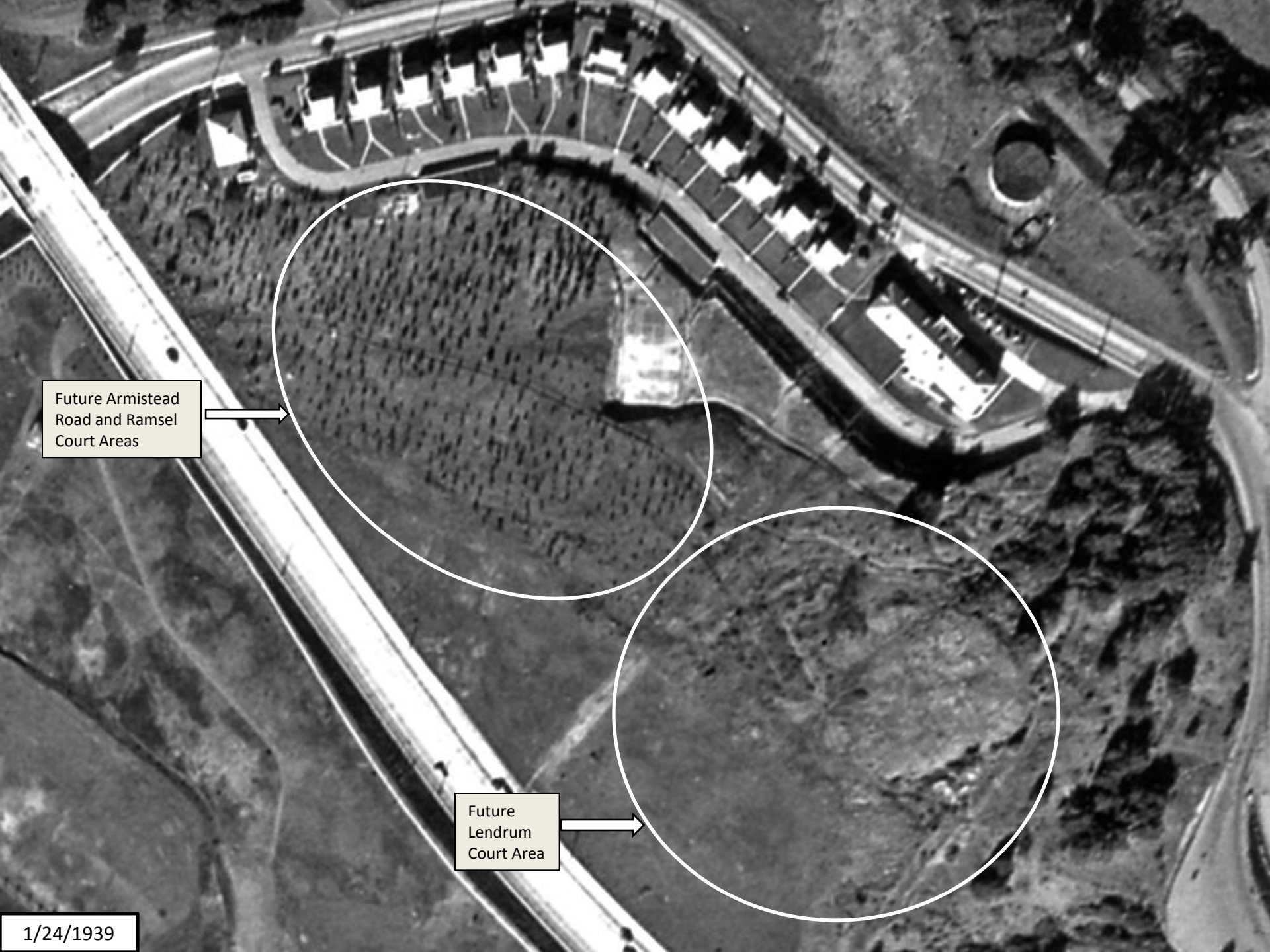

Building 969
Building 951
Tennis Courts
Future Armistead Road and Ramsel Court Areas
Future Highway 101
Pathway for Former Fuel Oil Distribution System Pipeline
Future Lendrum Court Area

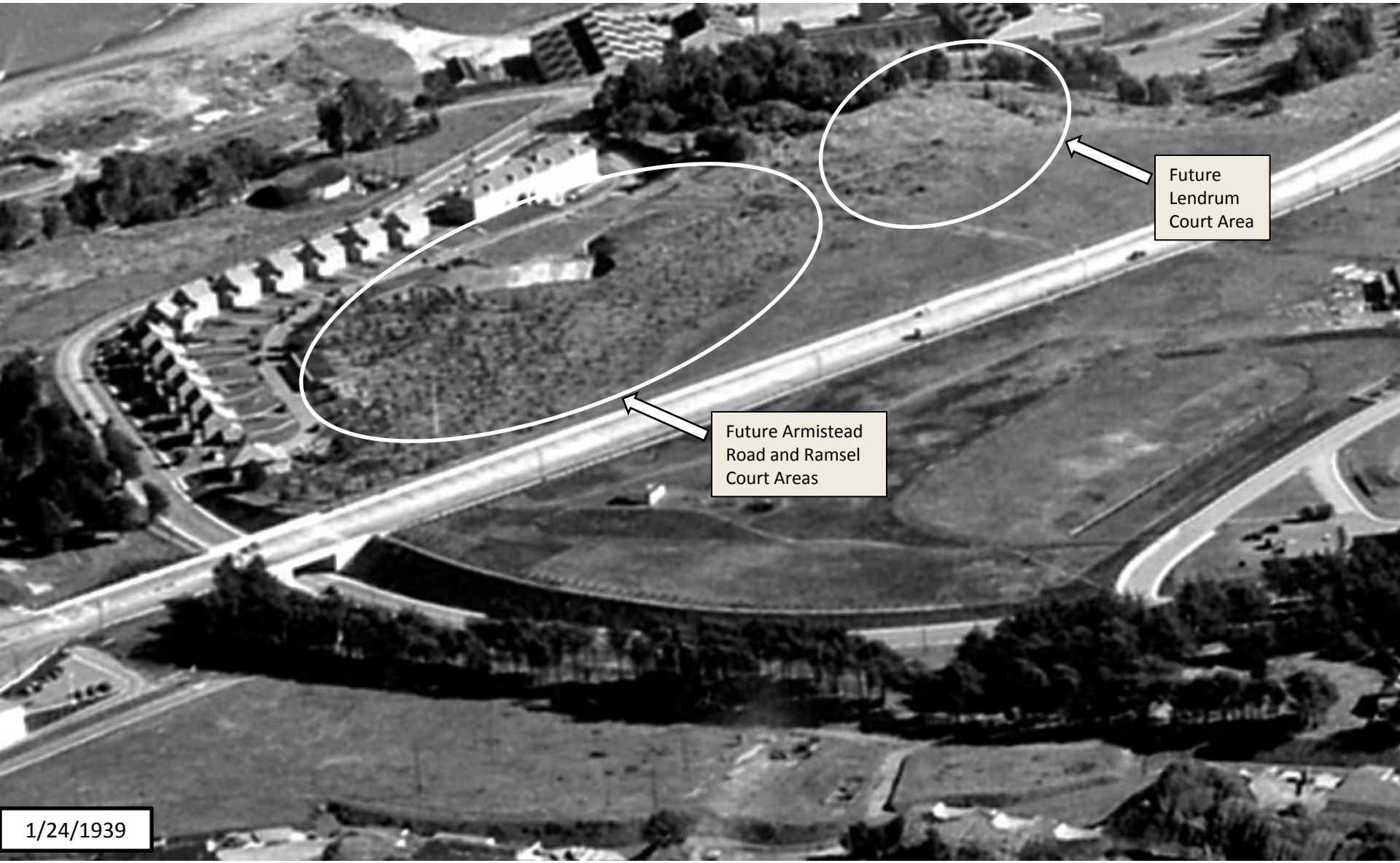
1936

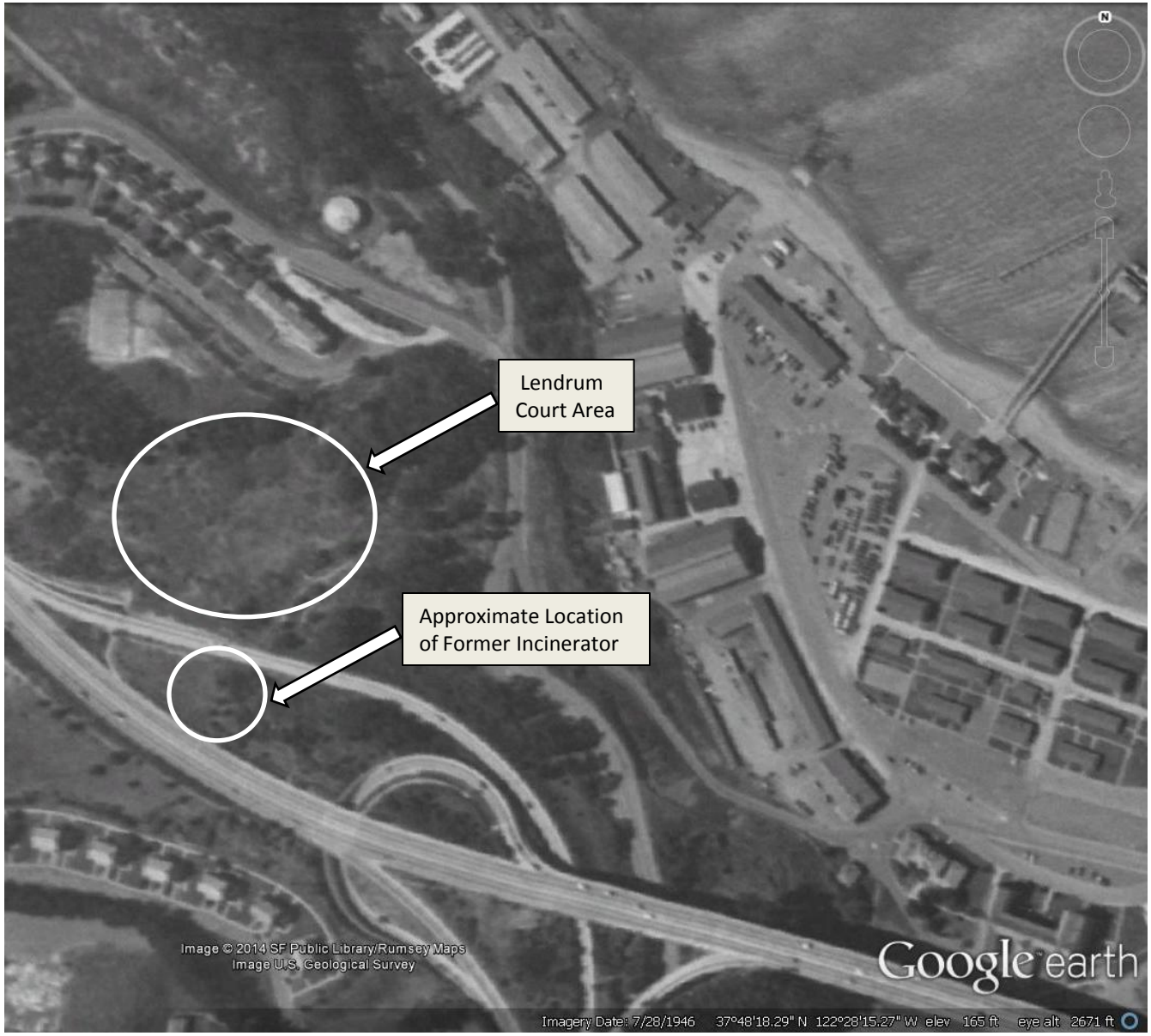

Future Armistead Road and Ramsel Court Areas
Highway 101
Future Lendrum Court Area
Approximate location of former incinerator
3/28/1936


Future Armistead Road and Ramsel Court Areas
Future Lendrum Court Area
1/8/1938

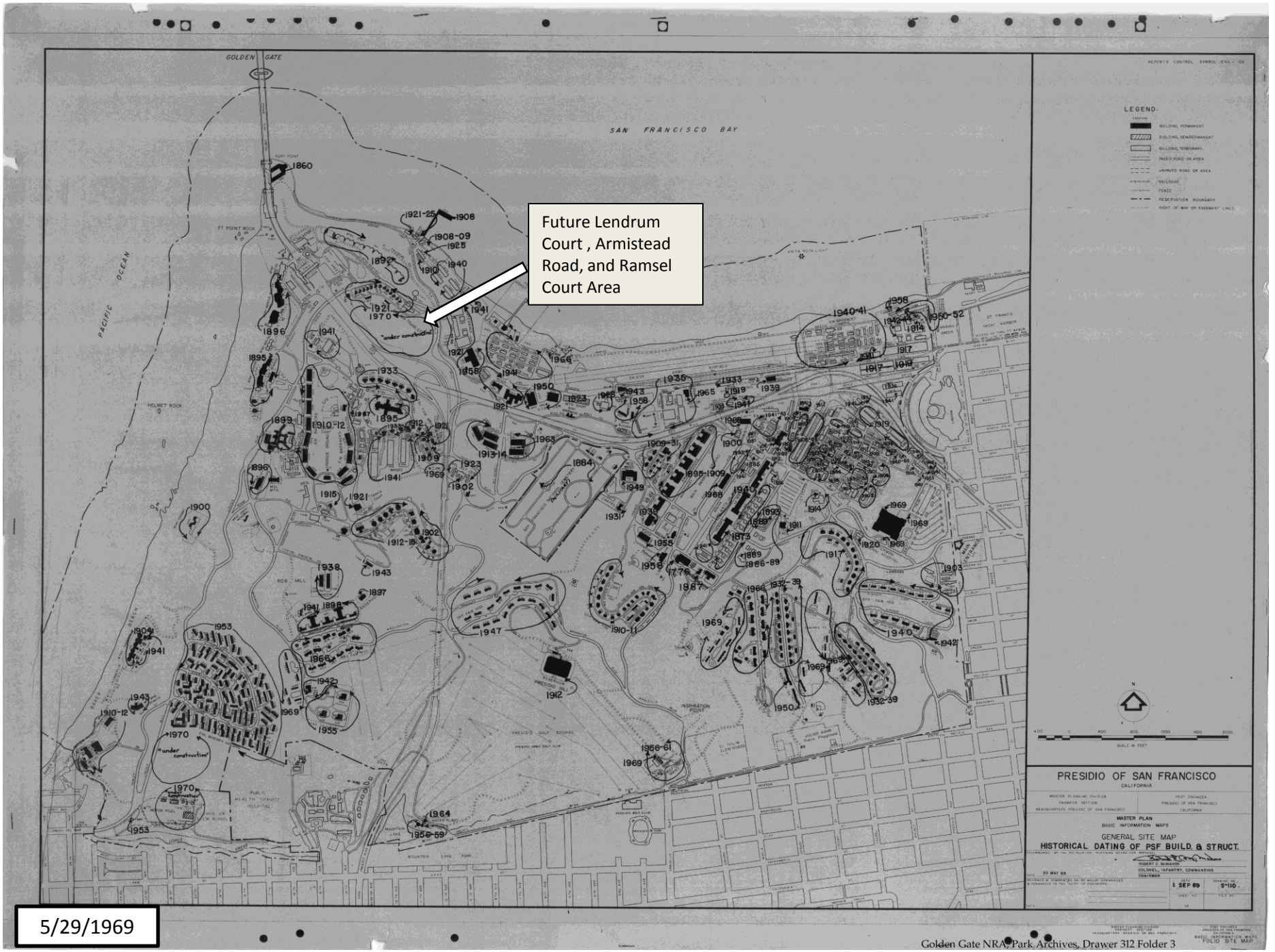

Future Armistead Road and Ramsel Court Areas
Future Lendrum Court Area
1/24/1939


Future Armistead Road and Ramsel Court Areas
Future Lendrum Court Area
1/24/1939

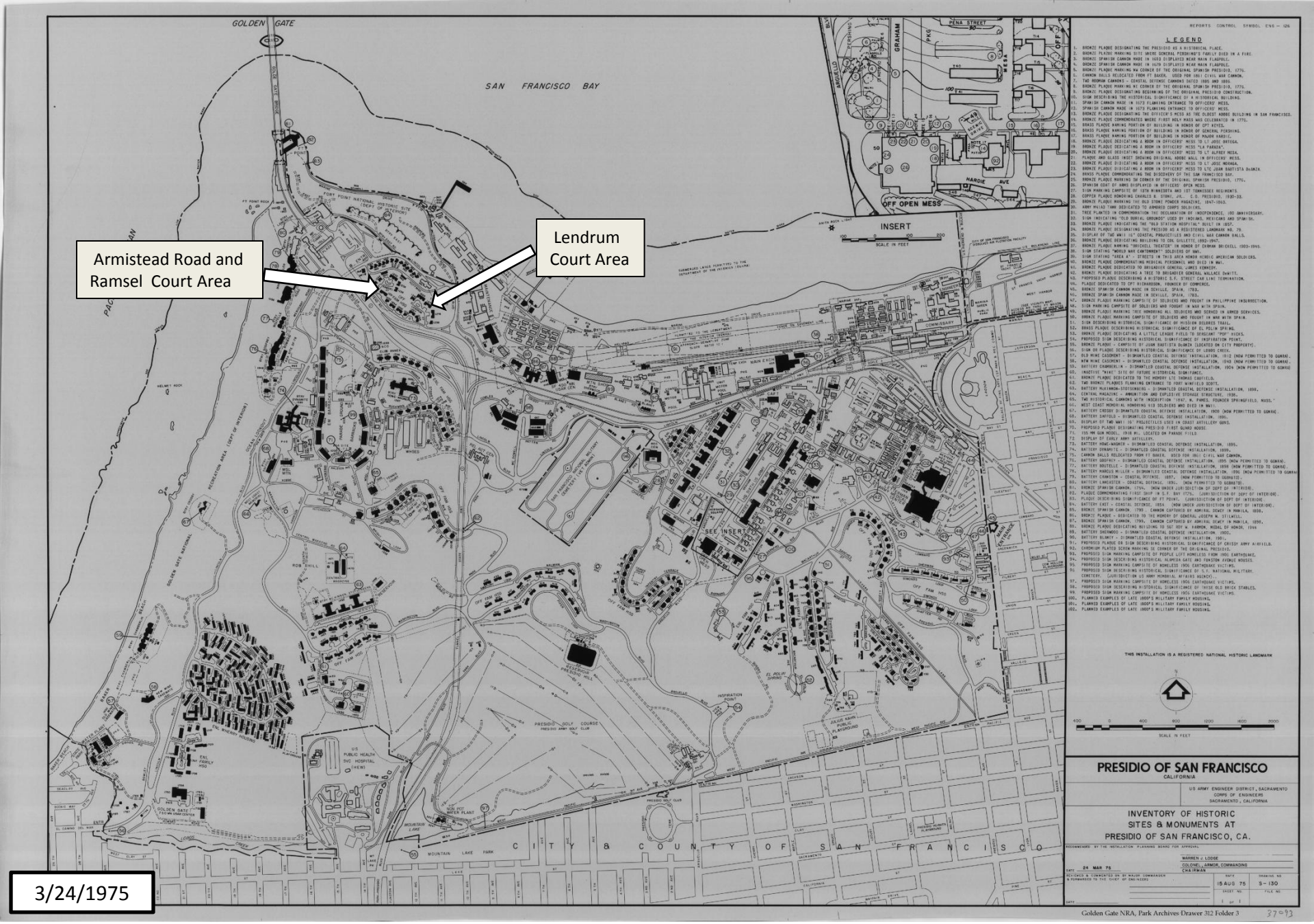

Future Lendrum Court Area
Future Armistead Road and Ramsel Court Areas
1/24/1939


Lendrum
Court Area
Approximate Location
of Former Incinerator
Image © 2014 SF Public Library/Rumsey Maps
Image U.S. Geological Survey
Google earth
Imagery Date: 7/28/1946 37°48'18.29" N 122°28'15.27" W elev 165 ft eye alt 2671 ft

1946




5/29/1969


Armistead Road and Ramsel Court Area
Lendrum Court Area
GOLDEN GATE
SAN FRANCISCO BAY
PRESIDIO OF SAN FRANCISCO
CALIFORNIA
INVENTORY OF HISTORIC SITES & MONUMENTS AT PRESIDIO OF SAN FRANCISCO, CA.
US ARMY ENGINEER DISTRICT, SACRAMENTO CORPS OF ENGINEERS SACRAMENTO, CALIFORNIA
15 AUG 75
S-130
THIS INSTALLATION IS A REGISTERED NATIONAL HISTORIC LANDMARK
C I T Y & C O U N T Y O F S A N F R A N C I S C O
3/24/1975
Golden Gate NRA, Park Archives Drawer 312 Folder 3
37-93

7/31/1938


7/31/1938 (with overlay of current Buildings)

# Appendix B

## Notice to Tenants Regarding Upcoming Work

## dewitt, john

**To:** dewitt, john
**Subject:** FW: Lendrum Court - Second Phase of Soil Invesigation

**From:** Presidio Trust Resident Advisory [mailto:noreply=presidiotrust.gov@mail38.atl111.rsgsv.net] **On Behalf Of** Presidio Trust Resident Advisory
**Sent:** Friday, August 22, 2014 11:15 AM
**To:** Ostrander, Ann
**Subject:** Lendrum Court - Second Phase of Soil Invesigation



Dear North Fort Scott Residents,

Beginning September 2, 2014, under the Department of Toxic Substances Control's (DTSC) oversight, the Trust will be conducting a second phase of soil investigation within the Lendrum Court area of your neighborhood. The purpose of this investigation is to:

- find how widely the sub-surface debris is dispersed in the Lendrum Court area
- characterize potential contaminants of concern (COCs) associated with the debris
- collect data to evaluate possible clean-up alternatives.

During this time, multiple trenches will be excavated in front, behind, or between most of the buildings in Lendrum Court and on the hillside towards Lincoln Boulevard. Trenches will be backfilled on the same day they are excavated. A copy of the draft work plan is posted on the Trust's webpage: http://www.presidio.gov/about/Documents/2014_08_06_AdditionalSamplingPlanLendrumCourt.pdf

Work will include removal of selective shrubs and vegetation growing beneath the trees on the hill behind Buildings 1279, 1278, and 1259. The vegetation removal is necessary to provide access for site investigation work, including trenching and site survey. Larger trees will not be removed.

Work hours will be from 8:00 AM to 5:00 PM, Monday through Friday. It is expected that the work will be completed in 5 to 6 weeks. I will provide you a copy of the investigation findings when they are available. For your safety, the areas will be fenced off and I request that you stay out of these areas during non-work hours.

Please give me a call if you have any questions. You may also contact George Chow, DTSC Project Manager, by telephone at 510-540-3879 or by email at George.Chow@dtsc.ca.gov.

Thank you for your continued understanding and support during the investigative and clean-up process.

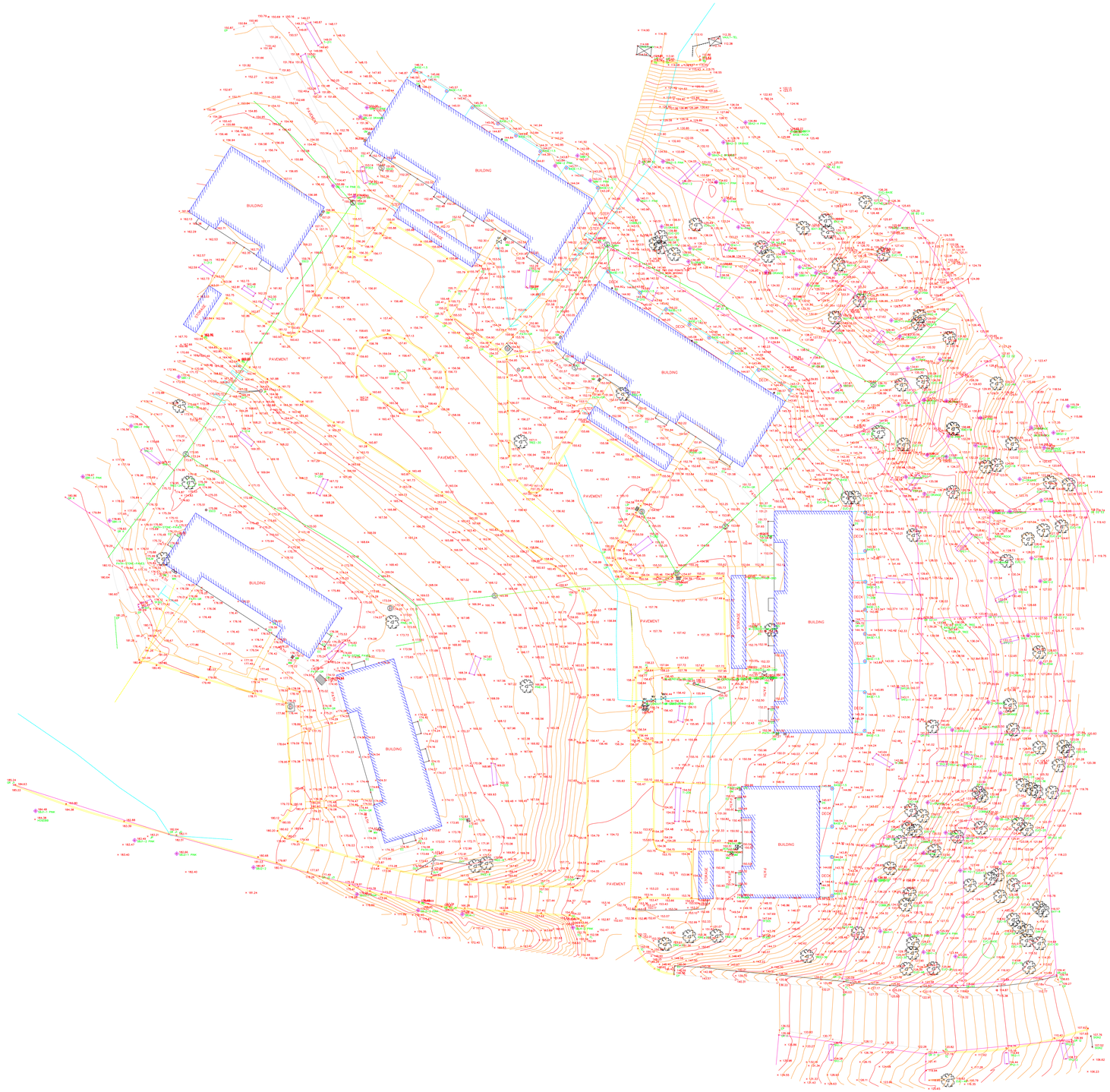
Sincerely,

Eileen Fanelli
Environmental Remediation Program Manager
Presidio Trust
efanelli@presidiotrust.gov
(415) 561-4259

c: Pilots' Row residents

# Appendix B

Lendrum Court Area Site Survey
PLS Surveyors, Inc., October 2014




Control Point Table

| Point # | Northing | Easting | Elevation | Row Description |
|---|---|---|---|---|
| 2 | 481195.9545 | 1430875.8771 | 156.455 | CUT-X |
| 3 | 481244.2146 | 1430780.0197 | 160.281 | NAIL-W |
| 4 | 481066.5011 | 1430894.1335 | 154.296 | CUT-X |
| 5 | 481038.6208 | 1430786.9117 | 169.428 | NAIL-W |
| 6 | 481032.4889 | 1430909.6808 | 152.407 | NAIL |
| 7 | 481066.1336 | 1430923.4340 | 150.476 | NAIL |
| 8 | 481113.2017 | 1430935.9713 | 151.489 | NAIL |
| 9 | 481149.4787 | 1430941.0455 | 152.341 | NAIL |
| 12 | 481195.9781 | 1430875.8775 | 156.420 | CUT-X |
| 13 | 481113.0163 | 1430996.4953 | 143.403 | NAIL |
| 14 | 481220.8715 | 1430992.1258 | 140.856 | NAIL |
| 15 | 481224.6432 | 1430933.3235 | 151.355 | NAIL |
| 16 | 481137.4377 | 1430716.4612 | 178.647 | NAIL |
| 17 | 481302.6049 | 1430722.7439 | 161.048 | NAIL |
| 18 | 481435.1305 | 1430713.8901 | 155.368 | NAIL |
| 19 | 481360.1853 | 1430865.5320 | 143.625 | NAIL |
| 20 | 481293.5593 | 1430917.0691 | 144.862 | NAIL |
| 21 | 481382.0868 | 1430742.1558 | 154.057 | NAIL |
| 22 | 481235.0608 | 1430694.2428 | 171.995 | NAIL |
| 24 | 481326.7540 | 1430835.3701 | 152.134 | NAIL |

Control Point Table

| Point # | Northing | Easting | Elevation | Row Description |
|---|---|---|---|---|
| 25 | 481283.4890 | 1430839.3977 | 152.530 | NAIL |
| 26 | 481078.5007 | 1430812.7399 | 170.432 | NAIL |
| 27 | 481060.6625 | 1430758.1190 | 174.509 | NAIL |
| 31 | 481046.8698 | 1430858.4740 | 154.075 | NAIL-W |
| 32 | 481099.8607 | 1430928.5950 | 150.375 | NAIL |
| 33 | 481108.4676 | 1431002.8390 | 142.680 | NAIL |
| 34 | 481201.2180 | 1431004.5530 | 139.904 | NAIL |
| 35 | 481142.1258 | 1431037.9360 | 137.287 | NAIL |
| 36 | 481022.1342 | 1430987.3240 | 153.870 | NAIL |
| 37 | 480976.6145 | 1430971.7800 | 130.831 | NAIL-W |
| 38 | 481267.6072 | 1430972.3350 | 138.679 | NAIL |
| 39 | 481255.9848 | 1431033.3820 | 131.958 | NAIL |
| 40 | 481353.3080 | 1430982.5730 | 127.682 | NAIL |
| 41 | 481346.3834 | 1430868.9500 | 144.804 | NAIL |
| 42 | 481366.4557 | 1430917.0580 | 135.226 | NAIL |
| 43 | 481403.5753 | 1430885.6730 | 126.754 | CUT-X |
| 44 | 481188.5107 | 1430642.4810 | 180.414 | NAIL-W |
| 45 | 481117.7343 | 1430635.6480 | 182.306 | NAIL-W |
| 46 | 481071.0170 | 1430710.6770 | 180.687 | NAIL-W |
| 47 | 481040.5086 | 1430771.6820 | 172.203 | NAIL-W |

Control Point Table

| Point # | Northing | Easting | Elevation | Row Description |
|---|---|---|---|---|
| 2276 | 481234.0653 | 1430676.3837 | 175.262 | TAG-5637 |
| 2956 | 481027.9191 | 1430982.4000 | 136.805 | TAG-5637 |
| 2985 | 481082.9852 | 1431006.5130 | 141.162 | TAG-5603 |
| 5038 | 481024.8118 | 1430917.3670 | 150.888 | TAG-5600 |

| POINT NUMBER | NORTHING NAD27 | EASTING NAD27 | NORTHING NAD83 | EASTING NAD83 | ELEVATION PLLW | ELEVATION NAVD88 | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 2792 | 481137.497 | 1431001.779 | 2121546.931 | 5992368.430 | 143.11 | 143.48 | 1279TPF0-1 |
| 2793 | 481132.365 | 1431001.927 | 2121541.799 | 5992368.578 | 143.11 | 143.48 | 1279TPF0-1 |
| 2842 | 481102.659 | 1431019.620 | 2121512.093 | 5992386.271 | 139.05 | 139.42 | 1279TPG1-2 |
| 2843 | 481102.373 | 1431024.239 | 2121511.807 | 5992390.890 | 138.05 | 138.42 | 1279TPG1-2 |
| 2845 | 481107.093 | 1431030.966 | 2121516.527 | 5992397.617 | 135.31 | 135.68 | 1279TPC1-1 |
| 2846 | 481105.234 | 1431035.726 | 2121514.668 | 5992402.377 | 134.21 | 134.58 | 1279TPC1-1 |
| 2884 | 481077.351 | 1431047.364 | 2121486.785 | 5992414.015 | 128.23 | 128.60 | 1279SBG2-1-PINK |
| 2926 | 481053.302 | 1431030.401 | 2121462.736 | 5992397.052 | 127.78 | 128.15 | 1279SBH2-1 |
| 2960 | 481047.489 | 1430978.160 | 2121456.923 | 5992344.811 | 141.68 | 142.05 | 1279SBH0-1 |
| 3004 | 481049.075 | 1430991.486 | 2121458.509 | 5992358.137 | 137.01 | 137.38 | 1279SBH0-2 |
| 3080 | 481024.796 | 1431019.939 | 2121434.230 | 5992386.590 | 125.95 | 126.32 | 1279SBH1-4 PINK |
| 3084 | 481023.674 | 1431007.031 | 2121433.108 | 5992373.682 | 129.24 | 129.61 | 1279SBH1-2 PINK |
| 3092 | 481015.752 | 1431013.518 | 2121425.186 | 5992380.169 | 126.72 | 127.09 | 1279SBH1-3 |
| 3102 | 481025.416 | 1430993.591 | 2121434.849 | 5992360.242 | 132.44 | 132.81 | 1279SBH1-1 |
| 3122 | 480973.336 | 1430971.012 | 2121382.770 | 5992337.663 | 130.18 | 130.55 | 1279TPI1-1 |
| 3123 | 480966.057 | 1430971.051 | 2121375.491 | 5992337.702 | 129.28 | 129.65 | 1279TPI1-1 |
| 3169 | 480966.706 | 1431079.008 | 2121376.140 | 5992445.659 | 108.73 | 109.10 | 1279TPI2-2 |
| 3170 | 480973.842 | 1431077.548 | 2121383.276 | 5992444.199 | 109.63 | 110.00 | 1279TPI2-2 |
| 3176 | 480969.497 | 1431051.506 | 2121378.931 | 5992418.157 | 114.69 | 115.06 | 1279TPI2-1 |
| 3177 | 480964.432 | 1431051.883 | 2121373.866 | 5992418.534 | 114.44 | 114.81 | 1279TPI2-1 |
| 3237 | 481158.540 | 1431048.948 | 2121567.974 | 5992415.599 | 133.17 | 133.54 | 1279TPF2-1 |
| 3238 | 481160.561 | 1431057.056 | 2121569.995 | 5992423.707 | 131.14 | 131.51 | 1279TPF2-1 |
| 3247 | 481177.371 | 1431046.751 | 2121586.805 | 5992413.402 | 132.04 | 132.41 | 1279TPE1-2 |
| 3248 | 481181.879 | 1431055.912 | 2121591.313 | 5992422.563 | 129.82 | 130.19 | 1279TPE1-2 |
| 3274 | 481186.540 | 1431067.204 | 2121595.974 | 5992433.855 | 127.20 | 127.57 | 1279SBE1-2 |
| 3357 | 481235.123 | 1431011.511 | 2121644.557 | 5992378.162 | 134.64 | 135.01 | 1279TPD1-1 |
| 3358 | 481228.564 | 1431007.023 | 2121637.998 | 5992373.674 | 136.88 | 137.25 | 1279TPD1-1 |
| 3366 | 481244.480 | 1431015.226 | 2121653.914 | 5992381.877 | 130.22 | 130.59 | 1279SB01-1 PINK |
| 3400 | 481200.621 | 1431028.989 | 2121610.055 | 5992395.640 | 133.26 | 133.63 | 1279TPE1-1 |
| 3405 | 481208.027 | 1431035.490 | 2121617.461 | 5992402.141 | 130.07 | 130.44 | 1279TPE1-1 |
| 3425 | 481218.310 | 1431045.400 | 2121627.744 | 5992412.051 | 126.19 | 126.56 | 1279SBE1-1 PINK |
| 3495 | 481254.787 | 1431073.298 | 2121664.221 | 5992439.949 | 117.41 | 117.78 | 1279SB02-2 |
| 3506 | 481267.017 | 1431079.954 | 2121676.451 | 5992446.605 | 115.39 | 115.76 | 1279SB02-1 |
| 3582 | 481295.850 | 1430990.642 | 2121705.284 | 5992357.293 | 132.07 | 132.44 | 1279TPC1-1 |
| 3583 | 481301.383 | 1430994.973 | 2121710.817 | 5992361.624 | 129.40 | 129.77 | 1279TPC1-1 |
| 3585 | 481306.484 | 1430998.674 | 2121715.918 | 5992365.325 | 127.24 | 127.61 | 1279SBC1-1 PINK |
| 3683 | 481273.657 | 1430971.292 | 2121683.091 | 5992337.943 | 138.45 | 138.82 | 1279TPC1-2 |
| 3684 | 481276.815 | 1430975.305 | 2121686.249 | 5992341.956 | 137.87 | 138.24 | 1279TPC1-2 |
| 3725 | 481326.540 | 1430918.831 | 2121735.974 | 5992285.482 | 138.58 | 138.95 | 1279TPA1-2 |
| 3726 | 481331.599 | 1430919.422 | 2121741.033 | 5992286.073 | 137.37 | 137.74 | 1279TPA1-2 |
| 3803 | 481316.731 | 1430952.043 | 2121726.165 | 5992318.694 | 133.44 | 133.81 | 1279TPB1-1 |
| 3804 | 481313.502 | 1430949.731 | 2121722.936 | 5992316.382 | 135.16 | 135.53 | 1279TPB1-1 |
| 3851 | 481327.626 | 1430955.026 | 2121737.060 | 5992321.677 | 132.74 | 133.11 | 1279SBB1-1 PINK |
| 3862 | 481370.144 | 1430918.079 | 2121779.577 | 5992284.730 | 134.62 | 134.99 | 1279SBA2-1 PINK |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3888 | 481397.564 | 1430931.580 | 2121806.998 | 5992298.231 | 126.89 | 127.26 | 1279SBA2-4 PINK |
| 3918 | 481338.920 | 1430922.330 | 2121748.353 | 5992288.981 | 134.46 | 134.83 | 1279TPA1-1 |
| 3919 | 481341.555 | 1430923.527 | 2121750.989 | 5992290.178 | 134.12 | 134.49 | 1279TPA1-1 |
| 3943 | 481361.935 | 1430882.014 | 2121771.369 | 5992248.665 | 140.11 | 140.48 | 1279SBA1-1 PINK |
| 3962 | 481369.857 | 1430901.184 | 2121779.291 | 5992267.835 | 136.00 | 136.37 | 1279TPA1-2 |
| 3963 | 481378.585 | 1430910.342 | 2121788.019 | 5992276.993 | 133.22 | 133.59 | 1279TPA1-2 |
| 3964 | 481382.974 | 1430914.891 | 2121792.408 | 5992281.542 | 131.66 | 132.03 | 1279SBA2-2 ORANG |
| 3965 | 481388.402 | 1430921.383 | 2121797.836 | 5992288.034 | 130.22 | 130.59 | 1279SBA2-3 ORANG |
| 3981 | 481379.595 | 1430893.593 | 2121789.029 | 5992260.244 | 135.15 | 135.52 | 1279SBA2-5 PINK |
| 4773 | 481377.615 | 1430843.913 | 2121787.049 | 5992210.564 | 143.84 | 144.21 | 1279SBM-2 PINK |
| 4774 | 481370.839 | 1430860.097 | 2121780.273 | 5992226.748 | 143.20 | 143.57 | 1279SBM-1 PINK |
| 4780 | 481382.289 | 1430854.222 | 2121791.723 | 5992220.873 | 142.33 | 142.70 | 1279SBM-3 |
| 4809 | 481321.461 | 1430831.227 | 2121730.894 | 5992197.878 | 152.59 | 152.96 | 1279TP304 |
| 4810 | 481329.582 | 1430831.901 | 2121739.016 | 5992198.552 | 152.16 | 152.53 | 1279TP304 |
| 4811 | 481369.731 | 1430756.837 | 2121779.165 | 5992123.488 | 154.02 | 154.39 | 1279TP303 |
| 4812 | 481377.173 | 1430755.195 | 2121786.607 | 5992121.846 | 153.14 | 153.51 | 1279TP303 |
| 4820 | 481400.155 | 1430754.408 | 2121809.589 | 5992121.059 | 150.94 | 151.31 | 1279SBL-2 ORANGE |
| 4821 | 481404.435 | 1430757.316 | 2121813.869 | 5992123.967 | 150.06 | 150.43 | 1279SBM-1 PINK |
| 28 | 481374.666 | 1430729.247 | 2121784.100 | 5992095.898 | 155.89 | 156.26 | 1279SBL-1 PINK |
| 4846 | 481214.340 | 1430638.881 | 2121623.774 | 5992005.532 | 178.85 | 179.22 | 1279SBK-4 |
| 4849 | 481234.565 | 1430626.611 | 2121643.999 | 5991993.262 | 178.97 | 179.34 | 1279SBK-3 PINK |
| 4858 | 481257.931 | 1430648.844 | 2121667.365 | 5992015.495 | 175.89 | 176.26 | 1279SBK-1 PINK |
| 4861 | 481246.820 | 1430653.611 | 2121656.254 | 5992020.262 | 176.33 | 176.70 | 1279TPK-1 |
| 4862 | 481240.619 | 1430662.049 | 2121650.053 | 5992028.700 | 175.41 | 175.78 | 1279TPK-1 |
| 4876 | 481280.530 | 1430670.760 | 2121689.964 | 5992037.411 | 172.15 | 172.52 | 1279SBK-2 |
| 4883 | 481174.666 | 1430652.296 | 2121584.099 | 5992018.947 | 180.77 | 181.14 | 1279TP301 |
| 4884 | 481177.227 | 1430658.344 | 2121586.661 | 5992024.995 | 178.12 | 178.49 | 1279TP301 |
| 4914 | 481080.752 | 1430604.837 | 2121490.186 | 5991971.488 | 184.48 | 184.85 | S1279BJ1-1 PINK |
| 4918 | 481067.249 | 1430650.427 | 2121476.683 | 5992017.078 | 183.49 | 183.86 | 1279SBJ1-2 PINK |
| 4922 | 481061.084 | 1430669.807 | 2121470.518 | 5992036.458 | 182.66 | 183.03 | 1279SBJ2-1 PINK |
| 4952 | 481054.741 | 1430705.140 | 2121464.175 | 5992071.791 | 180.87 | 181.24 | 1279SBJ2-2 |
| 4957 | 481042.373 | 1430752.750 | 2121451.807 | 5992119.401 | 176.26 | 176.63 | 1279SBJ3-1 PINK |
| 4974 | 481035.052 | 1430780.926 | 2121444.485 | 5992147.577 | 172.57 | 172.94 | 1279SBJ3-2 PINK |
| 4976 | 481033.208 | 1430801.229 | 2121442.641 | 5992167.880 | 168.36 | 168.73 | 1279SBJ4-1 |
| 4991 | 481030.540 | 1430938.208 | 2121439.974 | 5992304.859 | 147.94 | 148.31 | 1279TP305 |
| 4992 | 481022.942 | 1430937.966 | 2121432.375 | 5992304.617 | 147.15 | 147.52 | 1279TP305 |
| 5004 | 481027.070 | 1430852.150 | 2121436.504 | 5992218.801 | 154.80 | 155.17 | 1279SBJ4-2 PINK |

LICENSED LAND SURVEYOR
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No. 5254
STATE OF CALIFORNIA

11 06 14

| POINT NUMBER | NORTHING NAD27 | EASTING NAD27 | NORTHING NAD83 | NORTHING NAD83 | ELEVATION PLLW | ELEVATION NAVD88 | DESCRIPTION |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| 2796 | 481118.038 | 1431026.676 | 2121527.472 | 5992393.327 | 138.15 | 138.52 | D-ORANGE |
| 2799 | 481125.724 | 1431048.951 | 2121535.158 | 5992415.602 | 132.16 | 132.53 | D-ORANGE |
| 2800 | 481130.700 | 1431043.314 | 2121540.134 | 5992409.965 | 134.71 | 135.08 | D-ORANGE |
| 2847 | 481101.555 | 1431032.515 | 2121510.989 | 5992399.166 | 134.92 | 135.29 | D-ORANGE |
| 2940 | 481084.656 | 1431015.435 | 2121494.090 | 5992382.086 | 137.85 | 138.22 | D-ORANGE |
| 2991 | 481064.761 | 1430990.267 | 2121474.195 | 5992356.918 | 140.29 | 140.66 | D-ORANGE |
| 3231 | 481143.582 | 1431051.940 | 2121553.016 | 5992418.591 | 132.38 | 132.75 | D-ORANGE |
| 3279 | 481195.558 | 1431044.630 | 2121604.992 | 5992411.281 | 131.16 | 131.53 | D-ORANGE |
| 3354 | 481226.661 | 1431013.893 | 2121636.095 | 5992380.544 | 137.16 | 137.53 | D-ORANGE |
| 3361 | 481234.444 | 1431005.320 | 2121643.878 | 5992371.971 | 136.18 | 136.55 | D-ORANGE |
| 3369 | 481243.702 | 1431024.039 | 2121653.136 | 5992390.690 | 133.81 | 134.18 | D-ORANGE |
| 3424 | 481218.674 | 1431053.201 | 2121628.107 | 5992419.852 | 125.14 | 125.51 | D-ORANGE |
| 3479 | 481257.176 | 1431063.036 | 2121666.610 | 5992429.687 | 119.53 | 119.90 | D-ORANGE |
| 3481 | 481247.956 | 1431068.977 | 2121657.390 | 5992435.628 | 118.39 | 118.76 | D-ORANGE |
| 3489 | 481233.408 | 1431057.762 | 2121642.841 | 5992424.413 | 122.64 | 123.01 | D-ORANGE |
| 3564 | 481267.770 | 1431002.036 | 2121677.204 | 5992368.687 | 138.06 | 138.43 | D-ORANGE |
| 3571 | 481284.398 | 1431006.239 | 2121693.832 | 5992372.890 | 134.61 | 134.98 | D-ORANGE |
| 3578 | 481299.171 | 1431002.595 | 2121708.605 | 5992369.246 | 130.22 | 130.59 | D-ORANGE |
| 3732 | 481333.575 | 1430905.319 | 2121743.009 | 5992271.970 | 139.28 | 139.65 | D-ORANGE |
| 3860 | 481328.732 | 1430941.158 | 2121738.166 | 5992307.809 | 135.17 | 135.54 | D-ORANGE |
| 3939 | 481349.680 | 1430893.007 | 2121759.114 | 5992259.658 | 139.46 | 139.83 | D-ORANGE |
| | | | | | | | |
| 2797 | 481111.796 | 1431044.962 | 2121521.230 | 5992411.613 | 132.52 | 132.89 | N-PINK |
| 2801 | 481126.055 | 1431065.864 | 2121535.489 | 5992432.515 | 127.36 | 127.73 | N-PINK |
| 2802 | 481116.839 | 1431069.607 | 2121526.273 | 5992436.258 | 125.78 | 126.15 | N-PINK |
| 2851 | 481097.680 | 1431048.788 | 2121507.114 | 5992415.439 | 130.69 | 131.06 | N-PINK |
| 2873 | 481084.131 | 1431059.812 | 2121493.565 | 5992426.463 | 126.00 | 126.37 | N-PINK |
| 2919 | 481056.760 | 1431048.684 | 2121466.194 | 5992415.335 | 124.40 | 124.77 | N-PINK |
| 2929 | 481070.720 | 1431023.680 | 2121480.154 | 5992390.331 | 132.21 | 132.58 | N-PINK |
| 3032 | 481061.436 | 1431013.480 | 2121470.870 | 5992380.131 | 133.89 | 134.26 | N-PINK |
| 3052 | 481032.437 | 1431031.680 | 2121441.871 | 5992398.331 | 124.24 | 124.61 | N-PINK |
| 3076 | 481013.828 | 1431028.164 | 2121423.262 | 5992394.815 | 122.25 | 122.62 | N-PINK |
| 3251 | 481161.506 | 1431061.562 | 2121570.940 | 5992428.213 | 129.22 | 129.59 | N-PINK |
| 3254 | 481148.859 | 1431067.397 | 2121558.293 | 5992434.048 | 127.35 | 127.72 | N-PINK |
| 3283 | 481197.057 | 1431063.156 | 2121606.491 | 5992429.807 | 127.98 | 128.35 | N-PINK |
| 3375 | 481253.292 | 1431024.996 | 2121662.726 | 5992391.647 | 131.36 | 131.73 | N-PINK |
| 3383 | 481269.900 | 1431013.750 | 2121679.334 | 5992380.401 | 134.05 | 134.42 | N-PINK |
| 3387 | 481269.481 | 1431023.947 | 2121678.915 | 5992390.598 | 128.43 | 128.80 | N-PINK |
| 3453 | 481248.923 | 1431037.350 | 2121658.357 | 5992404.001 | 130.40 | 130.77 | N-PINK |
| 3457 | 481261.611 | 1431039.709 | 2121671.045 | 5992406.360 | 129.60 | 129.97 | N-PINK |
| 3518 | 481223.651 | 1431067.668 | 2121633.084 | 5992434.319 | 125.89 | 126.26 | N-PINK |
| 3539 | 481288.538 | 1431021.065 | 2121697.972 | 5992387.716 | 131.94 | 132.31 | N-PINK |
| 3574 | 481288.827 | 1431008.796 | 2121698.261 | 5992375.447 | 133.47 | 133.84 | N-PINK |
| 3606 | 481319.618 | 1431009.990 | 2121729.051 | 5992376.641 | 127.55 | 127.92 | N-PINK |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3798 | 481328.407 | 1430964.042 | 2121737.841 | 5992330.693 | 131.43 | 131.80 | N-PINK |
| 3799 | 481322.842 | 1430960.198 | 2121732.276 | 5992326.849 | 131.86 | 132.23 | N-PINK |
| 3817 | 481328.073 | 1430973.093 | 2121737.507 | 5992339.744 | 127.87 | 128.24 | N-PINK |
| 3852 | 481330.970 | 1430956.452 | 2121740.404 | 5992323.103 | 132.51 | 132.88 | N-PINK |
| 3854 | 481337.843 | 1430948.887 | 2121747.277 | 5992315.538 | 133.42 | 133.79 | N-PINK |
| 3863 | 481361.693 | 1430921.853 | 2121771.127 | 5992288.504 | 133.49 | 133.86 | N-PINK |
| 3866 | 481349.387 | 1430928.266 | 2121758.821 | 5992294.917 | 132.44 | 132.81 | N-PINK |
| 3928 | 481339.617 | 1430906.021 | 2121749.051 | 5992272.672 | 137.37 | 137.74 | N-PINK |

LICENSED LAND SURVEYOR
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No. 5254
STATE OF CALIFORNIA

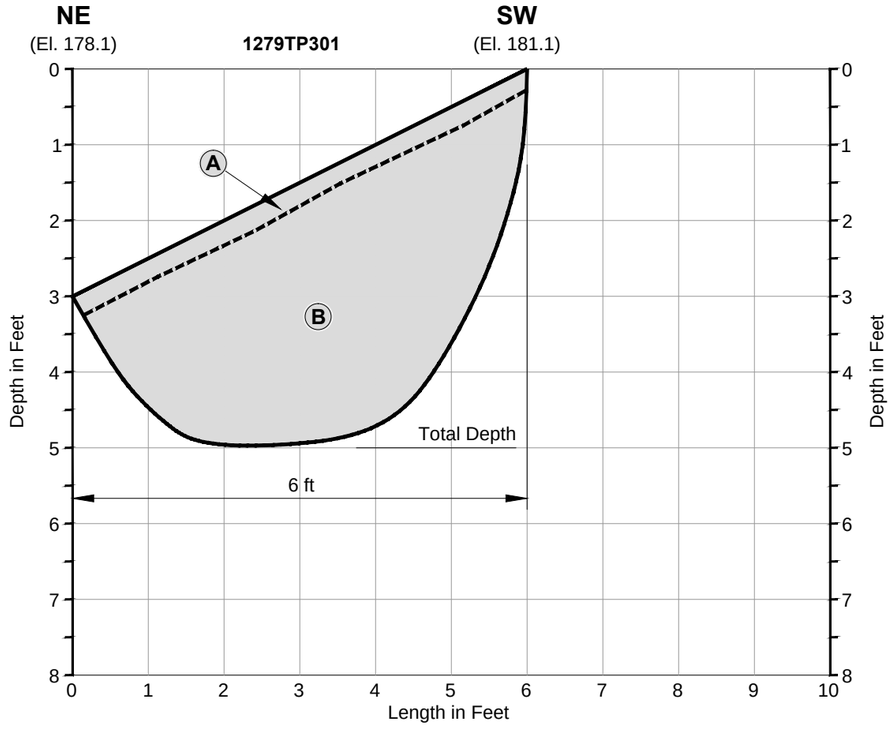
11-06-14

# Appendix C

Trench Logs and Select Photographs


View of trench.

View of trench looking south.




**LEGEND:**

**A:** Topsoil with vegetation and roots.

**B:** Sand, native soil, light yellowish brown, hard and well compacted. Mostly fine to medium sand grains with some fines. Excavator notes difficulty of digging and hardness of soil. No observed debris or ash, dry. Collected sample 1279TP301-S[0.5].

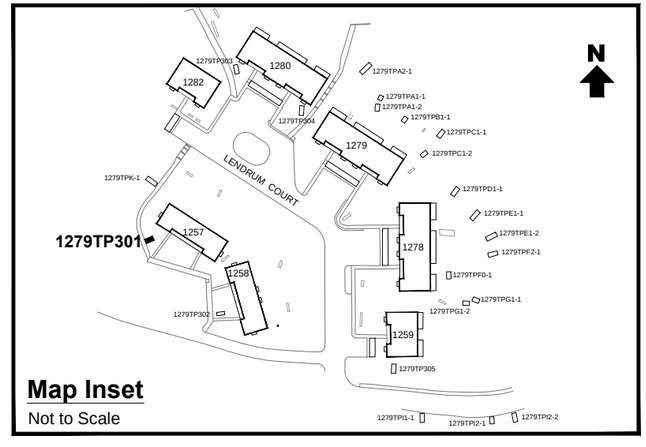
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**

Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TP301

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-1

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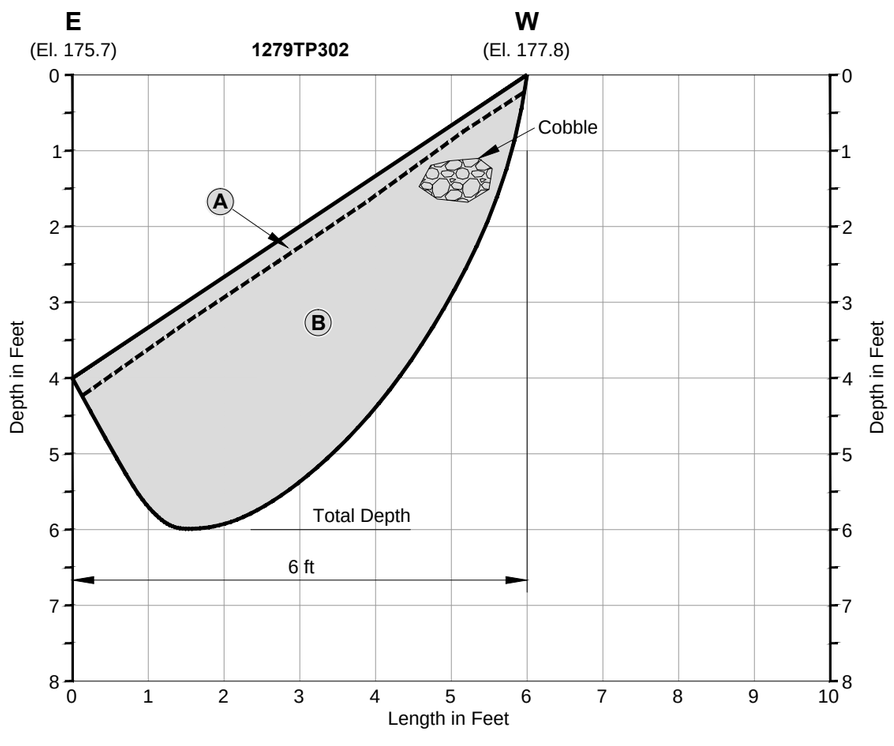
View of trench.


Excavating trench on slope.




**LEGEND:**

**A:** Topsoil with vegetation and roots.

**B:** Sand, native soil, yellowish brown, hard and well compacted. Fine to medium sand grains, well consolidated. Excavator notes difficulty of digging and hardness of soil. No observed debris or ash, dry. Collected sample 1279TP302-S[0.5].

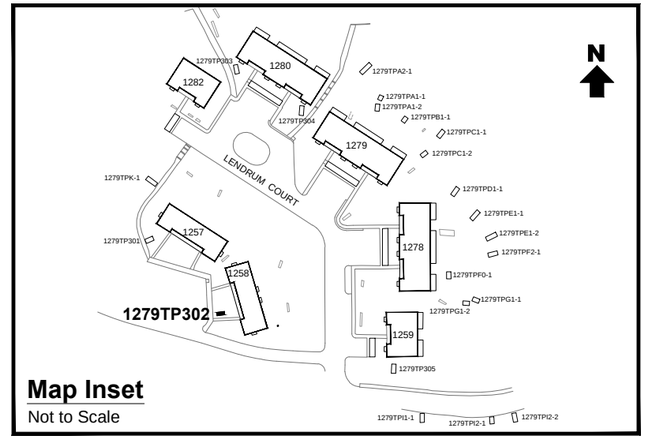
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**

Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TP302

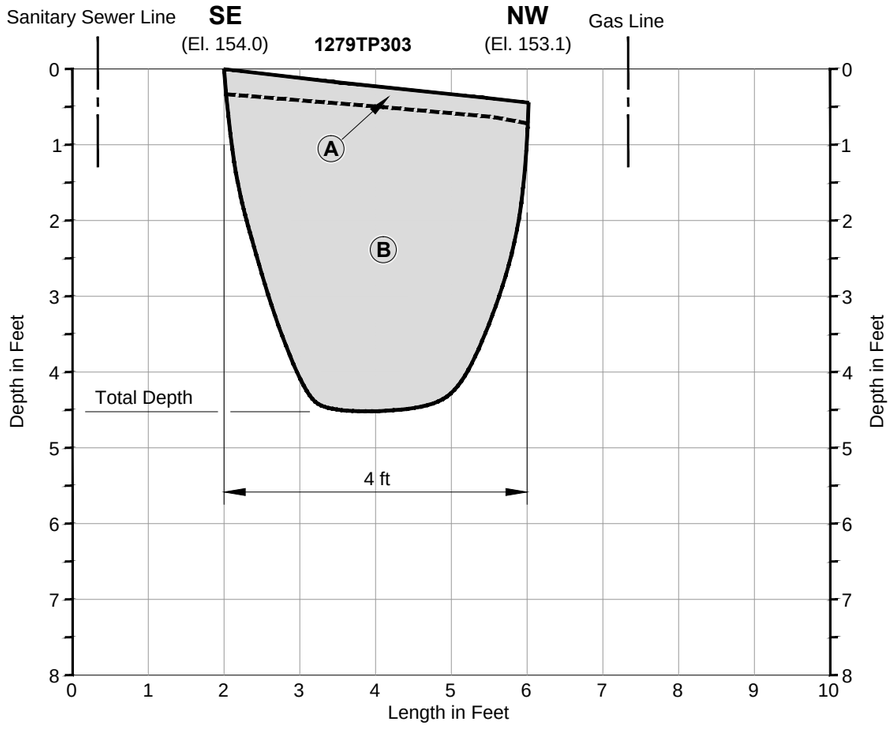
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-2

G:\B00025.07\2015-03\C-02_1279TP302.dwg 3-24-15


Spoils pile. Note yellow flag marking gas line that limited trench length.


View of trench in grass area.




**LEGEND:**

**A:** Topsoil with vegetation and roots.

**B:** Sand with fines, native soil, light yellowish brown, moderately consolidated. Fine to medium sand with some clay, no odor. Excavator notes easier digging due to soil moisture. No observed debris or ash. Collected sample 1279TP303-S[0.5].

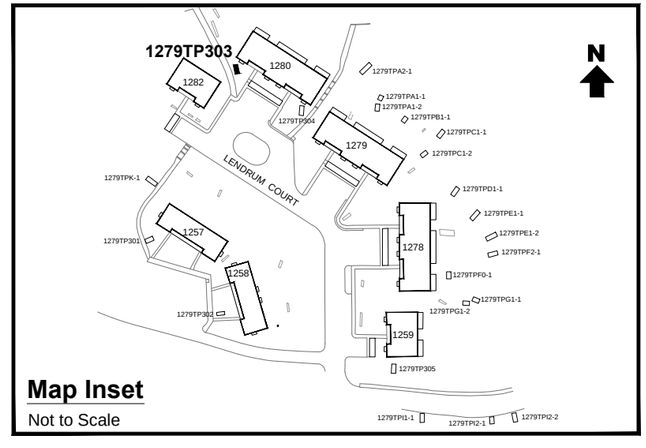
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**

Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TP303

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-3

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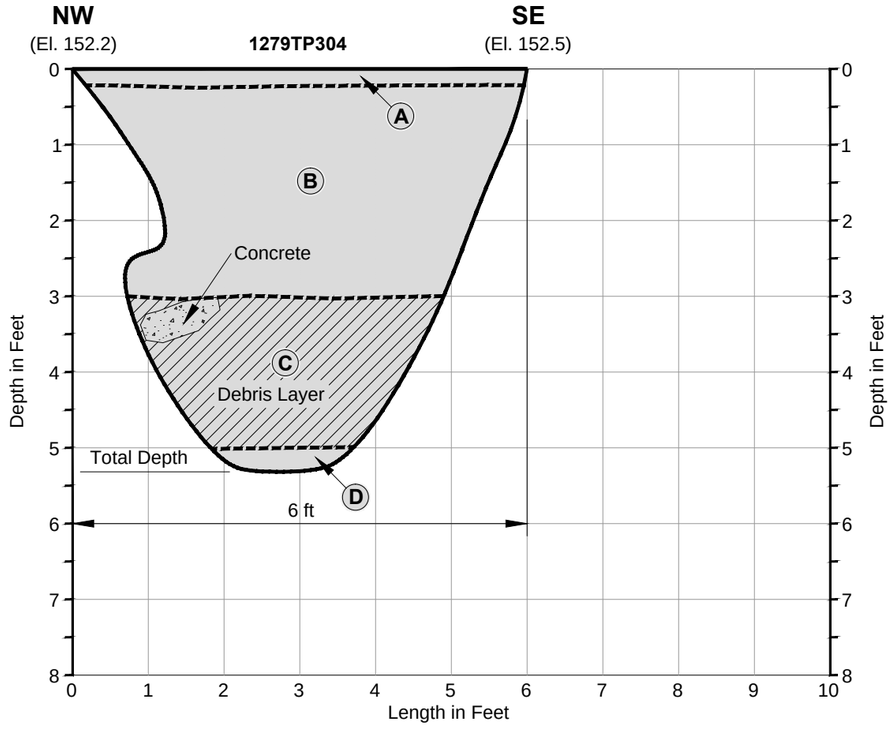
View of trench and spoil pile.

View inside trench. Note debris layer approximately 3 feet down.




**LEGEND:**

**A:** Topsoil with vegetation and roots.

**B:** Sand with fines, medium brown, weakly consolidated, dry. Mostly fine to medium sand with some clay, no odor. Some cobbles of serpentinite rock. No observed debris or ash.

**C:** Debris layer; observed debris includes glass, melted glass, ceramic and porcelain fragments, one large piece of concrete (~1 foot long); approximately 10 to 15% debris. Clayey sand fill, weakly consolidated, slightly powdery, dry. Collected sample 1279TP304-D[3.5].

**D:** Sand, native soil, light yellowish brown, moderate oxidation in root openings. Dry to moist. No odor or debris observed.

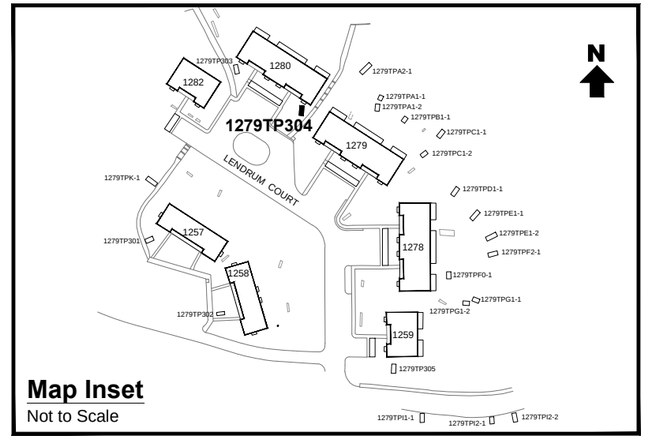
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

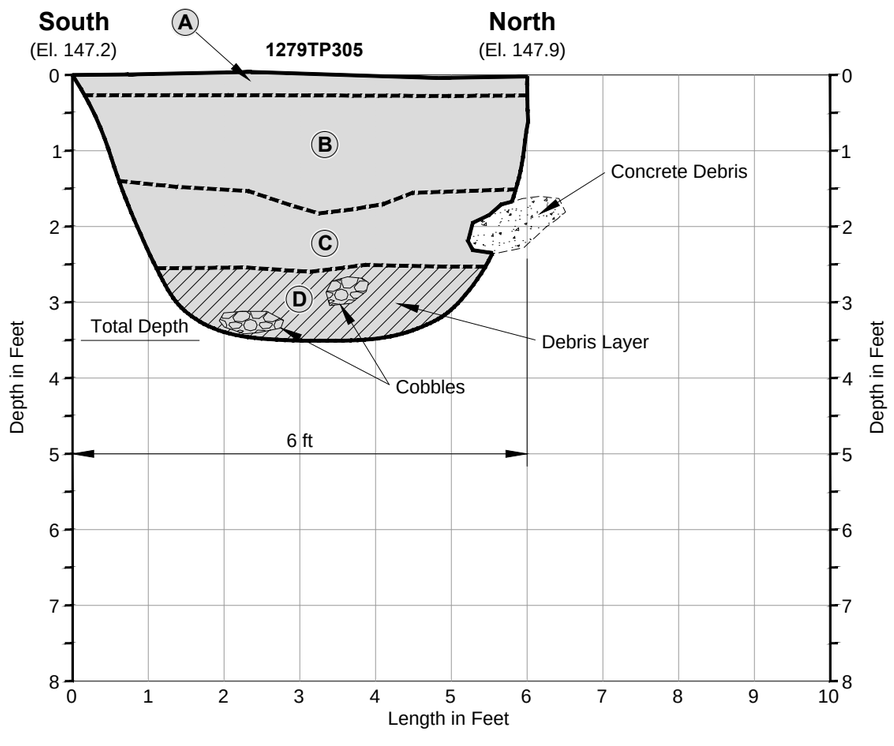
# Erler & Kalinowski, Inc.

Trench Log 1279TP304

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07
Figure C-4


View of trench and spoils pile.


Spoils pile. Note glass and porcelain fragments in near corner on plywood.




**LEGEND:**

**A:** Topsoil with vegetation and roots.

**B:** Sand with fines, yellowish brown, poorly consolidated, moderately sorted, with some fine gravels. No odor, dry. No observed debris or ash.

**C:** Sand with clay, light yellowish brown, fairly well consolidated. Some fine to medium gravel.

**D:** Debris layer; observed debris includes fragments of melted glass, sporadic porcelain fragments, with cobbles and serpentine rock; approximately 25% debris. Soil color is brown to medium brown, mostly fine grained sand with clay, dry, no odor. Collected sample 1279TP305-D[3.5]. Total depth was 4 feet; ground was too hard to continue trenching.

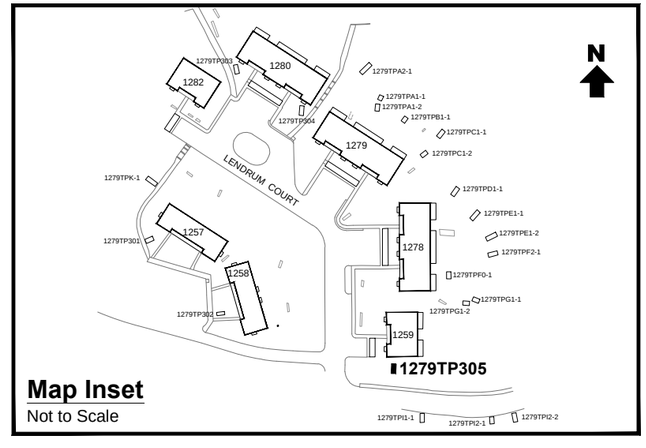
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TP305

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-5

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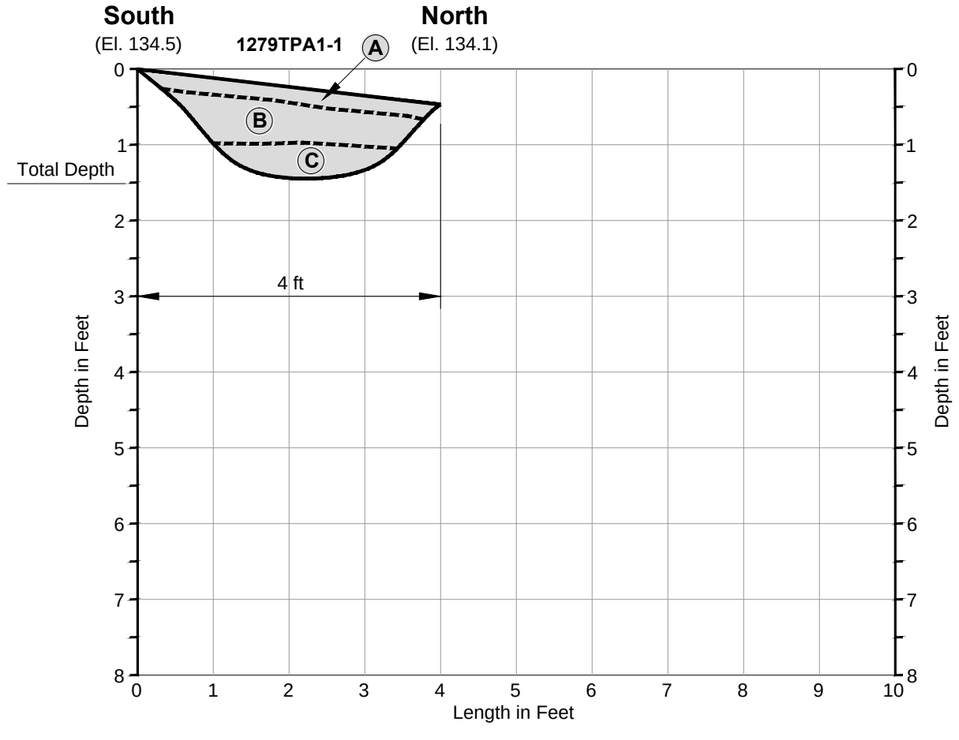
Initial digging of trench.


Spoils pile being generated during trenching.




**LEGEND:**

**A:** Topsoil with vegetation, duff, and roots.

**B:** Sand, native soil, light yellowish brown, moderately consolidated. No observed debris or ash. Collected sample 1279TPA1-1[0.5]S.

**C:** Degraded bedrock, undisturbed weathered serpentinite rock, hard.

El. = Elevation

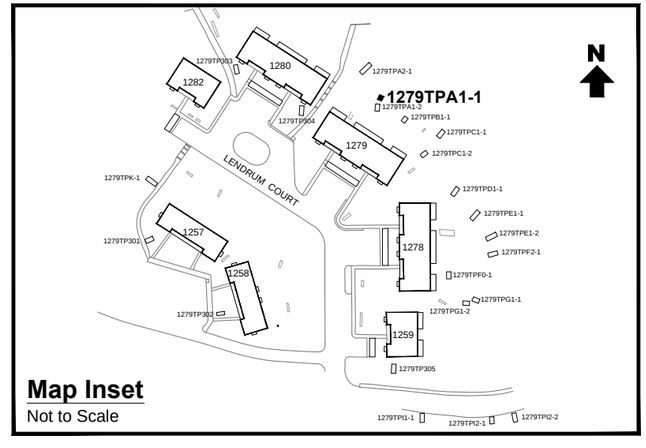
No photo is available of trench sidewalls.

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPA1-1

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-6

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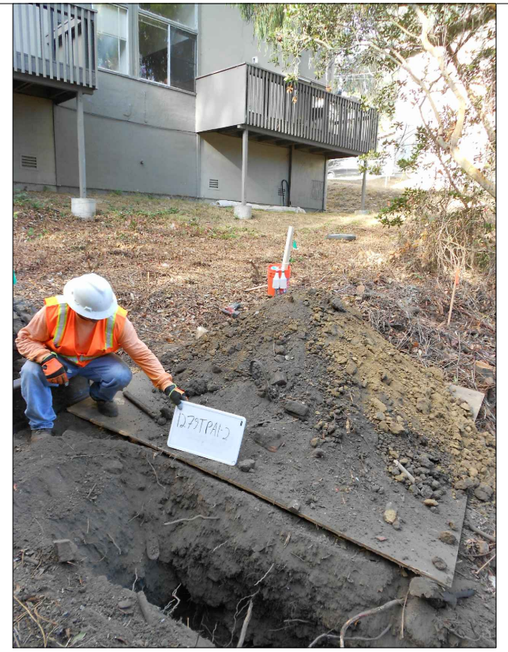
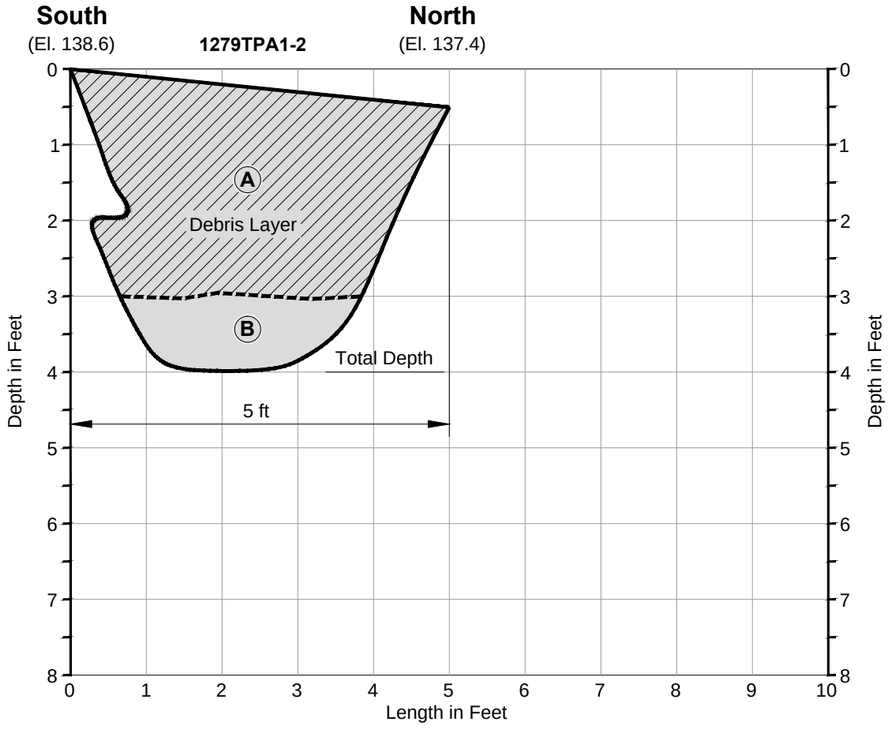
View of trench. Note ash in debris layer at surface.




Spoils pile. Note ash from top layer and native material from bottom of trench.




**LEGEND:**

**A:** Debris layer exposed to surface; observed debris includes glass and other debris, ashy in color, poorly consolidated. Collected sample 1279TPA1-2[2.0]D

**B:** Native, undisturbed soil, hard and compact, well consolidated. No observed debris or ash.

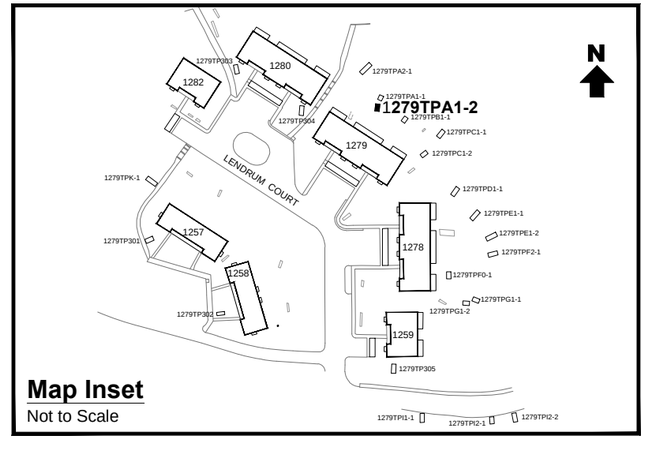
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPA1-2

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-7

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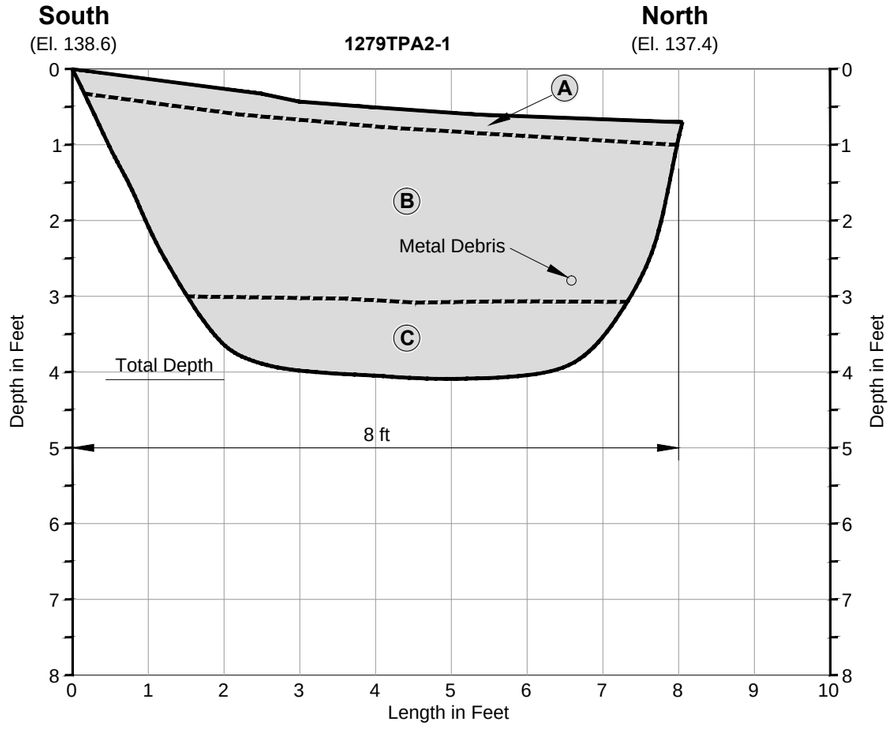
View of trench. Note that trench name is mislabeled in photo.


View of trench and spoils area. Note that trench name is mislabeled in photo.
Trench location confirmed by telephone pole at A1/A2 boundary.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Clayey sand, likely native soil, medium brown with yellowish hue. Excavator notes ease of digging, possibly due to disturbed native, possibly fill. Only 1 piece of observed debris.

**C:** Native, undisturbed Colma soil, light yellow brown, hard and compact, well consolidated. No observed debris or ash.

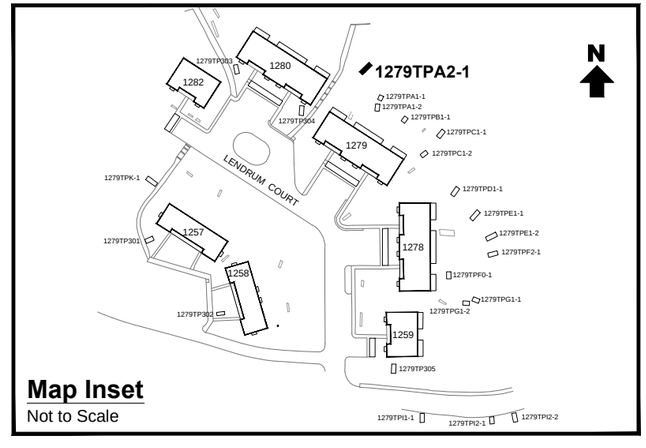
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




# Erler & Kalinowski, Inc.

Trench Log 1279TPA2-1

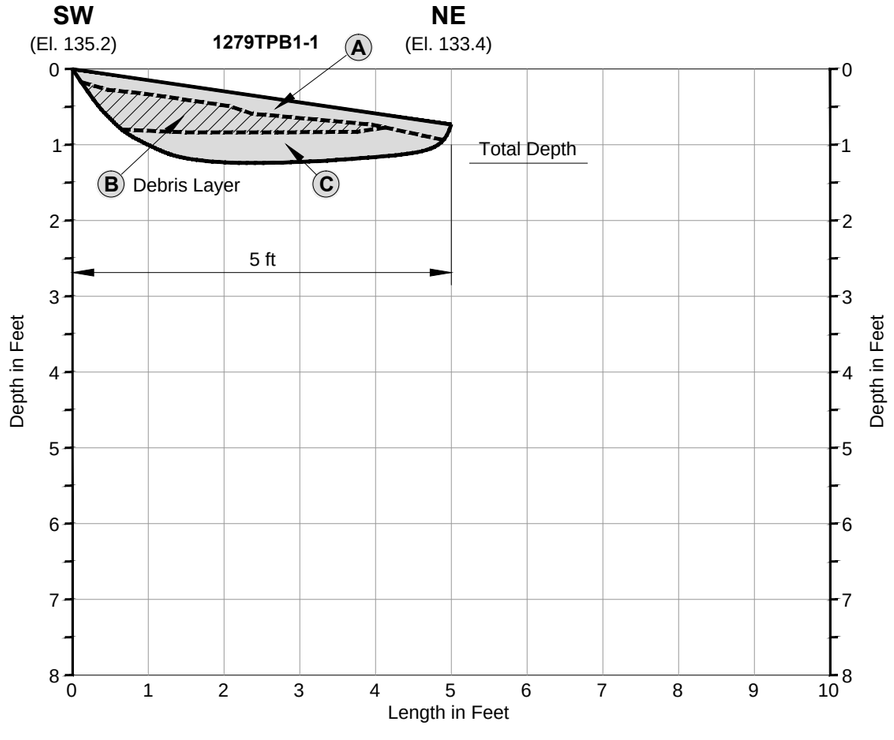
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-8

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-08_1279TPA2-1.dwg 3-24-15


View of trench and spoils pile.


Area view of trench.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Debris layer; ash present, observed debris includes fragments of glass and porcelain.

**C:** Native, undisturbed soil, light yellowish brown, hard and compact, well consolidated. No observed debris or ash.

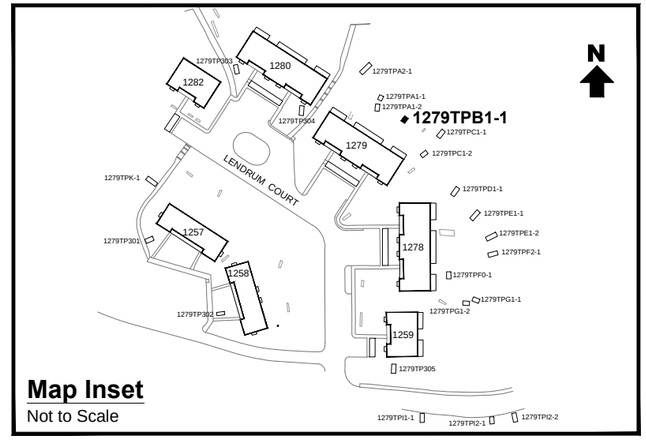
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPB1-1

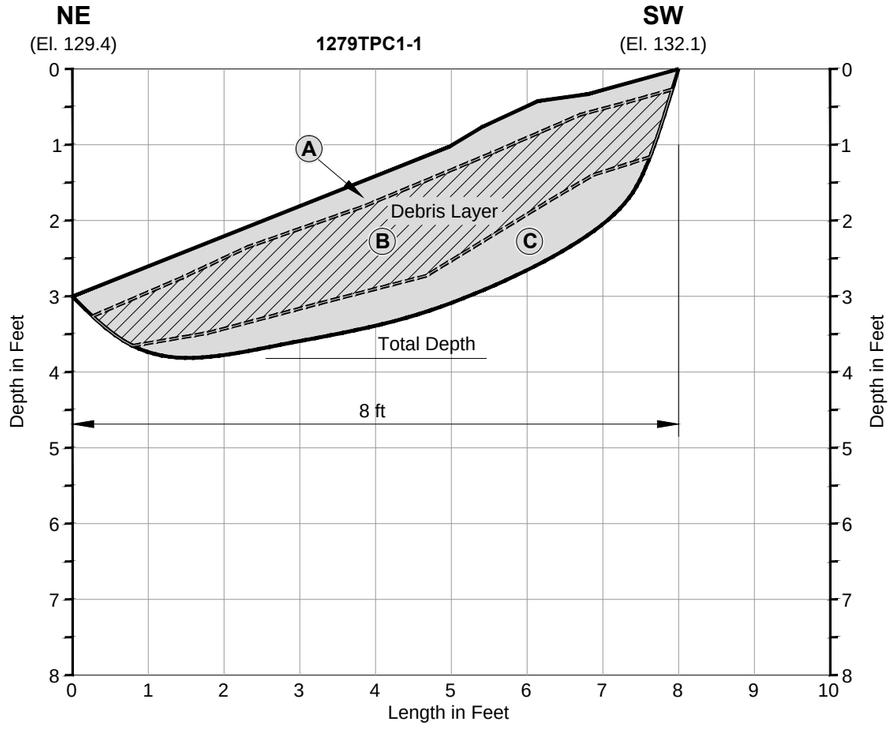
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-9

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-09_1279TPB1-1.dwg 3-24-15


View of trench and spoils pile. Note metal and brick debris in spoils.

Area view of trench.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Debris layer; ash present, observed debris includes fragments of glass, metal, and brick.

**C:** Native, undisturbed soil, light yellowish brown, hard and compact, very well consolidated. No observed debris or ash.

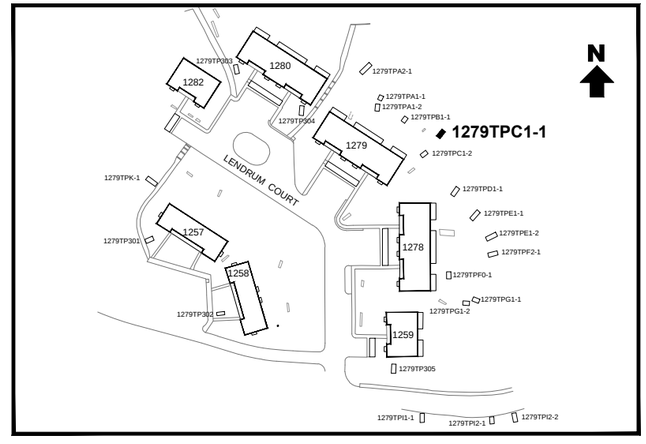
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




# Erler & Kalinowski, Inc.

Trench Log 1279TPC1-1

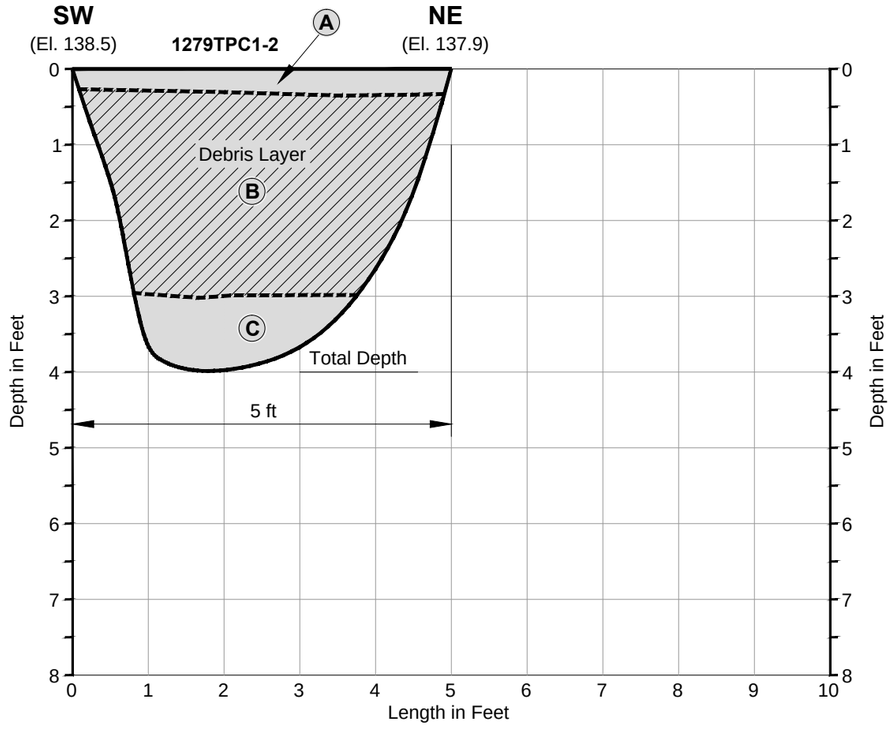
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-10

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-10_1279TPC1-1.dwg 3-24-15


View of trench. Note presence of ash.


Area view of trench and spoils pile. Note change in color of spoils, with native on left and ash to right rear of pile.




**LEGEND:**

**A:** Topsoil with vegetation, duff, and roots.

**B:** Debris layer; ash present, approximately 20%-30% ash and debris content, observed debris includes fragments of glass, melted glass, porcelain, scrap metal, brick, and possibly a discarded light bulb. Soil is grayish brown in color. Debris appears to be thinning to the east.

**C:** Native, apparently undisturbed Colma soil, light greenish in color indicating proximity to degraded serpentenite bedrock. No observed debris or ash.

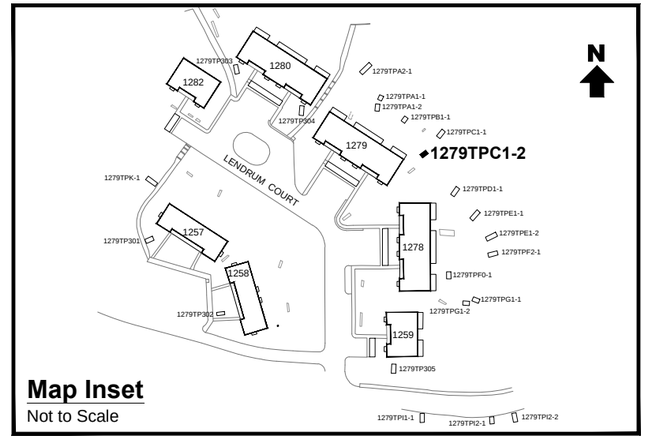
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPC1-2

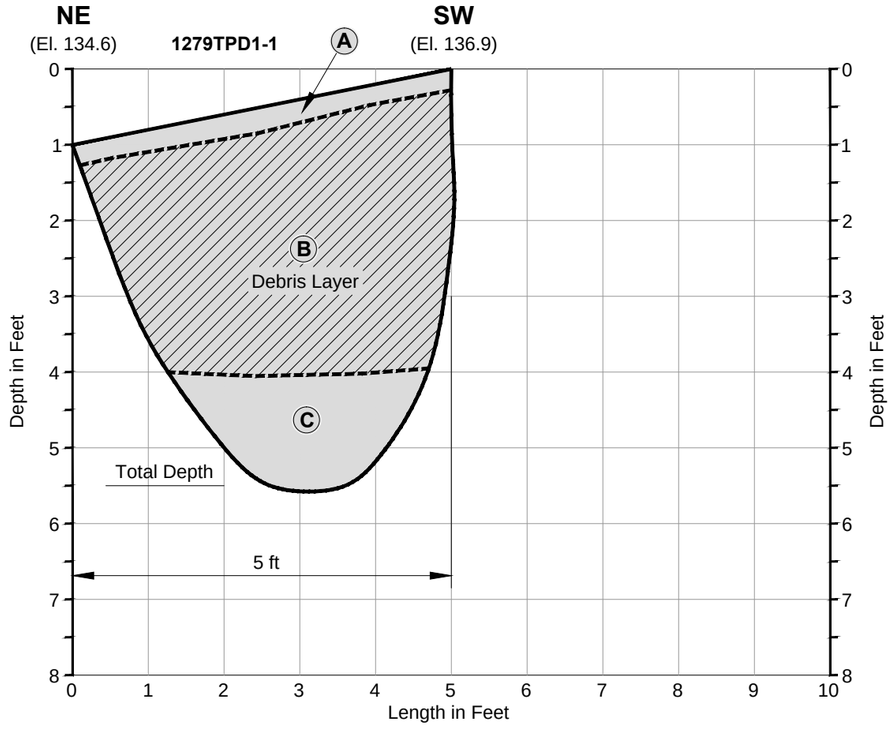
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-11

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-11_1279TPC1-2.dwg 3-24-15


View of trench and portion of spoils pile. Note ash in trench sidewall.

View inside trench. Note debris layer extends to native at bottom of trench.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Debris layer; ash present, observed debris includes fragments of glass.

**C:** Native, undisturbed soil, light yellowish brown, hard and compact, well consolidated. No observed debris or ash.

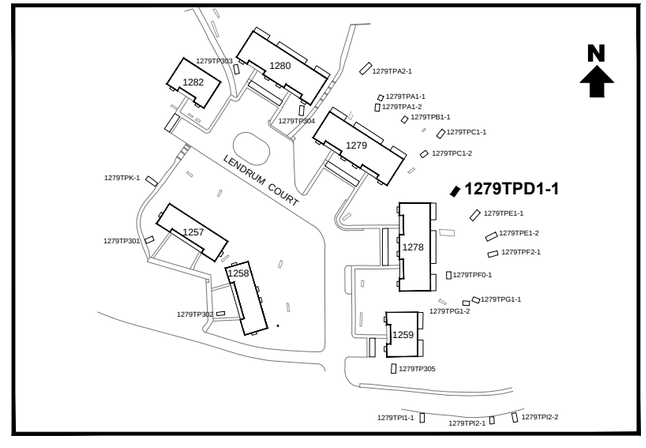
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




# Erler & Kalinowski, Inc.

Trench Log 1279TPD1-1

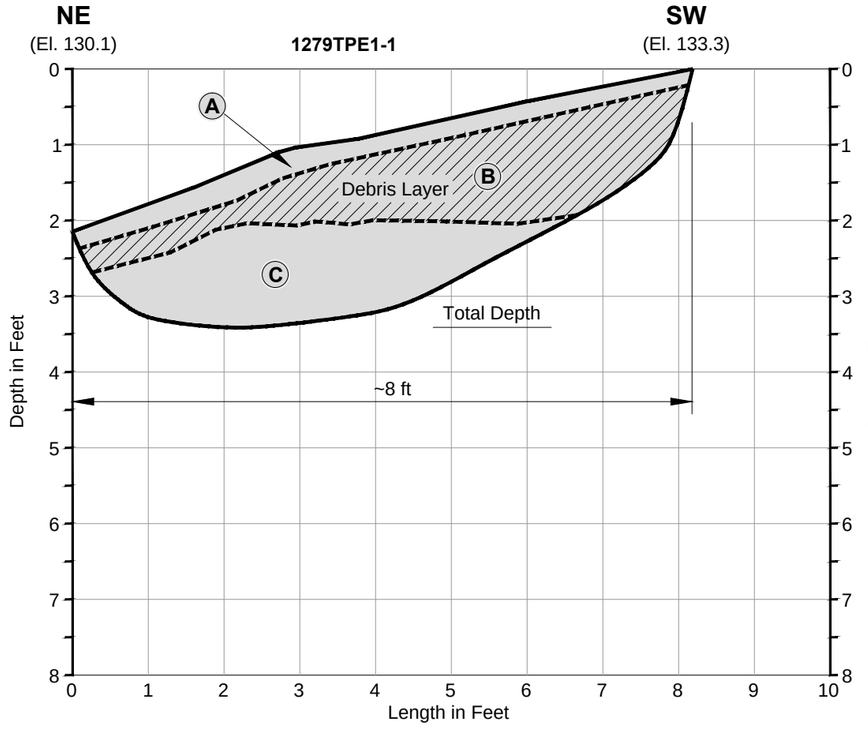
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-12

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-12_1279TPD1-1.dwg 3-24-15

View of trench.

Area view along trench and portion of spoils pile. Note ash at far end of trench and in spoils pile (uphill) decreases to the northeast (downhill). Note large cypress tree in background.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Debris layer; noticeable ash content, approximately 15 to 25% ash and debris content, observed debris includes fragments of glass and porcelain. Poorly consolidated.

**C:** Native, degraded bedrock, undisturbed. No observed debris or ash.

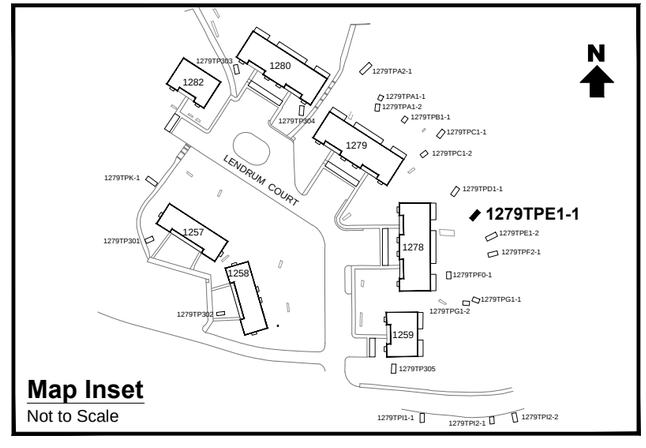
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

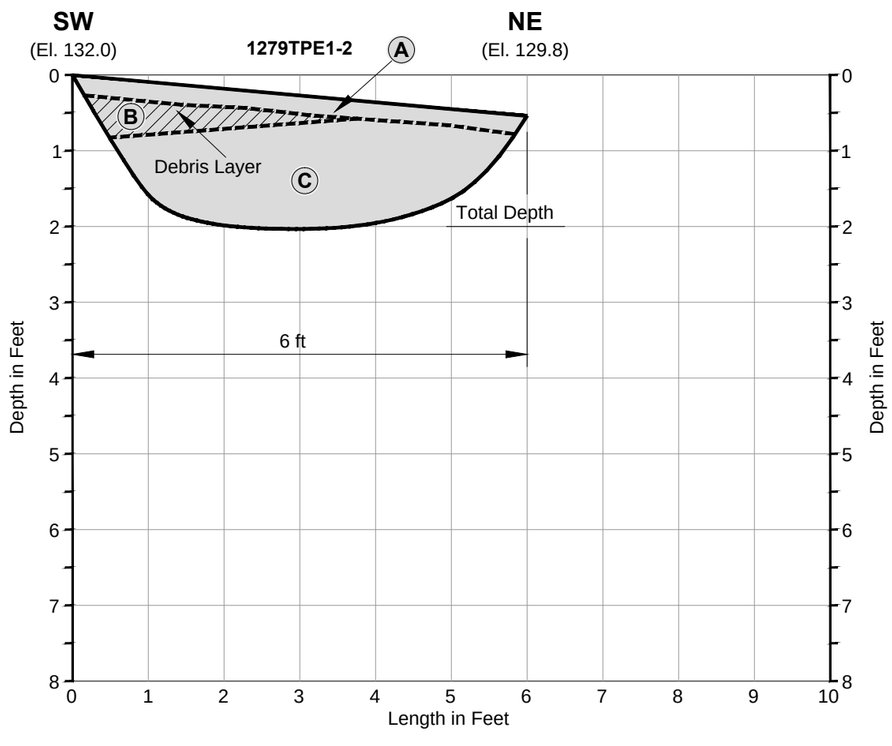
# Erler & Kalinowski, Inc.

Trench Log 1279TPE1-1

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07
Figure C-13


View of trench. Note debris layer pinching out.

Area view along trench and portion of spoils pile.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Debris layer; small amount of ash, estimated ~1 to 5% debris content.

**C:** Native, degraded bedrock, undisturbed. Serpentine rock, hard and fissle, greenish color.

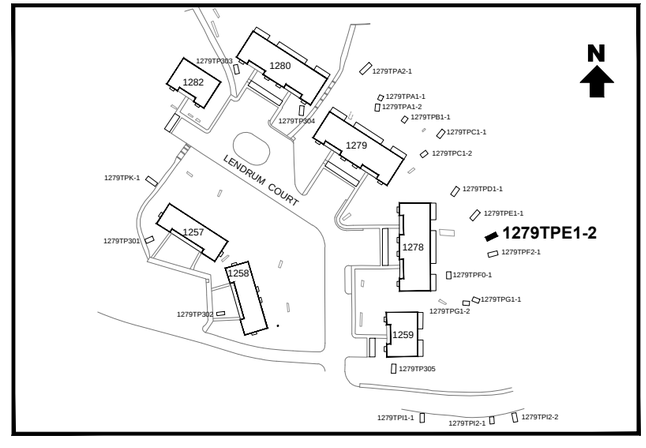
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




# Erler & Kalinowski, Inc.

Trench Log 1279TPE1-2

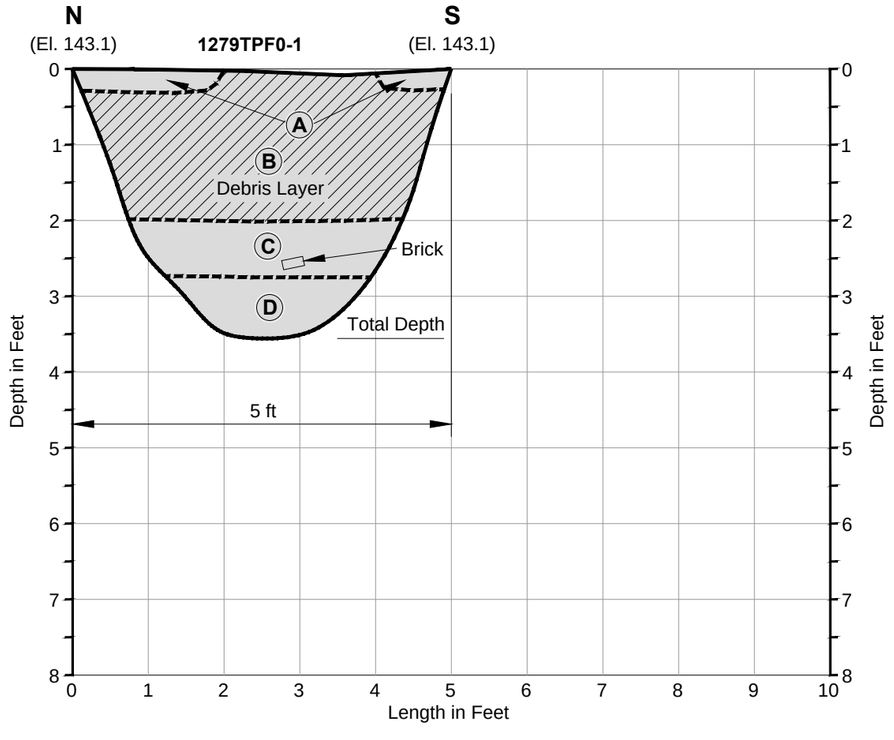
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-14

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-14_1279TPE1-2.dwg 3-24-15


View of trench. Note ash at surface and brick below debris layer.


Area view of spoils pile.




**LEGEND:**

**A:** Topsoil with vegetation and duff; intermittently present.

**B:** Debris layer; observed debris and ash, estimated ~15 to 25% debris and ash content, observed debris includes fragments of glass and porcelain. Collected sample 1279TPF0-1[1.5]D.

**C:** Disturbed native, light yellowish brown, estimated ~1% debris, observed debris includes bricks.

**D:** Native, degraded bedrock, undisturbed. Serpentine rock, highly fractured, greenish color.

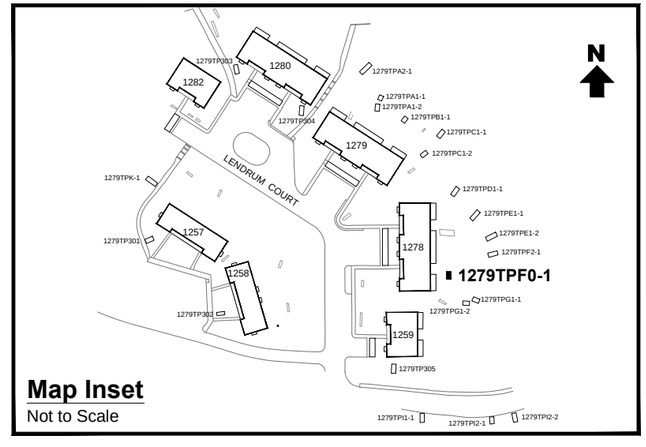
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPF0-1

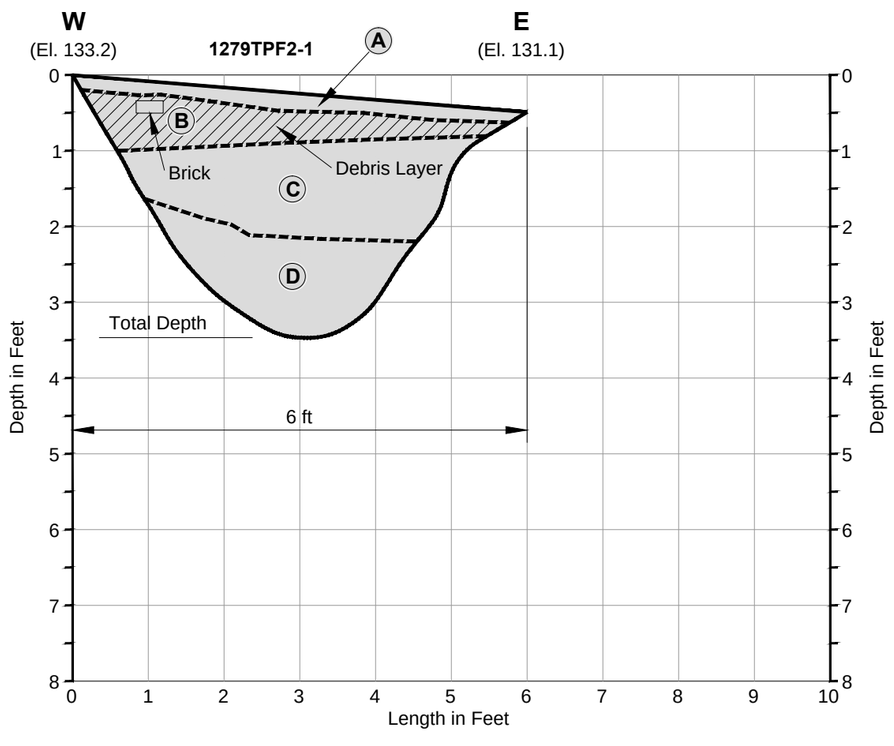
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-15

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-15_1279TPF1-1.dwg 3-24-15


View of trench and portion of spoils pile. Note ash on surface.


Spoils pile. Note large cobbles from shallow surface and debris layer.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Debris layer; observed debris and ash, estimated ~10 to 15% debris and ash content, observed debris includes porcelain fragments and brick. Collected samples 1279TPF2-1[0.0-1.0]D and 1279TPF2-1[DUP].

**C:** Native, undisturbed soil, Colma formation, relatively hard and compact, well consolidated. No observed debris or ash.

**D:** Native, degraded bedrock, undisturbed. Serpentine rock, highly fractured, greenish color. Relatively easy to break with excavator.

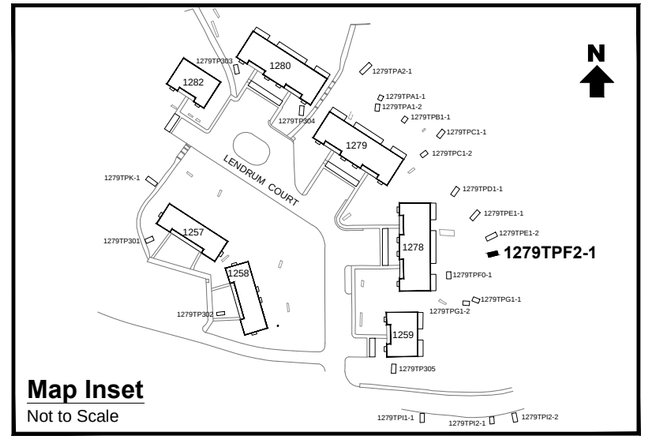
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPF2-1

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-16

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-16_1279TPF1-2.dwg 3-24-15


View of trench and spoils pile.


View into trench. Note degraded bedrock at bottom of trench.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Native sand, possibly disturbed, observed debris at upper boundary of unit, estimated ~1 to 5% debris content, observed debris includes glass and porcelain fragments. Excavator noted ease of excavation.

**C:** Native, degraded bedrock, undisturbed. Serpentine rock, relatively hard to break with excavator.

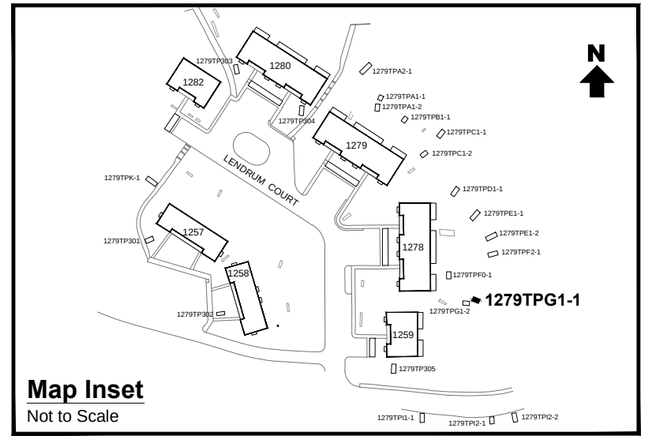
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

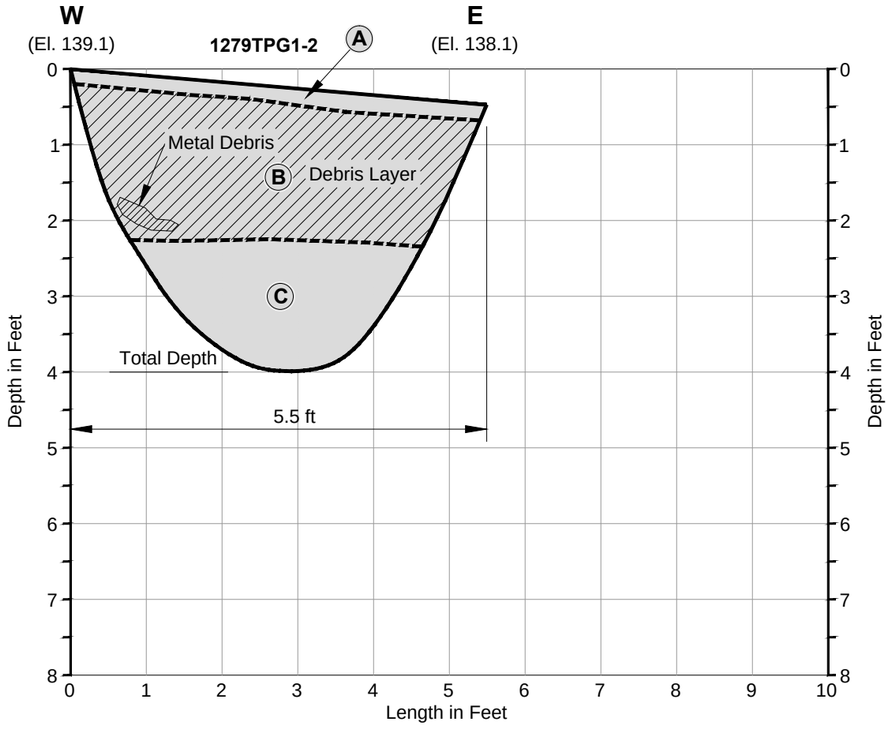
Trench Log 1279TPG1-1

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07
Figure C-17

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-17_1279TPG1-1.dwg 3-24-15


View of trench and spoils pile.


Area view of trench and spoils pile.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Debris layer; observed debris and fine ash, estimated ~15 to 20% debris and ash content, observed debris includes glass and porcelain fragments, and a piece of metal. Collected sample 1279TPG1-2[0.5-1.5]D.

**C:** Native, undisturbed soil, Colma formation, light yellowish brown, hard and compact. No observed debris or ash.

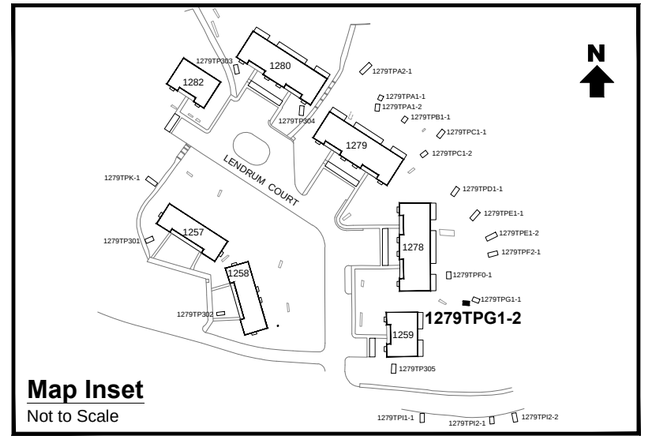
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPG1-2

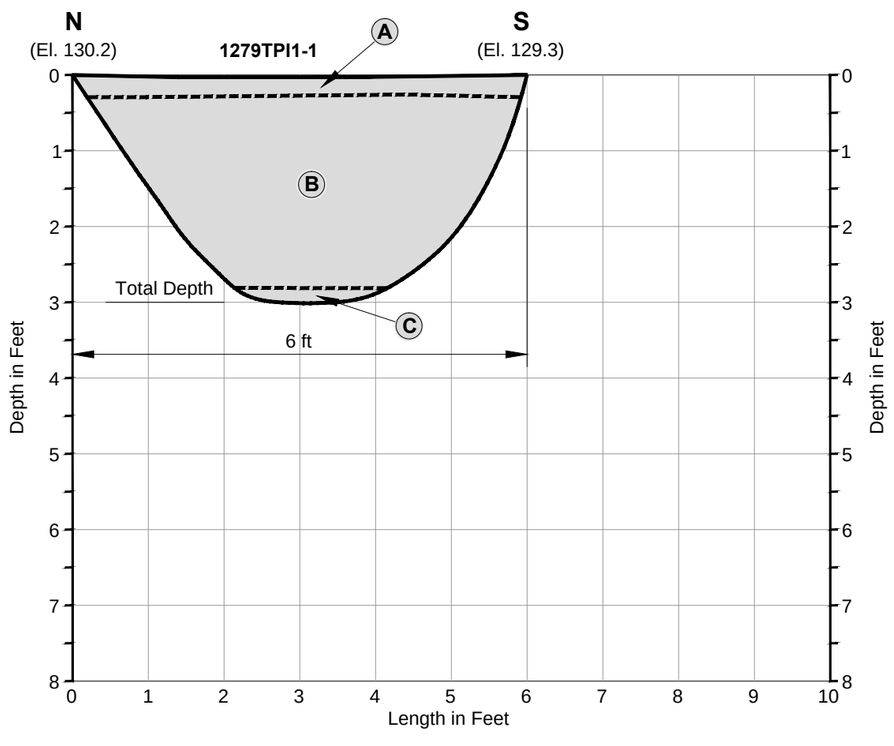
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-18

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-18_1279TPG1-2.dwg 3-24-15


View of trench.


Spoils pile.




**LEGEND:**

**A:** Topsoil with vegetation and duff. One piece of porcelain.

**B:** Native, undisturbed soil, Colma formation, hard and compact, well consolidated. Not fill, no observed debris or ash. Collected sample 1279TPI1-1[0.5]S.

**C:** Native, degraded bedrock, undisturbed. Serpentine rock, weak, highly fractured rock.

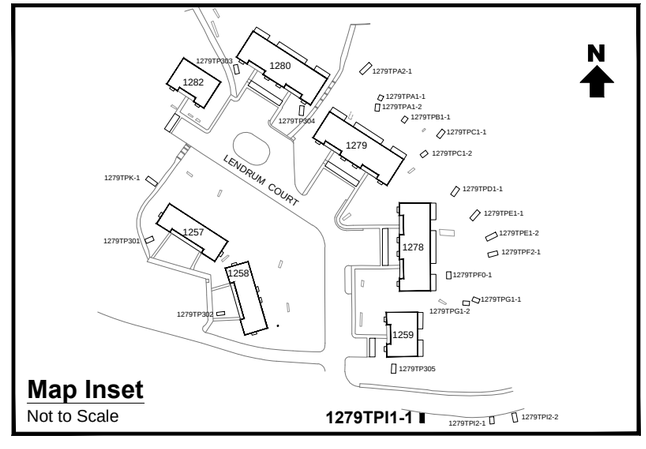
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

1279TPI1-1

# Erler & Kalinowski, Inc.

Trench Log 1279TPI1-1

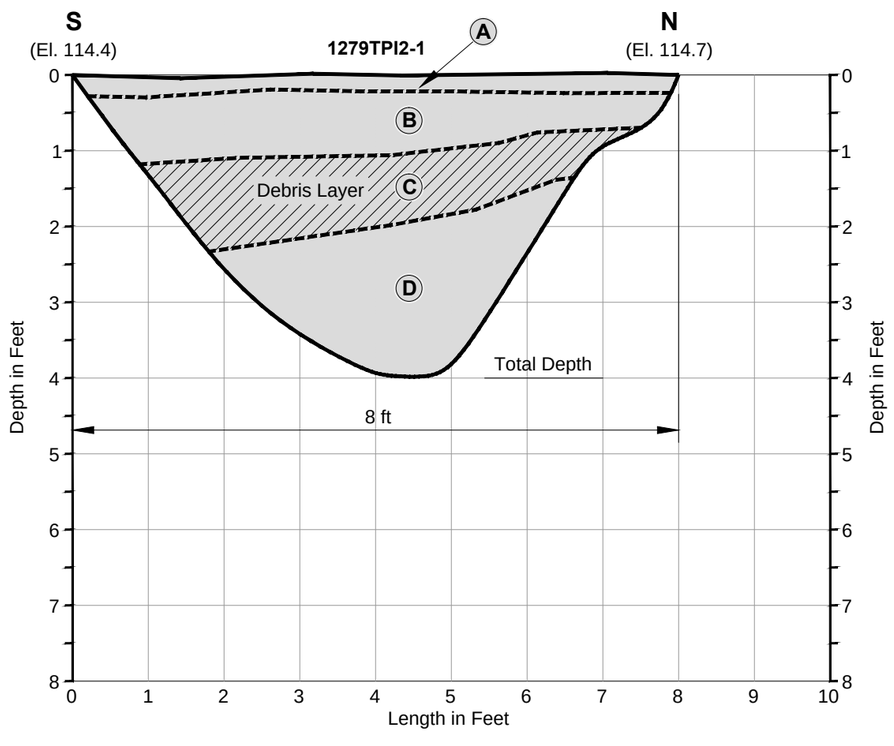
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-19

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-19_1279TPI1-1.dwg 3-24-15


View of trench.


Spoils pile. Note cobbles and asphalt in spoils.




**LEGEND:**

**A:** Topsoil with vegetation and duff.

**B:** Sand, loose, dry, medium grayish-brown, medium grain, well sorted. Collected sample 1279TPI2-1[0.5]S.

**C:** Gravel fill with fines, angular to subrounded gravel clasts, fine to medium size, hard (possibly cemented), light gray-brown color. Some small cobble-sized clasts of asphalt also present. Collected sample 1279TPI2-1[1.5]D.

**D:** Native soil, hard and compact, well consolidated, medium brown color. Some small cobbles of highly fractured serpentine rock present.

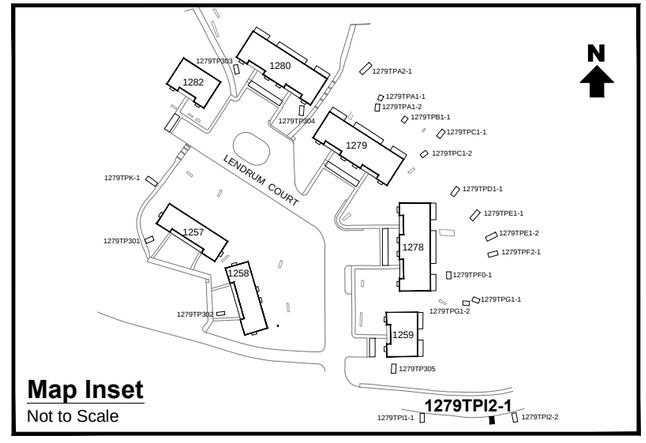
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPI2-1

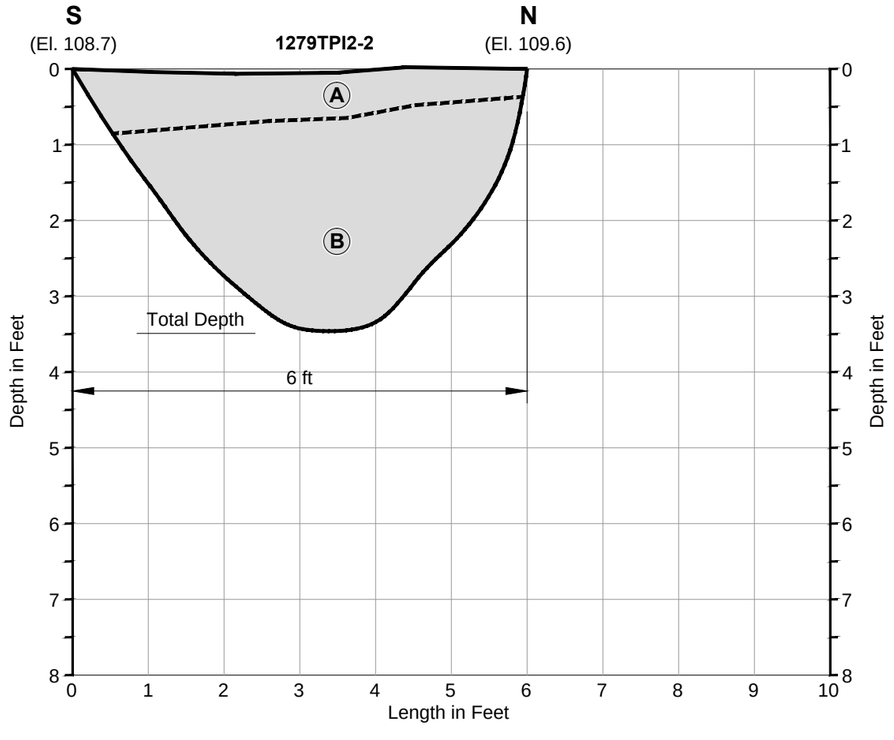
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-20

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-20_1279TPI2-1.dwg 3-24-15

View of trench and spoils pile.

Area view of trench and spoils pile.




**LEGEND:**

**A:** Sand, loose, dry, light grayish-brown, poorly consolidated, mostly fine to medium grain, well sorted. No ash or debris observed. Collected sample 1279TPI2-2[0.5]S.

**B:** Degraded bedrock, undisturbed. Greenish-gray serpentine rock, highly fractured, relatively hard to break with excavator. No debris or ash observed.

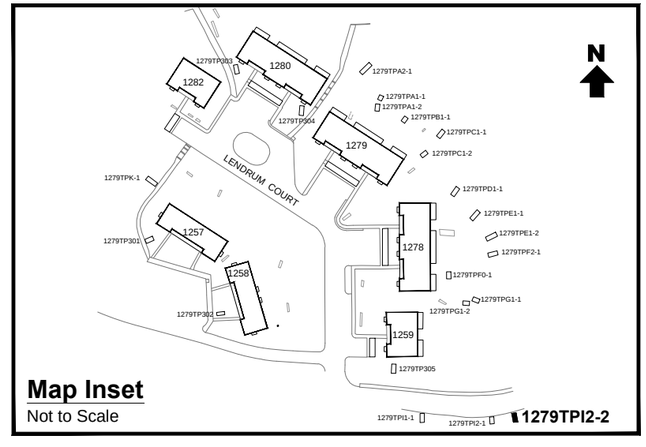
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




**Map Inset**
Not to Scale

# Erler & Kalinowski, Inc.

Trench Log 1279TPI2-2

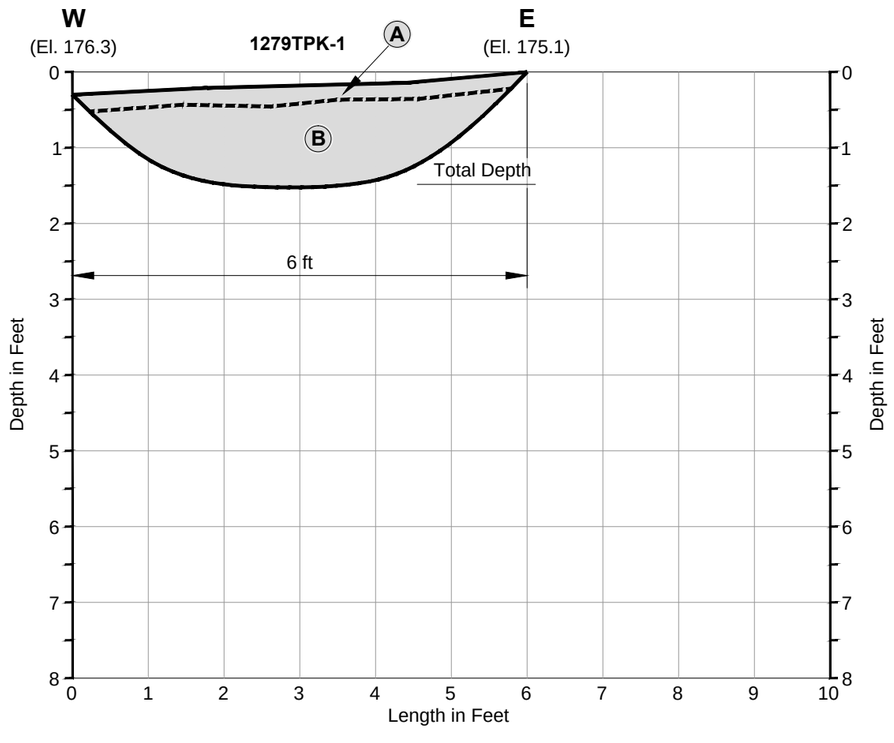
Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-21

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-21_1279TPI2-2.dwg 3-24-15


View of trench and spoils pile.


Area view of trench and spoils pile.




**LEGEND:**

**A:** Topsoil with vegetation, duff, and roots. Surficial glass observed <1%.

**B:** Native, undisturbed soil, Colma formation, light yellowish brown, hard and compact, very well consolidated. Excavator notes difficulty digging; occasional cobbles. No observed debris or ash. Collected sample 1279TPK-1[0.5]S.

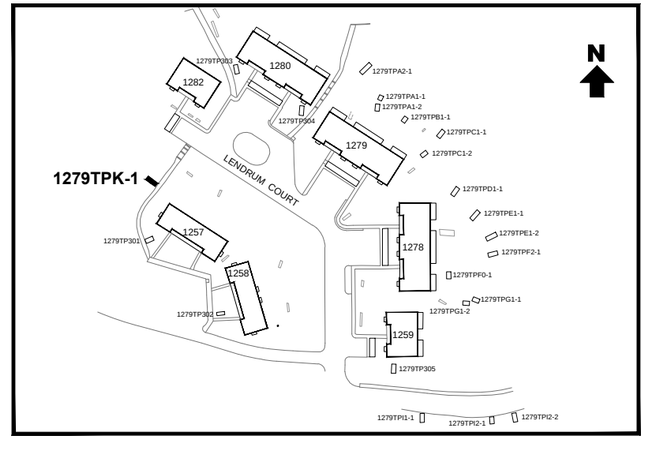
El. = Elevation

**NOTE:**

Lendrum Court trenches and features surveyed by PLS Surveys, Inc., in October 2014. California State Plane Coordinate System for vertical locations NAVD88 (North American Vertical Datum of 1988).

0 2 4

(Approximate Scale in Feet)




# Erler & Kalinowski, Inc.

Trench Log 1279TPK-1

Presidio Trust
San Francisco, CA
March 2015
EKI B00025.07

Figure C-22

C:\Users\vivasata\appdata\local\temp\AcPublish_11948\C-22_1279TPK1-1.dwg 3-24-15

# Appendix D

Analytical Laboratory Reports
(on CD-ROM)


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

**Laboratory Job Number 261194**
**ANALYTICAL REPORT**

Erler & Kalinowski, Inc.
1870 Ogden Drive
Burlingame, CA 94010-5306

Project : B00025.07 T4D
Location : Presidio - Lendrum Court
Level : II

| Sample ID | Lab ID | Sample ID | Lab ID |
|---|---|---|---|
| 1279TP305-D[3.5] | 261194-001 | 1279SBE1-2[0.5]S | 261194-015 |
| 1279TP302-S[0.5] | 261194-002 | 1279SBD2-1[0.5]S | 261194-016 |
| 1279TP301-S[0.5] | 261194-003 | 1279TPF2-1[0.0-1.0]D | 261194-017 |
| 1279TP303-S[0.5] | 261194-004 | 1279TPF2-1[DUP] | 261194-018 |
| 1279TP304-D[3.5] | 261194-005 | 1279TPG1-2[0.5-1.5]D | 261194-019 |
| 1279SBA2-1[0.5]S | 261194-006 | 1279TPF0-1[1.5]D | 261194-020 |
| 1279TPA1-1[0.5]S | 261194-007 | 1279SBH1-1[0.5]S | 261194-021 |
| 1279TPA1-2[2.0]D | 261194-008 | 1279SBH1-2[0.5]S | 261194-022 |
| 1279SBB1-1[0.5]S | 261194-009 | 1279SBH1-3[0.5]S | 261194-023 |
| 1279SBC1-1[0.5]S | 261194-010 | 1279SBG2-1[0.5]S | 261194-024 |
| 1279TPC1-1[1.5]D | 261194-011 | 1279SBH2-1[0.5]S | 261194-025 |
| 1279TPD1-1[3.0]D | 261194-012 | 1279SBH1-4[0.5]S | 261194-026 |
| 1279SBD1-1[0.5]S | 261194-013 | 1279SBH0-2[0.5]S | 261194-027 |
| 1279SBE1-1[0.5]S | 261194-014 | | |

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 10/01/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

# CASE NARRATIVE

| | |
|---|---|
| Laboratory number: | **261194** |
| Client: | **Erler & Kalinowski, Inc.** |
| Project: | **B00025.07 T4D** |
| Location: | **Presidio - Lendrum Court** |
| Request Date: | **09/24/14** |
| Samples Received: | **09/24/14** |

This data package contains sample and QC results for twenty four soil samples, requested for the above referenced project on 09/24/14. The samples were received cold and intact. All samples underwent the (ISM) Incremental Sampling Method for all analysis.

**Semivolatile Organics by GC/MS SIM (EPA 8270C-SIM):**
Many samples were diluted due to the dark and viscous nature of the sample extracts. No other analytical problems were encountered.

**Metals (EPA 6020 and EPA 7471A):**
Low recoveries were observed for antimony in the MS/MSD of 1279TP305-D[3.5] (lab # 261194-001); the BS/BSD were within limits, and the associated RPD was within limits. No other analytical problems were encountered.

**Moisture (ASTM D2216/CLP):**
No analytical problems were encountered.

# Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

## CHAIN OF CUSTODY RECORD

261194

1870 Ogden Drive, Burlingame, CA 94010
Phone: (650) 292-9100
Fax: (650) 552-9012

**Project Name:** Presidio - Lendrum Court

**Project No.:** B00025.07 T4D

**Project Location:** Presidio of San Francisco, CA

**Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900

**Report Results to:** John DeWitt, Labs EKI, Daniel Correia

**Sampled By:** Daniel Correia

EKI COC No. 20140922-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead only EPA 6020 | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ~~1279 TP305-S~~ DUP | | | | soil | 1 gallon size zip-lock bag | | | | | std. | DUP |
| 1 | 1279 TP305-D[3.5] | | 9/22/14 | 1152 | soil | 1 gallon zip lock bag | X | X | O | | std. | Return 1 jar to EKI |
| 2 | 1279 TP302-S[0.5] | | | 1320 | | | | | | X | | |
| 3 | 1279 TP301-S[0.5] | | | 1350 | | | | | | X | | |
| 4 | 1279 TP303-S[0.5] | | | 1445 | | | | | | X | | |
| 5 | 1279 TP304-D[3.5] | | | 1515 | | | X | X | O | | | Return 1 jar to EKI |

**Special Instructions:**

Run moisture after ISM

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP • Prepare ISM for All samples prior to Analysis. Return Marked samples to EKI for Dioxin Analysis by others.

| | | | |
|---|---|---|---|
| Relinquished by: (Signature) (Daniel Correia) EKI | Date: 9/24/14 | Time: 1604 | Received By: | Time: 1604 |
| Relinquished by: (Signature) | Date: 9/24/14 | Time: 1730 | Received By: | Time: 1730 |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |

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# Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

## CHAIN OF CUSTODY RECORD

261194

1870 Ogden Drive, Burlingame, CA 94010

Phone: (650) 292-9100
Fax: (650) 552-9012

**Project Name:** Presidio - Lendrum Court

**Project No.:** B00025.07 T4D

**Project Location:** Presidio of San Francisco, CA

**Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900

**Report Results to:** John DeWitt, Labs EKI, Daniel Correia

**Sampled By:** Daniel Correia

ANALYSES REQUESTED

EKI COC No. 20140923-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead only by EPA 6020 | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1279SBA2-1[0.5]S | | 9/23/14 | 0840 | soil | 1 gallon size zip-lock bag | | ~~XX~~ DJC | | X | std. | |
| 7 | 1279TPA1-1[0.5]S | | | 0900 | | | | ~~XX~~ DJC | | X | | |
| 8 | 1279TPA1-2[2.0]D | | | 0920 | | | X | X | ⊗ | | | Return J to EKE |
| 9 | 1279SBB1-1[0.5]S | | | 1000 | | | | ~~XX~~ DJC | | X | | |
| 10 | 1279SBC1-1[0.5]S | | | 1045 | | | | ~~XX~~ DJC | | X | | |
| 11 | 1279TPC1-1[1.5]D | | | 1100 | | | ~~X~~ | X | ⊗ | HOLD | | Return J to EKE |
| 12 | 1279TPD1-1[3.0]D | | | 1150 | | | ~~X~~ | X | ⊗ | HOLD | | Return J to EKE |
| 13 | 1279SBD1-1[0.5]S | | | 1200 | | | | ~~XX~~ DJC | | X | | |
| 14 | 1279SBE1-1[0.5]S | | | 1415 | | | | ~~XX~~ DJC | | X | | |
| 15 | 1279SBE1-2[0.5]S | | | 1510 | | | | ~~XX~~ DJC | | X | | |

**Special Instructions:**

Run moisture after ISM.

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP • Prepare ISM for all samples prior to Analysis. Return marked ~~ISM~~ samples to EKE for Analysis by others.

| | | | |
|---|---|---|---|
| Relinquished by: (Signature) Daniel Correia EKI | Date: 9/24/14 | Time: 1603 | Received By: | Time: 1603 |
| Relinquished by: (Signature) | Date: 9/24/14 | Time: 1730 | Received By: | Time: 1730 |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |

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# Erler & Kalinowski, Inc.

## CHAIN OF CUSTODY RECORD

2101194

CONSULTING ENGINEERS AND SCIENTISTS

1870 Ogden Drive, Burlingame, CA 94010

Phone: (650) 292-9100
Fax: (650) 552-9012

**Project Name:** Presidio - Lendrum Court

**Project No.:** B00025.07 T4D

**Project Location:** Presidio of San Francisco, CA

**Laboratory:** Curtis & Tompkins
2323 5th Street
Berkeley, CA 94710
(510) 486-0900

**Report Results to:** John DeWitt, Labs EKI, Daniel Correia

**Sampled By:** Daniel Correia

**ANALYSES REQUESTED**

EKI COC No. 20140924-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | ~~Title 22 Metals~~ Lead by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Title 22 metals EPA 6020 | | | | Hold | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 1279SBD2-1[0.5]S | | 9/24/14 | 0900 | soil | 1 gallon size zip-lock bag | | X | | | | | | | std. | |
| 17 | 1279 TP F2-1[0.0-1.0]D | | | 0945 | | | X | | C | X | | | | | | Return JAN to EKI |
| 18 | 1279 TP F2-1[Dup] | | | 0945 | | | X | | C | X | | | | | | |
| 19 | 1279 TP G1-2[0.5-1.5]D | | | 1045 | | | X | | C | X | | | | | | |
| 20 | 1279 TP F2-1[1.5]D | | | 1325 | | | X | | C | X | | | | | | Return JAN to EKI |
| 21 | 1279SBH1-1[0.5]S | | | 1355 | | | | X | | | | | | | | |
| 22 | 1279SBH1-2[0.5]S | | | 1420 | | | | X | | | | | | | | |
| 23 | 1279SBH1-3[0.5]S | | | 1440 | | | | X | | | | | | | | |
| 24 | 1279SBG2-1[0.5]S | | | 1525 | | | | X | | | | | | | | |
| 25 | 1279SBH2-1[0.5]S | | | 1540 | | | | X | | | | | | | | |
| 26 | 1279SBH1-4[0.5]S | | | 1545 | | | | ~~X~~ OTC | | | | | | X | | Hold ISM also |
| 27 | 1279SBH0-2[0.5]S | | | 1600 | | | | X | | | | | | | | |

**Special Instructions:**

Run moisture After ISM

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP - Prepare ISM for All Samples prior to Analysis. Return marked Samples to EKI For Dioxin Analysis by others

| | | | |
|---|---|---|---|
| Relinquished by: (Signature) (Daniel Correia) EKI | Date: ~~1602~~ | ~~Time:~~ Date / Time 9/24/14 / 1602 | Received By: Time: 1602 |
| Relinquished by: (Signature) | Date: 9/24/14 | Time: 1730 | Received By: Time: 1730 |
| Relinquished by: (Signature) | Date: | Time: | Received By: Time: |

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**COOLER RECEIPT CHECKLIST** Curtis & Tompkins, Ltd.

Login # 264194 Date Received 9/24/14 Number of coolers 2
Client EKI Project B000 25.07 TYD

Date Opened 9/24 By (print) FJ (sign) FJ
Date Logged in ____ By (print) ____ (sign) ____

1. Did cooler come with a shipping slip (airbill, etc) ____ YES ~~NO~~
   Shipping info ____
2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☐ ~~NO~~
   How many ____ Name ____ Date ____
2B. Were custody seals intact upon arrival? ____ YES NO ~~N/A~~
3. Were custody papers dry and intact when received? ____ ~~YES~~ NO
4. Were custody papers filled out properly (ink, signed, etc)? ____ ~~YES~~ NO
5. Is the project identifiable from custody papers? (If so fill out top of form) ~~YES~~ NO
6. Indicate the packing in cooler: (if other, describe) ____

☐ Bubble Wrap ☐ Foam blocks ☑ ~~Bags~~ ☐ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C
   Type of ice used: ☑ ~~Wet~~ ☐ Blue/Gel ☐ None Temp(°C) —
   ☑ ~~☐~~ Samples Received on ice & cold without a temperature blank; temp. ~~taken with IR gun~~
   ☐ Samples received on ice directly from the field. Cooling process had begun
8. Were Method 5035 sampling containers present? ____ YES ~~NO~~
   If YES, what time were they transferred to freezer? ____
9. Did all bottles arrive unbroken/unopened? ____ ~~YES~~ NO
10. Are there any missing / extra samples? ____ YES ~~NO~~
11. Are samples in the appropriate containers for indicated tests? ____ ~~YES~~ NO
12. Are sample labels present, in good condition and complete? ____ ~~YES~~ NO
13. Do the sample labels agree with custody papers? ____ YES ~~NO~~
14. Was sufficient amount of sample sent for tests requested? ____ ~~YES~~ NO
15. Are the samples appropriately preserved? ____ YES NO ~~N/A~~
16. Did you check preservatives for all bottles for each sample? ____ YES NO ~~N/A~~
17. Did you document your preservative check? ____ YES NO ~~N/A~~
18. Did you change the hold time in LIMS for unpreserved VOAs? ____ YES NO ~~N/A~~
19. Did you change the hold time in LIMS for preserved terracores? ____ YES NO ~~N/A~~
20. Are bubbles > 6mm absent in VOA samples? ____ YES NO ~~N/A~~
21. Was the client contacted concerning this sample delivery? ____ YES ~~NO~~
   If YES, Who was called? ____ By ____ Date: ____

COMMENTS
13) ~~[illegible]~~ 018 listed on COC as 1279 TPF2 - 1 [DUP], sample label lists 092414-DUP1

Rev 10, 9/12

Curtis & Tompkins, Ltd.

# Detections Summary for 261194

Results for any subcontracted analyses are not included in this summary.

Client : Erler & Kalinowski, Inc.
Project : B00025.07 T4D
Location : Presidio - Lendrum Court

## Client Sample ID : 1279TP305-D[3.5] Laboratory Sample ID : 261194-001

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Phenanthrene | 32 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Fluoranthene | 76 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Pyrene | 72 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)anthracene | 45 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Chrysene | 60 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(b)fluoranthene | 76 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)pyrene | 49 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Indeno(1,2,3-cd)pyrene | 23 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(g,h,i)perylene | 28 | | 21 | 4.3 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Antimony | 1.8 | | 0.16 | 0.052 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Arsenic | 7.2 | | 0.26 | 0.088 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 560 | | 21 | 7.2 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Beryllium | 0.57 | | 0.13 | 0.038 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cadmium | 1.4 | | 0.18 | 0.058 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 190 | | 0.24 | 0.079 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cobalt | 25 | | 0.21 | 0.063 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 130 | | 0.30 | 0.099 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Lead | 950 | | 13 | 3.9 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 0.53 | | 0.018 | 0.00098 | mg/Kg | Dry | 1.000 | EPA 7471A | METHOD |
| Molybdenum | 1.1 | | 0.43 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Nickel | 320 | | 42 | 14 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Selenium | 0.26 | | 0.26 | 0.086 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Silver | 0.67 | | 0.13 | 0.027 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.16 | | 0.067 | 0.021 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 63 | | 0.47 | 0.16 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 1,100 | | 67 | 15 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 7 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279TP302-S[0.5] Laboratory Sample ID : 261194-002

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 110 | | 0.13 | 0.038 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 6 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279TP301-S[0.5] Laboratory Sample ID : 261194-003

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 44 | | 0.13 | 0.036 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 5 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

Client Sample ID : 1279TP303-S[0.5] Laboratory Sample ID : 261194-004

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 38 | | 0.12 | 0.035 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 4 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279TP304-D[3.5] Laboratory Sample ID : 261194-005

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Fluoranthene | 35 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Pyrene | 31 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Chrysene | 24 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(b)fluoranthene | 30 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Antimony | 0.40 | | 0.15 | 0.051 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Arsenic | 3.8 | | 0.26 | 0.086 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 280 | | 21 | 7.0 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Beryllium | 0.51 | | 0.13 | 0.037 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cadmium | 0.66 | | 0.17 | 0.057 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 110 | | 0.23 | 0.077 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cobalt | 17 | | 0.21 | 0.062 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 83 | | 0.29 | 0.096 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Lead | 490 | | 13 | 3.8 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 0.27 | | 0.019 | 0.0011 | mg/Kg | Dry | 1.000 | EPA 7471A | METHOD |
| Molybdenum | 0.66 | | 0.42 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Nickel | 120 | | 0.41 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Selenium | 0.31 | | 0.25 | 0.084 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Silver | 0.21 | | 0.13 | 0.026 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.10 | | 0.065 | 0.021 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 55 | | 0.46 | 0.15 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 470 | | 65 | 15 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 6 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBA2-1[0.5]S Laboratory Sample ID : 261194-006

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 43 | | 0.13 | 0.038 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 7 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279TPA1-1[0.5]S Laboratory Sample ID : 261194-007

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 62 | | 0.13 | 0.038 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 7 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

## Client Sample ID : 1279TPA1-2[2.0]D  Laboratory Sample ID : 261194-008

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Phenanthrene | 110 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Fluoranthene | 150 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Pyrene | 130 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)anthracene | 66 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Chrysene | 85 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(b)fluoranthene | 100 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(k)fluoranthene | 30 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)pyrene | 68 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Indeno(1,2,3-cd)pyrene | 31 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(g,h,i)perylene | 36 | | 21 | 4.2 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Antimony | 2.7 | | 0.15 | 0.050 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Arsenic | 6.6 | | 0.25 | 0.084 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 630 | | 21 | 6.9 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Beryllium | 0.79 | | 0.13 | 0.036 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cadmium | 1.5 | | 0.17 | 0.056 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 55 | | 0.23 | 0.075 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cobalt | 10 | | 0.21 | 0.061 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 140 | | 0.28 | 0.095 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Lead | 1,800 | | 13 | 3.7 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 1.5 | | 0.091 | 0.0051 | mg/Kg | Dry | 5.000 | EPA 7471A | METHOD |
| Molybdenum | 1.1 | | 0.42 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Nickel | 58 | | 0.40 | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Selenium | 0.32 | | 0.25 | 0.083 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Silver | 0.92 | | 0.13 | 0.026 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.14 | | 0.064 | 0.020 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 71 | | 0.45 | 0.15 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 890 | | 64 | 14 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 5 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBB1-1[0.5]S  Laboratory Sample ID : 261194-009

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 290 | | 13 | 3.7 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 4 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBC1-1[0.5]S  Laboratory Sample ID : 261194-010

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 490 | | 12 | 3.5 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 7 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBD1-1[0.5]S  Laboratory Sample ID : 261194-013

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 270 | | 0.14 | 0.039 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 9 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

Client Sample ID : 1279SBE1-1[0.5]S Laboratory Sample ID : 261194-014

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 220 | | 0.14 | 0.039 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 13 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBE1-2[0.5]S Laboratory Sample ID : 261194-015

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 50 | | 0.13 | 0.037 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 5 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBD2-1[0.5]S Laboratory Sample ID : 261194-016

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 71 | | 0.13 | 0.038 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 7 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279TPF2-1[0.0-1.0]D Laboratory Sample ID : 261194-017

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Phenanthrene | 33 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Fluoranthene | 47 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Pyrene | 50 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)anthracene | 24 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Chrysene | 36 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(b)fluoranthene | 48 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(k)fluoranthene | 15 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)pyrene | 31 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Indeno(1,2,3-cd)pyrene | 14 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(g,h,i)perylene | 18 | | 11 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Antimony | 1.8 | | 0.16 | 0.052 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Arsenic | 6.0 | | 0.26 | 0.088 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 830 | | 21 | 7.1 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Beryllium | 1.0 | | 0.13 | 0.038 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cadmium | 1.5 | | 0.17 | 0.058 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 100 | | 0.24 | 0.078 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cobalt | 18 | | 0.21 | 0.063 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 160 | | 0.29 | 0.098 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Lead | 1,500 | | 13 | 3.8 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 2.1 | | 0.094 | 0.0053 | mg/Kg | Dry | 5.000 | EPA 7471A | METHOD |
| Molybdenum | 1.1 | | 0.43 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Nickel | 130 | | 0.41 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Selenium | 0.28 | | 0.26 | 0.086 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Silver | 1.5 | | 0.13 | 0.027 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.18 | | 0.067 | 0.021 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 84 | | 0.47 | 0.16 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 740 | | 67 | 15 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 7 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

Client Sample ID : 1279TPF2-1[DUP] Laboratory Sample ID : 261194-018

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Naphthalene | 11 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Acenaphthylene | 13 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Phenanthrene | 75 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Fluoranthene | 110 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Pyrene | 120 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)anthracene | 76 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Chrysene | 99 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(b)fluoranthene | 120 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(k)fluoranthene | 40 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)pyrene | 71 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Indeno(1,2,3-cd)pyrene | 23 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(g,h,i)perylene | 25 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Antimony | 3.8 | | 0.15 | 0.050 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Arsenic | 6.5 | | 0.25 | 0.085 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 810 | | 21 | 6.9 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Beryllium | 1.1 | | 0.13 | 0.037 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cadmium | 1.4 | | 0.17 | 0.056 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 96 | | 0.23 | 0.076 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cobalt | 14 | | 0.21 | 0.061 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 170 | | 0.29 | 0.095 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Lead | 1,700 | | 13 | 3.7 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 1.9 | | 0.089 | 0.0050 | mg/Kg | Dry | 5.000 | EPA 7471A | METHOD |
| Molybdenum | 1.2 | | 0.42 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Nickel | 110 | | 0.40 | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Selenium | 0.33 | | 0.25 | 0.083 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Silver | 1.4 | | 0.13 | 0.026 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.19 | | 0.065 | 0.020 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 86 | | 0.46 | 0.15 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 790 | | 65 | 14 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 5 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

Client Sample ID : 1279TPG1-2[0.5-1.5]D  Laboratory Sample ID : 261194-019

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Phenanthrene | 13 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Fluoranthene | 23 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Pyrene | 24 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)anthracene | 15 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Chrysene | 20 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(b)fluoranthene | 27 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)pyrene | 16 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Antimony | 1.9 | | 0.15 | 0.049 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Arsenic | 6.6 | | 0.25 | 0.084 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 520 | | 20 | 6.8 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Beryllium | 0.60 | | 0.13 | 0.036 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cadmium | 0.94 | | 0.17 | 0.055 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 260 | | 22 | 7.5 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Cobalt | 29 | | 0.20 | 0.060 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 230 | | 0.28 | 0.094 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Lead | 1,300 | | 13 | 3.7 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 0.57 | | 0.019 | 0.0011 | mg/Kg | Dry | 1.000 | EPA 7471A | METHOD |
| Molybdenum | 0.86 | | 0.41 | 0.14 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Nickel | 450 | | 40 | 13 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Silver | 0.83 | | 0.13 | 0.026 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.13 | | 0.064 | 0.020 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 65 | | 0.45 | 0.15 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 610 | | 64 | 14 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 5 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

## Client Sample ID : 1279TPF0-1[1.5]D  Laboratory Sample ID : 261194-020

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Naphthalene | 22 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Acenaphthylene | 17 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Acenaphthene | 20 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Fluorene | 31 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Phenanthrene | 250 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Anthracene | 59 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Fluoranthene | 300 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Pyrene | 290 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)anthracene | 150 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Chrysene | 170 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(b)fluoranthene | 180 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(k)fluoranthene | 68 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(a)pyrene | 140 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Indeno(1,2,3-cd)pyrene | 43 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Dibenz(a,h)anthracene | 17 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Benzo(g,h,i)perylene | 43 | | 10 | 2.1 | ug/Kg | Dry | 2.000 | EPA 8270C-SIM | EPA 3550B |
| Antimony | 2.2 | | 0.14 | 0.048 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Arsenic | 6.4 | | 0.25 | 0.082 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 920 | | 20 | 6.6 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Beryllium | 0.98 | | 0.12 | 0.035 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cadmium | 1.7 | | 0.16 | 0.054 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 55 | | 0.22 | 0.073 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Cobalt | 11 | | 0.20 | 0.059 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 350 | | 27 | 9.2 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Lead | 2,400 | | 12 | 3.6 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 1.8 | | 0.089 | 0.0050 | mg/Kg | Dry | 5.000 | EPA 7471A | METHOD |
| Molybdenum | 1.1 | | 0.40 | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Nickel | 58 | | 0.39 | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Selenium | 0.26 | | 0.24 | 0.080 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Silver | 1.7 | | 0.12 | 0.025 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.19 | | 0.062 | 0.020 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 79 | | 0.44 | 0.15 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 980 | | 62 | 14 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 5 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBH1-1[0.5]S  Laboratory Sample ID : 261194-021

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 110 | | 0.13 | 0.036 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBH1-2[0.5]S  Laboratory Sample ID : 261194-022

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 66 | | 0.12 | 0.035 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

Client Sample ID : 1279SBH1-3[0.5]S Laboratory Sample ID : 261194-023

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 94 | | 0.20 | 0.065 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBG2-1[0.5]S Laboratory Sample ID : 261194-024

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 110 | | 0.21 | 0.070 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 7 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBH2-1[0.5]S Laboratory Sample ID : 261194-025

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 7.0 | | 0.20 | 0.068 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 9 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBH0-2[0.5]S Laboratory Sample ID : 261194-027

| Analyte | Result | Flags | RL | MDL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|---|
| Lead | 160 | | 0.20 | 0.068 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TP305-D[3.5] | Batch#: | 215869 |
| Lab ID: | 261194-001 | Sampled: | 09/22/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/30/14 |
| Diln Fac: | 2.000 | | |

Moisture: 7%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 21 |
| Acenaphthylene | ND | 21 |
| Acenaphthene | ND | 21 |
| Fluorene | ND | 21 |
| Phenanthrene | 32 | 21 |
| Anthracene | ND | 21 |
| Fluoranthene | 76 | 21 |
| Pyrene | 72 | 21 |
| Benzo(a)anthracene | 45 | 21 |
| Chrysene | 60 | 21 |
| Benzo(b)fluoranthene | 76 | 21 |
| Benzo(k)fluoranthene | ND | 21 |
| Benzo(a)pyrene | 49 | 21 |
| Indeno(1,2,3-cd)pyrene | 23 | 21 |
| Dibenz(a,h)anthracene | ND | 21 |
| Benzo(g,h,i)perylene | 28 | 21 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 70 | 23-120 |
| 2-Fluorobiphenyl | 71 | 30-115 |
| Terphenyl-d14 | 69 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TP304-D[3.5] | Batch#: | 215869 |
| Lab ID: | 261194-005 | Sampled: | 09/22/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/30/14 |
| Diln Fac: | 2.000 | | |

Moisture: 6%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 21 |
| Acenaphthylene | ND | 21 |
| Acenaphthene | ND | 21 |
| Fluorene | ND | 21 |
| Phenanthrene | ND | 21 |
| Anthracene | ND | 21 |
| Fluoranthene | 35 | 21 |
| Pyrene | 31 | 21 |
| Benzo(a)anthracene | ND | 21 |
| Chrysene | 24 | 21 |
| Benzo(b)fluoranthene | 30 | 21 |
| Benzo(k)fluoranthene | ND | 21 |
| Benzo(a)pyrene | ND | 21 |
| Indeno(1,2,3-cd)pyrene | ND | 21 |
| Dibenz(a,h)anthracene | ND | 21 |
| Benzo(g,h,i)perylene | ND | 21 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 64 | 23-120 |
| 2-Fluorobiphenyl | 68 | 30-115 |
| Terphenyl-d14 | 68 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

# Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TPA1-2[2.0]D | Batch#: | 215869 |
| Lab ID: | 261194-008 | Sampled: | 09/23/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/30/14 |
| Diln Fac: | 2.000 | | |

Moisture: 5%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 21 |
| Acenaphthylene | ND | 21 |
| Acenaphthene | ND | 21 |
| Fluorene | ND | 21 |
| Phenanthrene | 110 | 21 |
| Anthracene | ND | 21 |
| Fluoranthene | 150 | 21 |
| Pyrene | 130 | 21 |
| Benzo(a)anthracene | 66 | 21 |
| Chrysene | 85 | 21 |
| Benzo(b)fluoranthene | 100 | 21 |
| Benzo(k)fluoranthene | 30 | 21 |
| Benzo(a)pyrene | 68 | 21 |
| Indeno(1,2,3-cd)pyrene | 31 | 21 |
| Dibenz(a,h)anthracene | ND | 21 |
| Benzo(g,h,i)perylene | 36 | 21 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 55 | 23-120 |
| 2-Fluorobiphenyl | 68 | 30-115 |
| Terphenyl-d14 | 62 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

# Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TPF2-1[0.0-1.0]D | Batch#: | 215869 |
| Lab ID: | 261194-017 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/29/14 |
| Diln Fac: | 2.000 | | |

Moisture: 7%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 11 |
| Acenaphthylene | ND | 11 |
| Acenaphthene | ND | 11 |
| Fluorene | ND | 11 |
| Phenanthrene | 33 | 11 |
| Anthracene | ND | 11 |
| Fluoranthene | 47 | 11 |
| Pyrene | 50 | 11 |
| Benzo(a)anthracene | 24 | 11 |
| Chrysene | 36 | 11 |
| Benzo(b)fluoranthene | 48 | 11 |
| Benzo(k)fluoranthene | 15 | 11 |
| Benzo(a)pyrene | 31 | 11 |
| Indeno(1,2,3-cd)pyrene | 14 | 11 |
| Dibenz(a,h)anthracene | ND | 11 |
| Benzo(g,h,i)perylene | 18 | 11 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 73 | 23-120 |
| 2-Fluorobiphenyl | 75 | 30-115 |
| Terphenyl-d14 | 73 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TPF2-1[DUP] | Batch#: | 215869 |
| Lab ID: | 261194-018 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/29/14 |
| Diln Fac: | 2.000 | | |

Moisture: 5%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | 11 | 10 |
| Acenaphthylene | 13 | 10 |
| Acenaphthene | ND | 10 |
| Fluorene | ND | 10 |
| Phenanthrene | 75 | 10 |
| Anthracene | ND | 10 |
| Fluoranthene | 110 | 10 |
| Pyrene | 120 | 10 |
| Benzo(a)anthracene | 76 | 10 |
| Chrysene | 99 | 10 |
| Benzo(b)fluoranthene | 120 | 10 |
| Benzo(k)fluoranthene | 40 | 10 |
| Benzo(a)pyrene | 71 | 10 |
| Indeno(1,2,3-cd)pyrene | 23 | 10 |
| Dibenz(a,h)anthracene | ND | 10 |
| Benzo(g,h,i)perylene | 25 | 10 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 84 | 23-120 |
| 2-Fluorobiphenyl | 81 | 30-115 |
| Terphenyl-d14 | 79 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

# Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TPG1-2[0.5-1.5]D | Batch#: | 215869 |
| Lab ID: | 261194-019 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/29/14 |
| Diln Fac: | 2.000 | | |

Moisture: 5%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 10 |
| Acenaphthylene | ND | 10 |
| Acenaphthene | ND | 10 |
| Fluorene | ND | 10 |
| Phenanthrene | 13 | 10 |
| Anthracene | ND | 10 |
| Fluoranthene | 23 | 10 |
| Pyrene | 24 | 10 |
| Benzo(a)anthracene | 15 | 10 |
| Chrysene | 20 | 10 |
| Benzo(b)fluoranthene | 27 | 10 |
| Benzo(k)fluoranthene | ND | 10 |
| Benzo(a)pyrene | 16 | 10 |
| Indeno(1,2,3-cd)pyrene | ND | 10 |
| Dibenz(a,h)anthracene | ND | 10 |
| Benzo(g,h,i)perylene | ND | 10 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 72 | 23-120 |
| 2-Fluorobiphenyl | 73 | 30-115 |
| Terphenyl-d14 | 72 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

# Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TPF0-1[1.5]D | Batch#: | 215869 |
| Lab ID: | 261194-020 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/29/14 |
| Diln Fac: | 2.000 | | |

Moisture: 5%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | 22 | 10 |
| Acenaphthylene | 17 | 10 |
| Acenaphthene | 20 | 10 |
| Fluorene | 31 | 10 |
| Phenanthrene | 250 | 10 |
| Anthracene | 59 | 10 |
| Fluoranthene | 300 | 10 |
| Pyrene | 290 | 10 |
| Benzo(a)anthracene | 150 | 10 |
| Chrysene | 170 | 10 |
| Benzo(b)fluoranthene | 180 | 10 |
| Benzo(k)fluoranthene | 68 | 10 |
| Benzo(a)pyrene | 140 | 10 |
| Indeno(1,2,3-cd)pyrene | 43 | 10 |
| Dibenz(a,h)anthracene | 17 | 10 |
| Benzo(g,h,i)perylene | 43 | 10 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 74 | 23-120 |
| 2-Fluorobiphenyl | 73 | 30-115 |
| Terphenyl-d14 | 76 | 18-137 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Type: | BLANK | Diln Fac: | 1.000 |
| Lab ID: | QC759487 | Batch#: | 215869 |
| Matrix: | Soil | Prepared: | 09/29/14 |
| Units: | ug/Kg | Analyzed: | 09/29/14 |

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 4.9 |
| Acenaphthylene | ND | 4.9 |
| Acenaphthene | ND | 4.9 |
| Fluorene | ND | 4.9 |
| Phenanthrene | ND | 4.9 |
| Anthracene | ND | 4.9 |
| Fluoranthene | ND | 4.9 |
| Pyrene | ND | 4.9 |
| Benzo(a)anthracene | ND | 4.9 |
| Chrysene | ND | 4.9 |
| Benzo(b)fluoranthene | ND | 4.9 |
| Benzo(k)fluoranthene | ND | 4.9 |
| Benzo(a)pyrene | ND | 4.9 |
| Indeno(1,2,3-cd)pyrene | ND | 4.9 |
| Dibenz(a,h)anthracene | ND | 4.9 |
| Benzo(g,h,i)perylene | ND | 4.9 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 71 | 23-120 |
| 2-Fluorobiphenyl | 66 | 30-115 |
| Terphenyl-d14 | 69 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Type: | LCS | Diln Fac: | 1.000 |
| Lab ID: | QC759488 | Batch#: | 215869 |
| Matrix: | Soil | Prepared: | 09/29/14 |
| Units: | ug/Kg | Analyzed: | 09/29/14 |

| Analyte | Spiked | Result | %REC | Limits |
|---|---|---|---|---|
| Acenaphthene | 33.15 | 21.69 | 65 | 31-137 |
| Pyrene | 33.15 | 25.39 | 77 | 35-142 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 76 | 23-120 |
| 2-Fluorobiphenyl | 68 | 30-115 |
| Terphenyl-d14 | 67 | 18-137 |

Curtis & Tompkins, Ltd.

Batch QC Report

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | ZZZZZZZZZZ | Batch#: | 215869 |
| MSS Lab ID: | 261246-009 | Sampled: | 09/26/14 |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | ug/Kg | Prepared: | 09/29/14 |
| Basis: | as received | Analyzed: | 09/29/14 |
| Diln Fac: | 2.000 | | |

Type: MS Lab ID: QC759489

| Analyte | MSS Result | Spiked | Result | %REC | Limits |
|---|---|---|---|---|---|
| Acenaphthene | <0.9944 | 32.93 | 28.08 | 85 | 31-137 |
| Pyrene | 10.33 | 32.93 | 32.29 | 67 | 35-142 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 75 | 23-120 |
| 2-Fluorobiphenyl | 77 | 30-115 |
| Terphenyl-d14 | 64 | 18-137 |

Type: MSD Lab ID: QC759490

| Analyte | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|
| Acenaphthene | 32.91 | 27.96 | 85 | 31-137 | 0 | 19 |
| Pyrene | 32.91 | 30.52 | 61 | 35-142 | 6 | 36 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 78 | 23-120 |
| 2-Fluorobiphenyl | 76 | 30-115 |
| Terphenyl-d14 | 67 | 18-137 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

# California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio - Lendrum Court |
| Field ID: | 1279TP305-D[3.5] | Basis: | dry |
| Lab ID: | 261194-001 | Sampled: | 09/22/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

Moisture: 7%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | 1.8 | 0.16 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Arsenic | 7.2 | 0.26 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Barium | 560 | 21 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Beryllium | 0.57 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cadmium | 1.4 | 0.18 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Chromium | 190 | 0.24 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cobalt | 25 | 0.21 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Copper | 130 | 0.30 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Lead | 950 | 13 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Mercury | 0.53 | 0.018 | 1.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | 1.1 | 0.43 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Nickel | 320 | 42 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Selenium | 0.26 | 0.26 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Silver | 0.67 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.16 | 0.067 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Vanadium | 63 | 0.47 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Zinc | 1,100 | 67 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |

RL= Reporting Limit

# Lead

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Analyte: | Lead | Basis: | dry |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

| Field ID | Type | Lab ID | Result | RL | Moisture | Dlln Fac | Batch# | Sampled | Prepared | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1279TP302-S[0.5] | SAMPLE | 261194-002 | 110 | 0.13 | 6% | 25.00 | 215862 | 09/22/14 | 09/29/14 | 09/29/14 |
| 1279TP301-S[0.5] | SAMPLE | 261194-003 | 44 | 0.13 | 5% | 25.00 | 215862 | 09/22/14 | 09/29/14 | 09/29/14 |
| 1279TP303-S[0.5] | SAMPLE | 261194-004 | 38 | 0.12 | 4% | 25.00 | 215862 | 09/22/14 | 09/29/14 | 09/29/14 |
| 1279SBA2-1[0.5]S | SAMPLE | 261194-006 | 43 | 0.13 | 7% | 25.00 | 215862 | 09/23/14 | 09/29/14 | 09/29/14 |
| 1279TPA1-1[0.5]S | SAMPLE | 261194-007 | 62 | 0.13 | 7% | 25.00 | 215862 | 09/23/14 | 09/29/14 | 09/29/14 |
| 1279SBB1-1[0.5]S | SAMPLE | 261194-009 | 290 | 13 | 4% | 2,500 | 215862 | 09/23/14 | 09/29/14 | 09/30/14 |
| 1279SBC1-1[0.5]S | SAMPLE | 261194-010 | 490 | 12 | 7% | 2,500 | 215862 | 09/23/14 | 09/29/14 | 09/30/14 |
| 1279SBD1-1[0.5]S | SAMPLE | 261194-013 | 270 | 0.14 | 9% | 25.00 | 215862 | 09/23/14 | 09/29/14 | 09/29/14 |
| 1279SBE1-1[0.5]S | SAMPLE | 261194-014 | 220 | 0.14 | 13% | 25.00 | 215862 | 09/23/14 | 09/29/14 | 09/29/14 |
| 1279SBE1-2[0.5]S | SAMPLE | 261194-015 | 50 | 0.13 | 5% | 25.00 | 215862 | 09/23/14 | 09/29/14 | 09/29/14 |
| 1279SBD2-1[0.5]S | SAMPLE | 261194-016 | 71 | 0.13 | 7% | 25.00 | 215862 | 09/24/14 | 09/29/14 | 09/29/14 |
| 1279SBH1-1[0.5]S | SAMPLE | 261194-021 | 110 | 0.13 | 3% | 25.00 | 215862 | 09/24/14 | 09/29/14 | 09/29/14 |
| 1279SBH1-2[0.5]S | SAMPLE | 261194-022 | 66 | 0.12 | 3% | 25.00 | 215862 | 09/24/14 | 09/29/14 | 09/29/14 |
| 1279SBH1-3[0.5]S | SAMPLE | 261194-023 | 94 | 0.20 | 3% | 25.00 | 215914 | 09/24/14 | 09/30/14 | 09/30/14 |
| 1279SBG2-1[0.5]S | SAMPLE | 261194-024 | 110 | 0.21 | 7% | 25.00 | 215914 | 09/24/14 | 09/30/14 | 09/30/14 |
| 1279SBH2-1[0.5]S | SAMPLE | 261194-025 | 7.0 | 0.20 | 9% | 25.00 | 215914 | 09/24/14 | 09/30/14 | 09/30/14 |
| 1279SBH0-2[0.5]S | SAMPLE | 261194-027 | 160 | 0.20 | 3% | 25.00 | 215914 | 09/24/14 | 09/30/14 | 09/30/14 |
| | BLANK | QC759464 | ND | 0.13 | | 25.00 | 215862 | | 09/29/14 | 09/29/14 |
| | BLANK | QC759666 | ND | 0.20 | | 25.00 | 215914 | | 09/30/14 | 09/30/14 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

# California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio - Lendrum Court |
| Field ID: | 1279TP304-D[3.5] | Basis: | dry |
| Lab ID: | 261194-005 | Sampled: | 09/22/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

Moisture: 6%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | 0.40 | 0.15 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Arsenic | 3.8 | 0.26 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Barium | 280 | 21 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Beryllium | 0.51 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cadmium | 0.66 | 0.17 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Chromium | 110 | 0.23 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cobalt | 17 | 0.21 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Copper | 83 | 0.29 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Lead | 490 | 13 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Mercury | 0.27 | 0.019 | 1.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | 0.66 | 0.42 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Nickel | 120 | 0.41 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Selenium | 0.31 | 0.25 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Silver | 0.21 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.10 | 0.065 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Vanadium | 55 | 0.46 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Zinc | 470 | 65 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

# California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio - Lendrum Court |
| Field ID: | 1279TPA1-2[2.0]D | Basis: | dry |
| Lab ID: | 261194-008 | Sampled: | 09/23/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

Moisture: 5%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | 2.7 | 0.15 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Arsenic | 6.6 | 0.25 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Barium | 630 | 21 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Beryllium | 0.79 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cadmium | 1.5 | 0.17 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Chromium | 55 | 0.23 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cobalt | 10 | 0.21 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Copper | 140 | 0.28 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Lead | 1,800 | 13 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Mercury | 1.5 | 0.091 | 5.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | 1.1 | 0.42 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Nickel | 58 | 0.40 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Selenium | 0.32 | 0.25 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Silver | 0.92 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.14 | 0.064 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Vanadium | 71 | 0.45 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Zinc | 890 | 64 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

# California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio - Lendrum Court |
| Field ID: | 1279TPF2-1[0.0-1.0]D | Basis: | dry |
| Lab ID: | 261194-017 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

Moisture: 7%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | 1.8 | 0.16 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Arsenic | 6.0 | 0.26 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Barium | 830 | 21 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Beryllium | 1.0 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cadmium | 1.5 | 0.17 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Chromium | 100 | 0.24 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cobalt | 18 | 0.21 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Copper | 160 | 0.29 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Lead | 1,500 | 13 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Mercury | 2.1 | 0.094 | 5.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | 1.1 | 0.43 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Nickel | 130 | 0.41 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Selenium | 0.28 | 0.26 | 25.00 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Silver | 1.5 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.18 | 0.067 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Vanadium | 84 | 0.47 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Zinc | 740 | 67 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio - Lendrum Court |
| Field ID: | 1279TPF2-1[DUP] | Basis: | dry |
| Lab ID: | 261194-018 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

Moisture: 5%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | 3.8 | 0.15 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Arsenic | 6.5 | 0.25 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Barium | 810 | 21 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Beryllium | 1.1 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cadmium | 1.4 | 0.17 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Chromium | 96 | 0.23 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cobalt | 14 | 0.21 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Copper | 170 | 0.29 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Lead | 1,700 | 13 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Mercury | 1.9 | 0.089 | 5.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | 1.2 | 0.42 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Nickel | 110 | 0.40 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Selenium | 0.33 | 0.25 | 25.00 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Silver | 1.4 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.19 | 0.065 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Vanadium | 86 | 0.46 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Zinc | 790 | 65 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

# California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio - Lendrum Court |
| Field ID: | 1279TPG1-2[0.5-1.5]D | Basis: | dry |
| Lab ID: | 261194-019 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

Moisture: 5%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | 1.9 | 0.15 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Arsenic | 6.6 | 0.25 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Barium | 520 | 20 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Beryllium | 0.60 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cadmium | 0.94 | 0.17 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Chromium | 260 | 22 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Cobalt | 29 | 0.20 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Copper | 230 | 0.28 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Lead | 1,300 | 13 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Mercury | 0.57 | 0.019 | 1.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | 0.86 | 0.41 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Nickel | 450 | 40 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Selenium | ND | 0.25 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Silver | 0.83 | 0.13 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.13 | 0.064 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Vanadium | 65 | 0.45 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Zinc | 610 | 64 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

# California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio - Lendrum Court |
| Field ID: | 1279TPF0-1[1.5]D | Basis: | dry |
| Lab ID: | 261194-020 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | | |

Moisture: 5%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | 2.2 | 0.14 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Arsenic | 6.4 | 0.25 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Barium | 920 | 20 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Beryllium | 0.98 | 0.12 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cadmium | 1.7 | 0.16 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Chromium | 55 | 0.22 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Cobalt | 11 | 0.20 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Copper | 350 | 27 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Lead | 2,400 | 12 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Mercury | 1.8 | 0.089 | 5.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | 1.1 | 0.40 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Nickel | 58 | 0.39 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Selenium | 0.26 | 0.24 | 25.00 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |
| Silver | 1.7 | 0.12 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.19 | 0.062 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Vanadium | 79 | 0.44 | 25.00 | 215862 | 09/29/14 | 09/29/14 | EPA 3050B | EPA 6020 |
| Zinc | 980 | 62 | 2,500 | 215862 | 09/29/14 | 09/30/14 | EPA 3050B | EPA 6020 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Type: | BLANK | Diln Fac: | 25.00 |
| Lab ID: | QC759464 | Batch#: | 215862 |
| Matrix: | Soil | Prepared: | 09/29/14 |
| Units: | mg/Kg | Analyzed: | 09/29/14 |

| Analyte | Result | RL |
|---|---|---|
| Antimony | ND | 0.15 |
| Arsenic | ND | 0.25 |
| Barium | ND | 0.20 |
| Beryllium | ND | 0.13 |
| Cadmium | ND | 0.16 |
| Chromium | ND | 0.22 |
| Cobalt | ND | 0.20 |
| Copper | ND | 0.28 |
| Lead | ND | 0.13 |
| Molybdenum | ND | 0.41 |
| Nickel | ND | 0.39 |
| Selenium | ND | 0.24 |
| Silver | ND | 0.13 |
| Thallium | ND | 0.063 |
| Vanadium | ND | 0.44 |
| Zinc | ND | 0.63 |

ND= Not Detected
RL= Reporting Limit

Batch QC Report

## Lead

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Analyte: | Lead | Basis: | dry |
| Matrix: | Soil | Diln Fac: | 25.00 |
| Units: | mg/Kg | Received: | 09/24/14 |

| Field ID | Type | MSS Lab ID | Lab ID | MSS Result | Spiked | Result | %REC | Limits | Moisture | RPD | Lim | Batch# | Sampled | Prepared | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BS | | QC759465 | | 25.00 | 26.19 | 105 | 75-125 | | | | 215862 | | 09/29/14 | 09/29/14 |
| | BSD | | QC759466 | | 25.00 | 26.04 | 104 | 75-125 | | 1 | 30 | 215862 | | 09/29/14 | 09/29/14 |
| 1279TP305-D[3.5] | MS | 261194-001 | QC759467 | 946.0 | 26.59 | 743.2 >LR | -763 NM | 75-125 | 7% | | | 215862 | 09/22/14 | 09/29/14 | 09/29/14 |
| 1279TP305-D[3.5] | MSD | 261194-001 | QC759468 | | 26.41 | 2,633 >LR | 6388 NM | 75-125 | 7% | NC | 30 | 215862 | 09/22/14 | 09/29/14 | 09/29/14 |
| | BS | | QC759667 | | 25.00 | 26.93 | 108 | 75-125 | | | | 215914 | | 09/30/14 | 09/30/14 |
| | BSD | | QC759668 | | 25.00 | 25.51 | 102 | 75-125 | | 5 | 30 | 215914 | | 09/30/14 | 09/30/14 |
| 1279SBH1-3[0.5]S | MS | 261194-023 | QC759669 | 93.97 | 25.22 | 113.8 | 79 | 75-125 | 3% | | | 215914 | 09/24/14 | 09/30/14 | 10/01/14 |
| 1279SBH1-3[0.5]S | MSD | 261194-023 | QC759670 | | 24.85 | 120.6 | 107 | 75-125 | 3% | 6 | 30 | 215914 | 09/24/14 | 09/30/14 | 10/01/14 |

NC= Not Calculated
NM= Not Meaningful: Sample concentration > 4X spike concentration
>LR= Response exceeds instrument's linear range
RPD= Relative Percent Difference



25.0

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Matrix: | Soil | Batch#: | 215862 |
| Units: | mg/Kg | Prepared: | 09/29/14 |
| Diln Fac: | 25.00 | Analyzed: | 09/29/14 |

Type: BS Lab ID: QC759465

| Analyte | Spiked | Result | %REC | Limits |
|---|---|---|---|---|
| Antimony | 25.00 | 24.58 | 98 | 75-125 |
| Arsenic | 25.00 | 23.66 | 95 | 75-125 |
| Barium | 25.00 | 24.58 | 98 | 75-125 |
| Beryllium | 25.00 | 23.90 | 96 | 75-125 |
| Cadmium | 25.00 | 24.10 | 96 | 75-125 |
| Chromium | 25.00 | 25.31 | 101 | 75-125 |
| Cobalt | 25.00 | 25.33 | 101 | 75-125 |
| Copper | 25.00 | 23.54 | 94 | 75-125 |
| Lead | 25.00 | 26.19 | 105 | 75-125 |
| Molybdenum | 25.00 | 24.44 | 98 | 75-125 |
| Nickel | 25.00 | 24.94 | 100 | 75-125 |
| Selenium | 25.00 | 24.83 | 99 | 75-125 |
| Silver | 25.00 | 24.73 | 99 | 75-125 |
| Thallium | 25.00 | 24.35 | 97 | 75-125 |
| Vanadium | 25.00 | 24.08 | 96 | 75-125 |
| Zinc | 25.00 | 23.58 | 94 | 75-125 |

Type: BSD Lab ID: QC759466

| Analyte | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|
| Antimony | 25.00 | 23.96 | 96 | 75-125 | 3 | 30 |
| Arsenic | 25.00 | 23.96 | 96 | 75-125 | 1 | 30 |
| Barium | 25.00 | 24.68 | 99 | 75-125 | 0 | 30 |
| Beryllium | 25.00 | 23.88 | 96 | 75-125 | 0 | 30 |
| Cadmium | 25.00 | 24.00 | 96 | 75-125 | 0 | 30 |
| Chromium | 25.00 | 25.03 | 100 | 75-125 | 1 | 30 |
| Cobalt | 25.00 | 25.01 | 100 | 75-125 | 1 | 30 |
| Copper | 25.00 | 23.38 | 94 | 75-125 | 1 | 30 |
| Lead | 25.00 | 26.04 | 104 | 75-125 | 1 | 30 |
| Molybdenum | 25.00 | 24.14 | 97 | 75-125 | 1 | 30 |
| Nickel | 25.00 | 25.05 | 100 | 75-125 | 0 | 30 |
| Selenium | 25.00 | 24.89 | 100 | 75-125 | 0 | 30 |
| Silver | 25.00 | 24.56 | 98 | 75-125 | 1 | 30 |
| Thallium | 25.00 | 24.25 | 97 | 75-125 | 0 | 30 |
| Vanadium | 25.00 | 24.28 | 97 | 75-125 | 1 | 30 |
| Zinc | 25.00 | 23.46 | 94 | 75-125 | 0 | 30 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Field ID: | 1279TP305-D[3.5] | Batch#: | 215862 |
| MSS Lab ID: | 261194-001 | Sampled: | 09/22/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | Prepared: | 09/29/14 |
| Basis: | dry | Analyzed: | 09/29/14 |
| Diln Fac: | 25.00 | | |

Type: MS Moisture: 7%
Lab ID: QC759467

| Analyte | MSS Result | Spiked | Result | %REC | Limits |
|---|---|---|---|---|---|
| Antimony | 1.816 | 26.59 | 10.53 | 33 * | 75-125 |
| Arsenic | 7.159 | 26.59 | 31.38 | 91 | 75-125 |
| Barium | 555.9 | 26.59 | 553.5 >LR | -9 NM | 75-125 |
| Beryllium | 0.5658 | 26.59 | 26.36 | 97 | 75-125 |
| Cadmium | 1.427 | 26.59 | 27.03 | 96 | 75-125 |
| Chromium | 191.2 | 26.59 | 210.5 | 72 NM | 75-125 |
| Cobalt | 24.93 | 26.59 | 49.06 | 91 | 75-125 |
| Copper | 128.4 | 26.59 | 147.7 | 73 NM | 75-125 |
| Lead | 946.0 | 26.59 | 743.2 >LR | -763 NM | 75-125 |
| Molybdenum | 1.147 | 26.59 | 24.12 | 86 | 75-125 |
| Nickel | 319.1 | 26.59 | 308.2 >LR | -41 NM | 75-125 |
| Selenium | 0.2635 | 26.59 | 24.13 | 90 | 75-125 |
| Silver | 0.6686 | 26.59 | 27.13 | 100 | 75-125 |
| Thallium | 0.1612 | 26.59 | 25.82 | 96 | 75-125 |
| Vanadium | 63.14 | 26.59 | 86.77 | 89 | 75-125 |
| Zinc | 1,056 | 26.59 | 898.2 >LR | -594 NM | 75-125 |

Type: MSD Moisture: 7%
Lab ID: QC759468

| Analyte | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|
| Antimony | 26.41 | 10.35 | 32 * | 75-125 | 1 | 30 |
| Arsenic | 26.41 | 31.28 | 91 | 75-125 | 0 | 30 |
| Barium | 26.41 | 547.3 >LR | -33 NM | 75-125 | NC | 30 |
| Beryllium | 26.41 | 26.12 | 97 | 75-125 | 0 | 30 |
| Cadmium | 26.41 | 27.13 | 97 | 75-125 | 1 | 30 |
| Chromium | 26.41 | 224.3 | 125 NM | 75-125 | 6 | 30 |
| Cobalt | 26.41 | 50.58 | 97 | 75-125 | 3 | 30 |
| Copper | 26.41 | 145.8 | 66 NM | 75-125 | 1 | 30 |
| Lead | 26.41 | 2,633 >LR | 6388 NM | 75-125 | NC | 30 |
| Molybdenum | 26.41 | 23.79 | 86 | 75-125 | 1 | 30 |
| Nickel | 26.41 | 321.5 >LR | 9 NM | 75-125 | NC | 30 |
| Selenium | 26.41 | 24.25 | 91 | 75-125 | 1 | 30 |
| Silver | 26.41 | 26.82 | 99 | 75-125 | 1 | 30 |
| Thallium | 26.41 | 25.34 | 95 | 75-125 | 1 | 30 |
| Vanadium | 26.41 | 89.25 | 99 | 75-125 | 3 | 30 |
| Zinc | 26.41 | 932.3 >LR | -469 NM | 75-125 | NC | 30 |

*= Value outside of QC limits; see narrative
NC= Not Calculated
NM= Not Meaningful: Sample concentration > 4X spike concentration
>LR= Response exceeds instrument's linear range
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | EPA 7471A |
| Analyte: | Mercury | Diln Fac: | 1.000 |
| Type: | BLANK | Batch#: | 215965 |
| Lab ID: | QC759854 | Prepared: | 10/01/14 |
| Matrix: | Soil | Analyzed: | 10/01/14 |
| Units: | mg/Kg | | |

| Result | RL |
|---|---|
| ND | 0.017 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | EPA 7471A |
| Analyte: | Mercury | Batch#: | 215965 |
| Matrix: | Soil | Prepared: | 10/01/14 |
| Units: | mg/Kg | Analyzed: | 10/01/14 |
| Diln Fac: | 1.000 | | |

| Type | Lab ID | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|---|
| BS | QC759855 | 0.2083 | 0.2020 | 97 | 75-125 | | |
| BSD | QC759856 | 0.2083 | 0.2042 | 98 | 75-125 | 1 | 35 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | EPA 7471A |
| Analyte: | Mercury | Diln Fac: | 1.000 |
| Field ID: | ZZZZZZZZZZ | Batch#: | 215965 |
| MSS Lab ID: | 261289-001 | Sampled: | 09/29/14 |
| Matrix: | Soil | Received: | 09/30/14 |
| Units: | mg/Kg | Prepared: | 10/01/14 |
| Basis: | as received | Analyzed: | 10/01/14 |

| Type | Lab ID | MSS Result | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|---|---|
| MS | QC759857 | 0.03471 | 0.2049 | 0.2463 | 103 | 75-125 | | |
| MSD | QC759858 | | 0.2119 | 0.2574 | 105 | 75-125 | 2 | 35 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

# Moisture

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | ASTM D2216/CLP |
| Analyte: | Moisture, Percent | Diln Fac: | 1.000 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | % | Analyzed: | 09/25/14 |

| Field ID | Lab ID | Result | RL | Batch# | Sampled |
|---|---|---|---|---|---|
| 1279TP305-D[3.5] | 261194-001 | 7 | 1 | 215804 | 09/22/14 |
| 1279TP302-S[0.5] | 261194-002 | 6 | 1 | 215804 | 09/22/14 |
| 1279TP301-S[0.5] | 261194-003 | 5 | 1 | 215804 | 09/22/14 |
| 1279TP303-S[0.5] | 261194-004 | 4 | 1 | 215804 | 09/22/14 |
| 1279TP304-D[3.5] | 261194-005 | 6 | 1 | 215804 | 09/22/14 |
| 1279SBA2-1[0.5]S | 261194-006 | 7 | 1 | 215804 | 09/23/14 |
| 1279TPA1-1[0.5]S | 261194-007 | 7 | 1 | 215804 | 09/23/14 |
| 1279TPA1-2[2.0]D | 261194-008 | 5 | 1 | 215804 | 09/23/14 |
| 1279SBB1-1[0.5]S | 261194-009 | 4 | 1 | 215804 | 09/23/14 |
| 1279SBC1-1[0.5]S | 261194-010 | 7 | 1 | 215804 | 09/23/14 |
| 1279SBD1-1[0.5]S | 261194-013 | 9 | 1 | 215804 | 09/23/14 |
| 1279SBE1-1[0.5]S | 261194-014 | 13 | 1 | 215804 | 09/23/14 |
| 1279SBE1-2[0.5]S | 261194-015 | 5 | 1 | 215804 | 09/23/14 |
| 1279SBD2-1[0.5]S | 261194-016 | 7 | 1 | 215804 | 09/24/14 |
| 1279TPF2-1[0.0-1.0]D | 261194-017 | 7 | 1 | 215804 | 09/24/14 |
| 1279TPF2-1[DUP] | 261194-018 | 5 | 1 | 215804 | 09/24/14 |
| 1279TPG1-2[0.5-1.5]D | 261194-019 | 5 | 1 | 215804 | 09/24/14 |
| 1279TPF0-1[1.5]D | 261194-020 | 5 | 1 | 215804 | 09/24/14 |
| 1279SBH1-1[0.5]S | 261194-021 | 3 | 1 | 215804 | 09/24/14 |
| 1279SBH1-2[0.5]S | 261194-022 | 3 | 1 | 215804 | 09/24/14 |
| 1279SBH1-3[0.5]S | 261194-023 | 3 | 1 | 215805 | 09/24/14 |
| 1279SBG2-1[0.5]S | 261194-024 | 7 | 1 | 215805 | 09/24/14 |
| 1279SBH2-1[0.5]S | 261194-025 | 9 | 1 | 215805 | 09/24/14 |
| 1279SBH0-2[0.5]S | 261194-027 | 3 | 1 | 215805 | 09/24/14 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Moisture

| | | | |
|---|---|---|---|
| Lab #: | 261194 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | ASTM D2216/CLP |
| Analyte: | Moisture, Percent | Units: | % |
| Type: | SDUP | Diln Fac: | 1.000 |
| Matrix: | Soil | Analyzed: | 09/25/14 |

| Field ID | MSS Lab ID | Lab ID | MSS Result | Result | RL | RPD | Lim | Batch# | Sampled | Received |
|---|---|---|---|---|---|---|---|---|---|---|
| 1279SBH1-2[0.5]S | 261194-022 | QC759252 | 2.854 | 2.911 | 1.000 | 2 | 10 | 215804 | 09/24/14 | 09/24/14 |
| ZZZZZZZZZZ | 261212-001 | QC759253 | 21.49 | 21.96 | 1.000 | 2 | 10 | 215805 | 09/23/14 | 09/25/14 |

RL= Reporting Limit
RPD= Relative Percent Difference


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

**Laboratory Job Number 261249**
**ANALYTICAL REPORT**

Erler & Kalinowski, Inc.
1870 Ogden Drive
Burlingame, CA 94010-5306

Project : B00025.07 T4D
Location : Presidio
Level : II

| Sample ID | Lab ID | Sample ID | Lab ID |
|---|---|---|---|
| 1279TPK-1[0.5]S | 261249-001 | 1279SBL-3[DUP] | 261249-016 |
| 1279SBK-1[0.5]S | 261249-002 | 1279TPI1-1[0.5]S | 261249-017 |
| 1279SBK-2[0.5]S | 261249-003 | 1279TPI2-1[0.5]S | 261249-018 |
| 1279SBK-3[0.5]S | 261249-004 | 1279TPI2-1[1.5]D | 261249-019 |
| 1279SBK-4[0.5]S | 261249-005 | 1279TPI2-2[0.5]S | 261249-020 |
| 1279SBA1-1[0.5]S | 261249-006 | 1279SBJI-2[0.5]S | 261249-021 |
| 1279SBA2-3[0.5]S | 261249-007 | 1279SBJ2-2[0.5]S | 261249-022 |
| 1279SBA2-4[0.5]S | 261249-008 | 1279SBJ1-1[0.5]S | 261249-023 |
| 1279SBA2-5[0.5]S | 261249-009 | 1279SBJ3-1[0.5]S | 261249-024 |
| 1279SBM-1[0.5]S | 261249-010 | 1279SBJ3-2[0.5]S | 261249-025 |
| 1279SBM-2[0.5]S | 261249-011 | 1279SBJ3-2[DUP] | 261249-026 |
| 1279SBM-3[0.5]S | 261249-012 | 1279SBJ4-1[0.5]S | 261249-027 |
| 1279SBL-1[0.5]S | 261249-013 | 1279SBJ4-2[0.5]S | 261249-028 |
| 1279SBL-2[0.5]S | 261249-014 | 1279SBJ2-1[0.5]S | 261249-029 |
| 1279SBL-3[0.5]S | 261249-015 | | |

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 10/09/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

# CASE NARRATIVE

| | |
|---|---|
| Laboratory number: | **261249** |
| Client: | **Erler & Kalinowski, Inc.** |
| Project: | **B00025.07 T4D** |
| Location: | **Presidio** |
| Request Date: | **09/26/14, 09/30/14** |
| Samples Received: | **09/26/14** |

This data package contains sample and QC results for twenty nine soil samples, requested for the above referenced project on 09/26/14 and 09/30/14. The samples were received cold and intact. All samples underwent the (ISM) Incremental Sampling Method for all analysis

**Semivolatile Organics by GC/MS SIM (EPA 8270C-SIM):**
Matrix spikes QC759808,QC759809 (batch 215948) were not reported because the parent sample required a dilution that would have diluted out the spikes. 1279TPI2-1[1.5]D (lab # 261249-019) was diluted due to the dark and viscous nature of the sample extract. No other analytical problems were encountered.

**Metals (EPA 6020 and EPA 7471A):**
Low recoveries were observed for antimony in the MS/MSD of 1279TPK-1[0.5]S (lab # 261249-001); the BS/BSD were within limits. High RPD was also observed for antimony; the RPD was acceptable in the BS/BSD, and this analyte was not detected at or above the RL in the associated sample. No other analytical problems were encountered.

**Moisture (ASTM D2216/CLP):**
High RPD was observed for moisture, percent in the SDUP of 1279TPI2-2[0.5]S (lab # 261249-020). No other analytical problems were encountered.

261249

**Subject:** RE: B00025.07 T4D - C&T Login Summary (261249)
**Date:** Tue, 30 Sep 2014 16:02:27 +0000
**From:** correia, daniel <DCorreia@EKICONSULT.COM>
**To:** Tracy Babjar <tracy.babjar@ctberk.com>, "montgomery-brown, john" <JMontgomery-Brown@EKICONSULT.COM>, "dewitt, john" <jdewitt@EKICONSULT.COM>

Good morning Tracy,

I spoke with John about this COC. We decided that yes, we do want to run sample 1279SBJ2-1[0.5]S for lead and moisture with ISM. We also decided to run the sample we put on hold 1279SBL-2[0.5]S for lead and moisture with ISM as well. I've attached a PDF'ed revision for clarification.

I'll be out of the office till next tuesday, I'm getting married :), so if you have any questions please contact John DeWitt or John Montgomery-Brown. Thanks Tracy!

-DJC

Daniel Correia
**Erler & Kalinowski, Inc.**
1870 Ogden Drive
Burlingame, CA 94010
Office: (650)292-9100
DCorreia@EKIconsult.com

261249

# Erler & Kalinowski, Inc.

## CHAIN OF CUSTODY RECORD

CONSULTING ENGINEERS AND SCIENTISTS
1870 Ogden Drive, Burlingame, CA 94010
Phone: (650) 292-9100
Fax: (650) 552-9012

| | |
|---|---|
| ***Project Name:*** Presidio - Lendrum Court | ***Project No.:*** B00025.07 T4D |
| ***Project Location:*** Presidio of San Francisco, CA | ***Laboratory:*** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900 |
| ***Report Results to:*** John DeWitt, Labs EKI, Daniel Correia | ***Sampled By:*** Daniel Correia |

**ANALYSES REQUESTED**

EKI COC No. 20140926-1 Revision 1a

| Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead by EPA Method 6020 | | | | Moisture Content | Hold | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1279SBJ2-1[0.5]S | | 9/26/2014 | 1125 | soil | 1 gallon size zip-lock bag | | | | X | | | | X | | std. | |
| 1279SBL-2[0.5]S | | 9/25/2014 | 1615 | soil | 1 gallon size zip-lock bag | | | | X | | | | X | | std. | |
| | | | | | | | | | | | | | | | | |
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**Special Instructions:**
Please perform ISM on all samples prior to analysis - Run Moisture after ISM
Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP

| | | | | | |
|---|---|---|---|---|---|
| Relinquished by: (Signature) Daniel Correia EKI | Date: 30-Sep-14 | Time: 0855 | Received By: | Time: | |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: | |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: | |

H261249 page 1 of 3

# Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

## CHAIN OF CUSTODY RECORD

1870 Ogden Drive, Burlingame, CA 94010
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**Project Name:** Presidio - Lendrum Court
**Project No.:** 800025.07 T4D
**Project Location:** Presidio of San Francisco, CA
**Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900
**Report Results to:** John DeWitt, Labs EKI, Daniel Correia
**Sampled By:** Daniel Correia

EKI COC No. 20140926-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead EPA 6010 | | | | Moisture Content | Hold | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 1279TPK-1[0.5]S | | 9/25/14 | 0850 | soil | 1 gallon size zip-lock bag | | | | X | | | | X | | std. | |
| 2 | 1279SBK-1[0.5]S | | | 0915 | | | | | | X | | | | X | | | |
| 3 | 1279SBK-2[0.5]S | | | 0930 | | | | | | X | | | | X | | | |
| 4 | 1279SBK-3[0.5]S | | | 0955 | | | | | | X | | | | X | | | |
| 5 | 1279SBK-4[0.5]S | | | 1005 | | | | | | X | | | | X | | | |
| 6 | 1279SBA1-1[0.5]S | | | 1155 | | | | | | X | | | | X | | | |
| 7 | 1279SBA2-3[0.5]S | | | 1430 | | | | | | X | | | | X | | | |
| 8 | 1279SBA2-4[0.5]S | | | 1455 | | | | | | X | | | | X | | | |
| 9 | 1279SBA2-5[0.5]S | | | 1515 | | | | | | X | | | | X | | | |
| 10 | 1279SBM-1[0.5]S | | | 1530 | | | | | | X | | | | X | | | |
| 11 | 1279SBM-2[0.5]S | | | 1540 | | | | | | X | | | | X | | | |
| 12 | 1279SBM-3[0.5]S | | | 1550 | | | | | | X | | | | X | | | |

**Special Instructions:** Please perform ISM on all samples prior to analysis - Run moisture after ISM.

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP

| | Date | Time | | Time |
|---|---|---|---|---|
| Relinquished by: (Signature) (Daniel Correia) EKI | 9/26/14 | 1530 | Received By: | 1538 |
| Relinquished by: (Signature) | 9/26/14 | 1750 | Received By: | 1750 |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |

stored on ice cold RL

#241249 page 2 of 3

# Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

## CHAIN OF CUSTODY RECORD

1870 Ogden Drive, Burlingame, CA 94010
Phone: (650) 292-9100
Fax: (650) 552-9012

**Project Name:** Presidio - Lendrum Court
**Project No.:** B000025.07 T4D
**Project Location:** Presidio of San Francisco, CA
**Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900
**Report Results to:** John DeWitt, Labs EKI, Daniel Correia
**Sampled By:** Daniel Correia

EKI COC No. 20140926-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead EPA 6020 | | | | Moisture Content | Hold | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 13 | 1279SBL-1[0.5]S | | 9/25/14 | 1605 | soil | 1 gallon size zip-lock bag | | | | X | | | | X | | std. | |
| 14 | 1279SBL-2[0.5]S | | " | 1615 | | | | | | | | | | | X | | |
| 15 | 1279SBL-3[0.5]S | | 9/24/14 | 0900 | | | | | | X | | | | X | | | |
| 16 | 1279SBL-3[DUP] | | | | | | | | | X | | | | X | | | |
| 17 | ~~1279SBTP-11~~ | | | | | | | | | | | | | | | | |
| 17 | 1279SPI1-1[0.5]S | | | 0930 | | | | | | X | | | | X | | | |
| 18 | 1279TPI2-1[0.5]S | | | 1015 | | | | | | X | | | | X | | | |
| 19 | 1279TPI2-1[1.5]D | | | 1020 | | | X | X | | X | | | | X | | | |
| 20 | 1279TPI2-2[0.5]S | | | 1045 | | | | | | | | | | X | | | |
| 21 | 1279SBJ1-2[0.5]S | | | 1115 | | | | | | X | | | | X | | | |
| 22 | 1279SBJ2-2[0.5]S | | | 1130 | | | | | | X | | | | X | | | |
| 23 | 1279SBJ1-1[0.5]S | | | 1105 | | | | | | X | | | | X | | | |
| | | | | | | | | | | X | | | | X | | | |

**Special Instructions:** Please perform LSM on all samples prior to analysis - run moisture after LSM

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP

| | Date | Time | | Time |
|---|---|---|---|---|
| Relinquished by: (Signature) (Daniel Correia) EKI | 9/24/14 | 1539 | Received By: | 1539 |
| Relinquished by: (Signature) | 9/26/14 | 1750 | Received By: | 1750 |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |

intact on ice o/l KC

#261249

Page 3 of 3

## Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

# CHAIN OF CUSTODY RECORD

1870 Ogden Drive, Burlingame, CA 94010
Phone: (650) 292-9100
Fax: (650) 552-9012

| | |
|---|---|
| **Project Name:** Presidio - Lendrum Court | **Project No.:** B00025.07 T4D |
| **Project Location:** Presidio of San Francisco, CA | **Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900 |
| **Report Results to:** John DeWitt, Labs EKI, Daniel Correia | **Sampled By:** Daniel Correia |

EKI COC No. 20140926-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead EPA 6020 | | | | Moisture Content | Hold | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 24 | 1279SBJ3-1[0.5]5 | | 9/26/14 | 1135 | soil | 1 gallon size zip-lock bag | | | | X | | | | X | | | |
| 25 | 1279SBJ3-2[0.5]5 | | | 1140 | | | | | | X | | | | X | | std. | |
| 26 | 1279SBJ3-2[DUP] | | | | | | | | | X | | | | X | | | |
| 27 | 1279SBJ4-1[0.5]5 | | | 1145 | | | | | | X | | | | X | | | |
| 28 | 1279SBJ4-2[0.5]5 | | | 1150 | | | | | | X | | | | X | | | |
| | | | | | | | | | | / | | | | | | | |

**Special Instructions:** Please perform ISM on all samples prior to analysis - run moisture after ISM

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP

| | Date | Time | | Time |
|---|---|---|---|---|
| Relinquished by: (Signature) (Daniel Correia) EKI | 9/26/14 | 1539 | Received By: | 1539 |
| Relinquished by: (Signature) | 9/26/14 | 1750 | Received By: | 1730 |
| Relinquished by: (Signature) | | | Received By: | |

Wait on ice add KC

**COOLER RECEIPT CHECKLIST** Curtis & Tompkins, Ltd.

Login # 261249 Date Received 9/26/14 Number of coolers 2
Client EKI Project B66025.07 TMD

Date Opened 9/26 By (print) SK (sign)
Date Logged in 9/26 By (print) SJ (sign)

1. Did cooler come with a shipping slip (airbill, etc) YES ~~NO~~
Shipping info

2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☒ ~~NO~~
How many Name Date
2B. Were custody seals intact upon arrival? YES NO ~~N/A~~
3. Were custody papers dry and intact when received? ~~YES~~ NO
4. Were custody papers filled out properly (ink, signed, etc)? ~~YES~~ NO
5. Is the project identifiable from custody papers? (If so fill out top of form) ~~YES~~ NO
6. Indicate the packing in cooler: (if other, describe)

☐ Bubble Wrap ☐ Foam blocks ☒ ~~Bags~~ ☐ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☒ ~~Wet~~ ☐ Blue/Gel ☐ None Temp(°C) —

☒ Samples Received on ice & cold without a temperature blank; ~~temp. taken with IR gun~~

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? YES ~~NO~~
If YES, what time were they transferred to freezer?
9. Did all bottles arrive unbroken/unopened? ~~YES~~ NO
10. Are there any missing / extra samples? 9/29 YES ~~NO~~
11. Are samples in the appropriate containers for indicated tests? ~~YES~~ NO
12. Are sample labels present, in good condition and complete? ~~YES~~ NO
13. Do the sample labels agree with custody papers? ~~YES~~ NO
14. Was sufficient amount of sample sent for tests requested? ~~YES~~ NO
15. Are the samples appropriately preserved? YES NO ~~N/A~~
16. Did you check preservatives for all bottles for each sample? YES NO ~~N/A~~
17. Did you document your preservative check? YES NO ~~N/A~~
18. Did you change the hold time in LIMS for unpreserved VOAs? YES NO ~~N/A~~
19. Did you change the hold time in LIMS for preserved terracores? YES NO ~~N/A~~
20. Are bubbles > 6mm absent in VOA samples? YES NO ~~N/A~~
21. Was the client contacted concerning this sample delivery? YES ~~NO~~
If YES, Who was called? By Date:

COMMENTS
10) Received 1 extra sample not on COC
w/ sample ID 279SB12-110.5JS
& sample time: 9/26/14 @ 1125

Rev 10, 9/12

Curtis & Tompkins, Ltd.

# Detections Summary for 261249

Results for any subcontracted analyses are not included in this summary.

Client : Erler & Kalinowski, Inc.
Project : B00025.07 T4D
Location : Presidio

## Client Sample ID : 1279TPK-1[0.5]S Laboratory Sample ID : 261249-001

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 230 | | 19 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 1 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBK-1[0.5]S Laboratory Sample ID : 261249-002

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 81 | | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBK-2[0.5]S Laboratory Sample ID : 261249-003

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 83 | | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBK-3[0.5]S Laboratory Sample ID : 261249-004

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 94 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBK-4[0.5]S Laboratory Sample ID : 261249-005

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 340 | | 20 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

## Client Sample ID : 1279SBA1-1[0.5]S Laboratory Sample ID : 261249-006

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 23 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 1 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

Client Sample ID : 1279SBA2-3[0.5]S Laboratory Sample ID : 261249-007

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 16 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBA2-4[0.5]S Laboratory Sample ID : 261249-008

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 28 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBA2-5[0.5]S Laboratory Sample ID : 261249-009

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 26 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBM-1[0.5]S Laboratory Sample ID : 261249-010

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 67 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBM-2[0.5]S Laboratory Sample ID : 261249-011

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 52 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBM-3[0.5]S Laboratory Sample ID : 261249-012

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 67 | | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBL-1[0.5]S Laboratory Sample ID : 261249-013

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 37 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBL-2[0.5]S Laboratory Sample ID : 261249-014

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 69 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBL-3[0.5]S Laboratory Sample ID : 261249-015

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 54 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBL-3[DUP] Laboratory Sample ID : 261249-016

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 52 | | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279TPI1-1[0.5]S Laboratory Sample ID : 261249-017

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 150 | | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279TPI2-1[0.5]S Laboratory Sample ID : 261249-018

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 54 | | 0.13 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |

Client Sample ID : 1279TPI2-1[1.5]D Laboratory Sample ID : 261249-019

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Arsenic | 3.9 | | 0.24 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Barium | 120 | | 0.19 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Beryllium | 0.24 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Chromium | 290 | | 21 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Cobalt | 40 | | 0.19 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Copper | 30 | | 0.27 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Lead | 340 | | 12 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Mercury | 0.065 | | 0.019 | mg/Kg | Dry | 1.000 | EPA 7471A | METHOD |
| Nickel | 460 | | 38 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Silver | 0.30 | | 0.12 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Thallium | 0.14 | | 0.060 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Vanadium | 47 | | 0.43 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Zinc | 56 | | 0.60 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

Client Sample ID : 1279TPI2-2[0.5]S Laboratory Sample ID : 261249-020

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 54 | | 0.19 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |

Client Sample ID : 1279SBJI-2[0.5]S Laboratory Sample ID : 261249-021

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 820 | | 20 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBJ2-2[0.5]S Laboratory Sample ID : 261249-022

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 170 | | 0.20 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBJ1-1[0.5]S Laboratory Sample ID : 261249-023

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 680 | | 20 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBJ3-1[0.5]S Laboratory Sample ID : 261249-024

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 120 | | 0.19 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBJ3-2[0.5]S Laboratory Sample ID : 261249-025

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 50 | | 0.20 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBJ3-2[DUP] Laboratory Sample ID : 261249-026

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 35 | | 0.20 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

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Client Sample ID : 1279SBJ4-1[0.5]S Laboratory Sample ID : 261249-027

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 370 | | 20 | mg/Kg | Dry | 2500 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 2 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBJ4-2[0.5]S Laboratory Sample ID : 261249-028

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 200 | | 0.20 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 6 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Client Sample ID : 1279SBJ2-1[0.5]S Laboratory Sample ID : 261249-029

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 180 | | 0.19 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 3 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Field ID: | 1279TPI2-1[1.5]D | Batch#: | 215948 |
| Lab ID: | 261249-019 | Sampled: | 09/26/14 |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | ug/Kg | Prepared: | 09/30/14 |
| Basis: | dry | Analyzed: | 10/02/14 |
| Diln Fac: | 20.00 | | |

Moisture: 3%

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 100 |
| Acenaphthylene | ND | 100 |
| Acenaphthene | ND | 100 |
| Fluorene | ND | 100 |
| Phenanthrene | ND | 100 |
| Anthracene | ND | 100 |
| Fluoranthene | ND | 100 |
| Pyrene | ND | 100 |
| Benzo(a)anthracene | ND | 100 |
| Chrysene | ND | 100 |
| Benzo(b)fluoranthene | ND | 100 |
| Benzo(k)fluoranthene | ND | 100 |
| Benzo(a)pyrene | ND | 100 |
| Indeno(1,2,3-cd)pyrene | ND | 100 |
| Dibenz(a,h)anthracene | ND | 100 |
| Benzo(g,h,i)perylene | ND | 100 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | DO | 23-120 |
| 2-Fluorobiphenyl | DO | 30-115 |
| Terphenyl-d14 | DO | 18-137 |

DO= Diluted Out
ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Type: | BLANK | Diln Fac: | 1.000 |
| Lab ID: | QC759806 | Batch#: | 215948 |
| Matrix: | Soil | Prepared: | 09/30/14 |
| Units: | ug/Kg | Analyzed: | 10/01/14 |

| Analyte | Result | RL |
|---|---|---|
| Naphthalene | ND | 5.0 |
| Acenaphthylene | ND | 5.0 |
| Acenaphthene | ND | 5.0 |
| Fluorene | ND | 5.0 |
| Phenanthrene | ND | 5.0 |
| Anthracene | ND | 5.0 |
| Fluoranthene | ND | 5.0 |
| Pyrene | ND | 5.0 |
| Benzo(a)anthracene | ND | 5.0 |
| Chrysene | ND | 5.0 |
| Benzo(b)fluoranthene | ND | 5.0 |
| Benzo(k)fluoranthene | ND | 5.0 |
| Benzo(a)pyrene | ND | 5.0 |
| Indeno(1,2,3-cd)pyrene | ND | 5.0 |
| Dibenz(a,h)anthracene | ND | 5.0 |
| Benzo(g,h,i)perylene | ND | 5.0 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 67 | 23-120 |
| 2-Fluorobiphenyl | 75 | 30-115 |
| Terphenyl-d14 | 79 | 18-137 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Semivolatile Organics by GC/MS SIM

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3550B |
| Project#: | B00025.07 T4D | Analysis: | EPA 8270C-SIM |
| Type: | LCS | Diln Fac: | 1.000 |
| Lab ID: | QC759807 | Batch#: | 215948 |
| Matrix: | Soil | Prepared: | 09/30/14 |
| Units: | ug/Kg | Analyzed: | 10/01/14 |

| Analyte | Spiked | Result | %REC | Limits |
|---|---|---|---|---|
| Acenaphthene | 33.15 | 24.51 | 74 | 31-137 |
| Pyrene | 33.15 | 24.42 | 74 | 35-142 |

| Surrogate | %REC | Limits |
|---|---|---|
| Nitrobenzene-d5 | 65 | 23-120 |
| 2-Fluorobiphenyl | 69 | 30-115 |
| Terphenyl-d14 | 69 | 18-137 |

# Lead

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Analyte: | Lead | Basis: | dry |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | mg/Kg | | |

| Field ID | Type | Lab ID | Result | RL | Moisture | Diln Fac | Batch# | Sampled | Prepared | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1279TPK-1[0.5]S | SAMPLE | 261249-001 | 230 | 19 | 1% | 2,500 | 215984 | 09/25/14 | 10/01/14 | 10/02/14 |
| 1279SBK-1[0.5]S | SAMPLE | 261249-002 | 81 | 0.13 | 2% | 25.00 | 215984 | 09/25/14 | 10/01/14 | 10/01/14 |
| 1279SBK-2[0.5]S | SAMPLE | 261249-003 | 83 | 0.13 | 2% | 25.00 | 215984 | 09/25/14 | 10/01/14 | 10/01/14 |
| 1279SBK-3[0.5]S | SAMPLE | 261249-004 | 94 | 0.12 | 2% | 25.00 | 215984 | 09/25/14 | 10/01/14 | 10/01/14 |
| 1279SBK-4[0.5]S | SAMPLE | 261249-005 | 340 | 20 | 2% | 2,500 | 215984 | 09/25/14 | 10/01/14 | 10/02/14 |
| 1279SBA1-1[0.5]S | SAMPLE | 261249-006 | 23 | 0.12 | 1% | 25.00 | 215984 | 09/25/14 | 10/01/14 | 10/01/14 |
| 1279SBA2-3[0.5]S | SAMPLE | 261249-007 | 16 | 0.12 | 2% | 25.00 | 215984 | 09/25/14 | 10/01/14 | 10/01/14 |
| 1279SBA2-4[0.5]S | SAMPLE | 261249-008 | 28 | 0.12 | 2% | 25.00 | 215984 | 09/25/14 | 10/02/14 | 10/02/14 |
| 1279SBA2-5[0.5]S | SAMPLE | 261249-009 | 26 | 0.12 | 2% | 25.00 | 215984 | 09/25/14 | 10/02/14 | 10/02/14 |
| 1279SBM-1[0.5]S | SAMPLE | 261249-010 | 67 | 0.12 | 2% | 25.00 | 215984 | 09/25/14 | 10/02/14 | 10/02/14 |
| 1279SBM-2[0.5]S | SAMPLE | 261249-011 | 52 | 0.12 | 2% | 25.00 | 215984 | 09/25/14 | 10/02/14 | 10/02/14 |
| 1279SBM-3[0.5]S | SAMPLE | 261249-012 | 67 | 0.13 | 2% | 25.00 | 215984 | 09/25/14 | 10/02/14 | 10/02/14 |
| 1279SBL-1[0.5]S | SAMPLE | 261249-013 | 37 | 0.12 | 3% | 25.00 | 215984 | 09/25/14 | 10/02/14 | 10/02/14 |
| 1279SBL-2[0.5]S | SAMPLE | 261249-014 | 69 | 0.12 | 2% | 25.00 | 215984 | 09/25/14 | 10/02/14 | 10/02/14 |
| 1279SBL-3[0.5]S | SAMPLE | 261249-015 | 54 | 0.12 | 2% | 25.00 | 215984 | 09/26/14 | 10/02/14 | 10/02/14 |
| 1279SBL-3[DUP] | SAMPLE | 261249-016 | 52 | 0.13 | 2% | 25.00 | 215984 | 09/26/14 | 10/02/14 | 10/02/14 |
| 1279TPI1-1[0.5]S | SAMPLE | 261249-017 | 150 | 0.13 | 2% | 25.00 | 215984 | 09/26/14 | 10/02/14 | 10/02/14 |
| 1279TPI2-1[0.5]S | SAMPLE | 261249-018 | 54 | 0.13 | 1% | 25.00 | 215984 | 09/26/14 | 10/02/14 | 10/02/14 |

ND= Not Detected
RL= Reporting Limit

# Lead

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Analyte: | Lead | Basis: | dry |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | mg/Kg | | |

| Field ID | Type | Lab ID | Result | RL | Moisture | Diln Fac | Batch# | Sampled | Prepared | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|
| 1279TPI2-2[0.5]S | SAMPLE | 261249-020 | 54 | 0.19 | 0% | 25.00 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJI-2[0.5]S | SAMPLE | 261249-021 | 820 | 20 | 2% | 2,500 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ2-2[0.5]S | SAMPLE | 261249-022 | 170 | 0.20 | 3% | 25.00 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ1-1[0.5]S | SAMPLE | 261249-023 | 680 | 20 | 2% | 2,500 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ3-1[0.5]S | SAMPLE | 261249-024 | 120 | 0.19 | 2% | 25.00 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ3-2[0.5]S | SAMPLE | 261249-025 | 50 | 0.20 | 3% | 25.00 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ3-2[DUP] | SAMPLE | 261249-026 | 35 | 0.20 | 2% | 25.00 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ4-1[0.5]S | SAMPLE | 261249-027 | 370 | 20 | 2% | 2,500 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ4-2[0.5]S | SAMPLE | 261249-028 | 200 | 0.20 | 6% | 25.00 | 216029 | 09/26/14 | 10/03/14 | 10/06/14 |
| 1279SBJ2-1[0.5]S | SAMPLE | 261249-029 | 180 | 0.19 | 3% | 25.00 | 216029 | 09/26/14 | 10/03/14 | 10/06/14 |
| | BLANK | QC759920 | ND | 0.13 | | 25.00 | 215984 | | 10/01/14 | 10/01/14 |
| | BLANK | QC760100 | ND | 0.20 | | 25.00 | 216029 | | 10/02/14 | 10/03/14 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

# California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Project#: | B00025.07 T4D |
| Client: | Erler & Kalinowski, Inc. | Location: | Presidio |
| Field ID: | 1279TPI2-1[1.5]D | Basis: | dry |
| Lab ID: | 261249-019 | Sampled: | 09/26/14 |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | mg/Kg | | |

Moisture: 3%

| Analyte | Result | RL | Diln Fac | Batch# | Prepared | Analyzed | Prep | Analysis |
|---|---|---|---|---|---|---|---|---|
| Antimony | ND | 0.14 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Arsenic | 3.9 | 0.24 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Barium | 120 | 0.19 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Beryllium | 0.24 | 0.12 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Cadmium | ND | 0.16 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Chromium | 290 | 21 | 2,500 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Cobalt | 40 | 0.19 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Copper | 30 | 0.27 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Lead | 340 | 12 | 2,500 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Mercury | 0.065 | 0.019 | 1.000 | 215965 | 10/01/14 | 10/01/14 | METHOD | EPA 7471A |
| Molybdenum | ND | 0.39 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Nickel | 460 | 38 | 2,500 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Selenium | ND | 0.20 | 25.00 | 215984 | 10/02/14 | 10/03/14 | EPA 3050B | EPA 6020 |
| Silver | 0.30 | 0.12 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Thallium | 0.14 | 0.060 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Vanadium | 47 | 0.43 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |
| Zinc | 56 | 0.60 | 25.00 | 215984 | 10/02/14 | 10/02/14 | EPA 3050B | EPA 6020 |

ND= Not Detected
RL= Reporting Limit

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | EPA 7471A |
| Analyte: | Mercury | Diln Fac: | 1.000 |
| Type: | BLANK | Batch#: | 215965 |
| Lab ID: | QC759854 | Prepared: | 10/01/14 |
| Matrix: | Soil | Analyzed: | 10/01/14 |
| Units: | mg/Kg | | |

| Result | RL |
|---|---|
| ND | 0.017 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | EPA 7471A |
| Analyte: | Mercury | Batch#: | 215965 |
| Matrix: | Soil | Prepared: | 10/01/14 |
| Units: | mg/Kg | Analyzed: | 10/01/14 |
| Diln Fac: | 1.000 | | |

| Type | Lab ID | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|---|
| BS | QC759855 | 0.2083 | 0.2020 | 97 | 75-125 | | |
| BSD | QC759856 | 0.2083 | 0.2042 | 98 | 75-125 | 1 | 35 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | EPA 7471A |
| Analyte: | Mercury | Diln Fac: | 1.000 |
| Field ID: | ZZZZZZZZZZ | Batch#: | 215965 |
| MSS Lab ID: | 261289-001 | Sampled: | 09/29/14 |
| Matrix: | Soil | Received: | 09/30/14 |
| Units: | mg/Kg | Prepared: | 10/01/14 |
| Basis: | as received | Analyzed: | 10/01/14 |

| Type | Lab ID | MSS Result | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|---|---|
| MS | QC759857 | 0.03471 | 0.2049 | 0.2463 | 103 | 75-125 | | |
| MSD | QC759858 | | 0.2119 | 0.2574 | 105 | 75-125 | 2 | 35 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Type: | BLANK | Diln Fac: | 25.00 |
| Lab ID: | QC759920 | Batch#: | 215984 |
| Matrix: | Soil | Prepared: | 10/01/14 |
| Units: | mg/Kg | Analyzed: | 10/01/14 |

| Analyte | Result | RL |
|---|---|---|
| Antimony | ND | 0.15 |
| Arsenic | ND | 0.25 |
| Barium | ND | 0.20 |
| Beryllium | ND | 0.13 |
| Cadmium | ND | 0.16 |
| Chromium | ND | 0.22 |
| Cobalt | ND | 0.20 |
| Copper | ND | 0.28 |
| Lead | ND | 0.13 |
| Molybdenum | ND | 0.41 |
| Nickel | ND | 0.39 |
| Selenium | ND | 0.24 |
| Silver | ND | 0.13 |
| Thallium | ND | 0.063 |
| Vanadium | ND | 0.44 |
| Zinc | ND | 0.63 |

ND= Not Detected
RL= Reporting Limit

Batch QC Report

## Lead

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Analyte: | Lead | Basis: | dry |
| Matrix: | Soil | Diln Fac: | 25.00 |
| Units: | mg/Kg | Received: | 09/26/14 |

| Field ID | Type | MSS Lab ID | Lab ID | MSS Result | Spiked | Result | %REC | Limits | Moisture | RPD | Lim | Batch# | Sampled | Prepared | Analyzed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BS | | QC759921 | | 25.00 | 29.35 | 117 | 75-125 | | | | 215984 | | 10/01/14 | 10/01/14 |
| | BSD | | QC759922 | | 25.00 | 30.53 | 122 | 75-125 | | 4 | 30 | 215984 | | 10/01/14 | 10/01/14 |
| 1279TPK-1[0.5]S | MS | 261249-001 | QC759923 | 227.3 | 24.85 | 258.2 >LR | 125 NM | 75-125 | 1% | | | 215984 | 09/25/14 | 10/01/14 | 10/01/14 |
| 1279TPK-1[0.5]S | MSD | 261249-001 | QC759924 | | 24.49 | 317.9 >LR | 370 NM | 75-125 | 1% | NC | 30 | 215984 | 09/25/14 | 10/01/14 | 10/01/14 |
| | BS | | QC760101 | | 25.00 | 26.16 | 105 | 75-125 | | | | 216029 | | 10/02/14 | 10/03/14 |
| | BSD | | QC760102 | | 25.00 | 25.99 | 104 | 75-125 | | 1 | 30 | 216029 | | 10/02/14 | 10/03/14 |
| 1279SBJ1-1[0.5]S | MS | 261249-023 | QC760103 | 682.2 | 24.41 | 1,974 >LR | 5291 NM | 75-125 | 2% | | | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |
| 1279SBJ1-1[0.5]S | MSD | 261249-023 | QC760104 | | 25.06 | 495.9 >LR | -743 NM | 75-125 | 2% | NC | 30 | 216029 | 09/26/14 | 10/02/14 | 10/03/14 |

NC= Not Calculated
NM= Not Meaningful: Sample concentration > 4X spike concentration
>LR= Response exceeds instrument's linear range
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Matrix: | Soil | Batch#: | 215984 |
| Units: | mg/Kg | Prepared: | 10/01/14 |
| Diln Fac: | 25.00 | | |

Type: BS Lab ID: QC759921

| Analyte | Spiked | Result | %REC | Limits | Analyzed |
|---|---|---|---|---|---|
| Antimony | 25.00 | 26.50 | 106 | 75-125 | 10/01/14 |
| Arsenic | 25.00 | 27.33 | 109 | 75-125 | 10/01/14 |
| Barium | 25.00 | 27.49 | 110 | 75-125 | 10/01/14 |
| Beryllium | 25.00 | 27.14 | 109 | 75-125 | 10/01/14 |
| Cadmium | 25.00 | 27.36 | 109 | 75-125 | 10/01/14 |
| Chromium | 25.00 | 28.84 | 115 | 75-125 | 10/01/14 |
| Cobalt | 25.00 | 28.83 | 115 | 75-125 | 10/01/14 |
| Copper | 25.00 | 26.93 | 108 | 75-125 | 10/01/14 |
| Lead | 25.00 | 29.35 | 117 | 75-125 | 10/01/14 |
| Molybdenum | 25.00 | 27.28 | 109 | 75-125 | 10/01/14 |
| Nickel | 25.00 | 29.00 | 116 | 75-125 | 10/01/14 |
| Selenium | 25.00 | 29.45 | 118 | 75-125 | 10/07/14 |
| Silver | 25.00 | 27.21 | 109 | 75-125 | 10/01/14 |
| Thallium | 25.00 | 27.03 | 108 | 75-125 | 10/01/14 |
| Vanadium | 25.00 | 27.86 | 111 | 75-125 | 10/01/14 |
| Zinc | 25.00 | 26.70 | 107 | 75-125 | 10/01/14 |

Type: BSD Lab ID: QC759922

| Analyte | Spiked | Result | %REC | Limits | RPD | Lim | Analyzed |
|---|---|---|---|---|---|---|---|
| Antimony | 25.00 | 27.66 | 111 | 75-125 | 4 | 30 | 10/01/14 |
| Arsenic | 25.00 | 29.04 | 116 | 75-125 | 6 | 30 | 10/01/14 |
| Barium | 25.00 | 28.59 | 114 | 75-125 | 4 | 30 | 10/01/14 |
| Beryllium | 25.00 | 28.11 | 112 | 75-125 | 4 | 30 | 10/01/14 |
| Cadmium | 25.00 | 28.31 | 113 | 75-125 | 3 | 30 | 10/01/14 |
| Chromium | 25.00 | 29.81 | 119 | 75-125 | 3 | 30 | 10/01/14 |
| Cobalt | 25.00 | 29.94 | 120 | 75-125 | 4 | 30 | 10/01/14 |
| Copper | 25.00 | 28.86 | 115 | 75-125 | 7 | 30 | 10/01/14 |
| Lead | 25.00 | 30.53 | 122 | 75-125 | 4 | 30 | 10/01/14 |
| Molybdenum | 25.00 | 28.45 | 114 | 75-125 | 4 | 30 | 10/01/14 |
| Nickel | 25.00 | 29.96 | 120 | 75-125 | 3 | 30 | 10/01/14 |
| Selenium | 25.00 | 29.53 | 118 | 75-125 | 0 | 30 | 10/07/14 |
| Silver | 25.00 | 28.28 | 113 | 75-125 | 4 | 30 | 10/01/14 |
| Thallium | 25.00 | 28.11 | 112 | 75-125 | 4 | 30 | 10/01/14 |
| Vanadium | 25.00 | 28.83 | 115 | 75-125 | 3 | 30 | 10/01/14 |
| Zinc | 25.00 | 28.74 | 115 | 75-125 | 7 | 30 | 10/01/14 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

Batch QC Report

## California Title 22 Metals

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Field ID: | 1279TPK-1[0.5]S | Batch#: | 215984 |
| MSS Lab ID: | 261249-001 | Sampled: | 09/25/14 |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | mg/Kg | Prepared: | 10/01/14 |
| Basis: | dry | Analyzed: | 10/01/14 |
| Diln Fac: | 25.00 | | |

Type: MS Moisture: 1%
Lab ID: QC759923

| Analyte | MSS Result | Spiked | Result | %REC | Limits |
|---|---|---|---|---|---|
| Antimony | 1.988 | 24.85 | 9.143 | 29 * | 75-125 |
| Arsenic | 6.153 | 24.85 | 33.13 | 109 | 75-125 |
| Barium | 111.6 | 24.85 | 138.8 | 109 NM | 75-125 |
| Beryllium | 0.4877 | 24.85 | 28.68 | 113 | 75-125 |
| Cadmium | 0.1004 | 24.85 | 27.92 | 112 | 75-125 |
| Chromium | 89.23 | 24.85 | 117.2 | 113 | 75-125 |
| Cobalt | 14.40 | 24.85 | 43.05 | 115 | 75-125 |
| Copper | 18.54 | 24.85 | 47.57 | 117 | 75-125 |
| Lead | 227.3 | 24.85 | 258.2 >LR | 125 NM | 75-125 |
| Molybdenum | 0.5870 | 24.85 | 24.17 | 95 | 75-125 |
| Nickel | 66.90 | 24.85 | 93.84 | 108 | 75-125 |
| Selenium | 0.3229 | 24.85 | 30.21 | 120 | 75-125 |
| Silver | 0.06391 | 24.85 | 27.80 | 112 | 75-125 |
| Thallium | 0.1552 | 24.85 | 28.00 | 112 | 75-125 |
| Vanadium | 63.33 | 24.85 | 90.98 | 111 | 75-125 |
| Zinc | 51.59 | 24.85 | 78.80 | 109 | 75-125 |

Type: MSD Moisture: 1%
Lab ID: QC759924

| Analyte | Spiked | Result | %REC | Limits | RPD | Lim |
|---|---|---|---|---|---|---|
| Antimony | 24.49 | 14.24 | 50 * | 75-125 | 45 * | 30 |
| Arsenic | 24.49 | 34.06 | 114 | 75-125 | 4 | 30 |
| Barium | 24.49 | 139.7 | 115 NM | 75-125 | 1 | 30 |
| Beryllium | 24.49 | 28.40 | 114 | 75-125 | 0 | 30 |
| Cadmium | 24.49 | 27.95 | 114 | 75-125 | 2 | 30 |
| Chromium | 24.49 | 117.7 | 116 | 75-125 | 1 | 30 |
| Cobalt | 24.49 | 42.67 | 115 | 75-125 | 0 | 30 |
| Copper | 24.49 | 47.43 | 118 | 75-125 | 1 | 30 |
| Lead | 24.49 | 317.9 >LR | 370 NM | 75-125 | NC | 30 |
| Molybdenum | 24.49 | 24.55 | 98 | 75-125 | 3 | 30 |
| Nickel | 24.49 | 95.32 | 116 | 75-125 | 2 | 30 |
| Selenium | 24.49 | 30.27 | 122 | 75-125 | 2 | 30 |
| Silver | 24.49 | 27.65 | 113 | 75-125 | 1 | 30 |
| Thallium | 24.49 | 27.85 | 113 | 75-125 | 1 | 30 |
| Vanadium | 24.49 | 90.92 | 113 | 75-125 | 0 | 30 |
| Zinc | 24.49 | 79.20 | 113 | 75-125 | 1 | 30 |

*= Value outside of QC limits; see narrative
NC= Not Calculated
NM= Not Meaningful: Sample concentration > 4X spike concentration
>LR= Response exceeds instrument's linear range
RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

# Moisture

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | ASTM D2216/CLP |
| Analyte: | Moisture, Percent | Diln Fac: | 1.000 |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | % | Analyzed: | 10/04/14 |

| Field ID | Lab ID | Result | RL | Batch# | Sampled |
|---|---|---|---|---|---|
| 1279TPK-1[0.5]S | 261249-001 | 1 | 1 | 216082 | 09/25/14 |
| 1279SBK-1[0.5]S | 261249-002 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBK-2[0.5]S | 261249-003 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBK-3[0.5]S | 261249-004 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBK-4[0.5]S | 261249-005 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBA1-1[0.5]S | 261249-006 | 1 | 1 | 216082 | 09/25/14 |
| 1279SBA2-3[0.5]S | 261249-007 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBA2-4[0.5]S | 261249-008 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBA2-5[0.5]S | 261249-009 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBM-1[0.5]S | 261249-010 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBM-2[0.5]S | 261249-011 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBM-3[0.5]S | 261249-012 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBL-1[0.5]S | 261249-013 | 3 | 1 | 216082 | 09/25/14 |
| 1279SBL-2[0.5]S | 261249-014 | 2 | 1 | 216082 | 09/25/14 |
| 1279SBL-3[0.5]S | 261249-015 | 2 | 1 | 216082 | 09/26/14 |
| 1279SBL-3[DUP] | 261249-016 | 2 | 1 | 216082 | 09/26/14 |
| 1279TPI1-1[0.5]S | 261249-017 | 2 | 1 | 216082 | 09/26/14 |
| 1279TPI2-1[0.5]S | 261249-018 | 1 | 1 | 216082 | 09/26/14 |
| 1279TPI2-1[1.5]D | 261249-019 | 3 | 1 | 216082 | 09/26/14 |
| 1279TPI2-2[0.5]S | 261249-020 | ND | 1 | 216082 | 09/26/14 |
| 1279SBJI-2[0.5]S | 261249-021 | 2 | 1 | 216083 | 09/26/14 |
| 1279SBJ2-2[0.5]S | 261249-022 | 3 | 1 | 216083 | 09/26/14 |
| 1279SBJ1-1[0.5]S | 261249-023 | 2 | 1 | 216083 | 09/26/14 |
| 1279SBJ3-1[0.5]S | 261249-024 | 2 | 1 | 216083 | 09/26/14 |
| 1279SBJ3-2[0.5]S | 261249-025 | 3 | 1 | 216083 | 09/26/14 |
| 1279SBJ3-2[DUP] | 261249-026 | 2 | 1 | 216083 | 09/26/14 |
| 1279SBJ4-1[0.5]S | 261249-027 | 2 | 1 | 216083 | 09/26/14 |
| 1279SBJ4-2[0.5]S | 261249-028 | 6 | 1 | 216083 | 09/26/14 |
| 1279SBJ2-1[0.5]S | 261249-029 | 3 | 1 | 216083 | 09/26/14 |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Moisture

| | | | |
|---|---|---|---|
| Lab #: | 261249 | Location: | Presidio |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | ASTM D2216/CLP |
| Analyte: | Moisture, Percent | Diln Fac: | 1.000 |
| Type: | SDUP | Sampled: | 09/26/14 |
| Matrix: | Soil | Received: | 09/26/14 |
| Units: | % | Analyzed: | 10/04/14 |

| Field ID | MSS Lab ID | Lab ID | MSS Result | Result | RL | RPD | Lim | Batch# |
|---|---|---|---|---|---|---|---|---|
| 1279TPI2-2[0.5]S | 261249-020 | QC760314 | <1.000 | 0.5597 | 1.000 | 28 * | 10 | 216082 |
| 1279SBJ2-1[0.5]S | 261249-029 | QC760315 | 3.166 | 2.864 | 1.000 | 10 | 10 | 216083 |

*= Value outside of QC limits; see narrative
RL= Reporting Limit
RPD= Relative Percent Difference


Curtis & Tompkins, Ltd.
Analytical Laboratories, Since 1878

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (510) 486-0900

**Laboratory Job Number 261692**
**ANALYTICAL REPORT**

| | |
|---|---|
| Erler & Kalinowski, Inc. | Project : B00025.07 T4D |
| 1870 Ogden Drive | Location : Presidio - Lendrum Court |
| Burlingame, CA 94010-5306 | Level : II |

| Sample ID | Lab ID |
|---|---|
| 1279SBH1-4[0.5]S | 261692-001 |

This data package has been reviewed for technical correctness and completeness. Release of this data has been authorized by the Laboratory Manager or the Manager's designee, as verified by the following signature. The results contained in this report meet all requirements of NELAC and pertain only to those samples which were submitted for analysis. This report may be reproduced only in its entirety.

Signature: Tracy Babjar Date: 10/21/2014

Tracy Babjar
Project Manager
tracy.babjar@ctberk.com
(510) 204-2226

CA ELAP# 2896, NELAP# 4044-001

Curtis & Tompkins, Ltd.

# CASE NARRATIVE

| | |
|---|---|
| Laboratory number: | **261692** |
| Client: | **Erler & Kalinowski, Inc.** |
| Project: | **B00025.07 T4D** |
| Location: | **Presidio - Lendrum Court** |
| Request Date: | **10/14/14** |
| Samples Received: | **09/24/14** |

This data package contains sample and QC results for one soil sample, requested for the above referenced project on 10/14/14. The sample was received cold and intact.All samples underwent the (ISM) Incremental Sampling Method for all analysis.

**Metals (EPA 6020):**
No analytical problems were encountered.

**Moisture (ASTM D2216/CLP):**
No analytical problems were encountered.

 261692

**Subject:** RE: B00025.07 T4D - C&T Login Summary (261249)
**From:** "correia, daniel" <DCorreia@EKICONSULT.COM>
**Date:** 10/14/2014 12:02 PM
**To:** 'Tracy Babjar' <tracy.babjar@ctberk.com>

Hey Tracy,

Thanks for the congrats, it was a beautiful day.

I would like to request that C&T analyze a sample we placed on hold. I've attached a revised COC to reflect the request. The sample is 1279SBH1-4[0.5]S, and analytes are Lead, and moisture content. Let me know if you have any questions. Thanks Tracy.

-DJC CT# 261194-026

---

**From:** Tracy Babjar [mailto:tracy.babjar@ctberk.com]
**Sent:** Tuesday, September 30, 2014 11:50 AM
**To:** correia, daniel
**Cc:** montgomery-brown, john; dewitt, john; Goy >> John Goyette
**Subject:** Re: B00025.07 T4D - C&T Login Summary (261249)

Hi Daniel,

We will get those two samples added on.

Congratulations!

Tracy ☺:-)

On 9/30/2014 9:02 AM, correia, daniel wrote:
Good morning Tracy,

I spoke with John about this COC. We decided that yes, we do want to run sample 1279SBJ2-1[0.5]S for lead and moisture with ISM. We also decided to run the sample we put on hold 1279SBL-2[0.5]S for lead and moisture with ISM as well. I've attached a PDF'ed revision for clarification.

I'll be out of the office till next tuesday, I'm getting married :), so if you have any questions please contact John DeWitt or John Montgomery-Brown. Thanks Tracy!

-DJC

Daniel Correia
**Erler & Kalinowski, Inc.**
1870 Ogden Drive
Burlingame, CA 94010
Office: (650)292-9100
DCorreia@EKIconsult.com

---

**From:** Tracy Babjar [tracy.babjar@ctberk.com]
**Sent:** Monday, September 29, 2014 1:49 PM
**To:** montgomery-brown, john; cheng, cindy; correia, daniel; daugherty, jessica; dewitt, john
**Subject:** B00025.07 T4D - C&T Login Summary (261249)

Received an extra sample not on COC with sample ID: 1279SBJ2-1[0.5]S and sampling time of 09/26/14 at 1125. Placed on hold, Please Advise.

**C&T Login Summary for 261249**

# *Erler & Kalinowski, Inc.* CHAIN OF CUSTODY RECORD 261692

CONSULTING ENGINEERS AND SCIENTISTS 1870 Ogden Drive, Burlingame, CA 94010 Phone: (650) 292-9100
Fax: (650) 552-9012

| ***Project Name:*** Presidio - Lendrum Ct. | ***Project No.:*** B00025.07 T4D | ANALYSES REQUESTED | EKI C |
|---|---|---|---|
| ***Project Location:*** Presidio of San Francisco, CA | ***Laboratory:*** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900 | | |
| ***Report Results to:*** John DeWitt, Daniel Correia | ***Sampled By:*** Daniel Correia | | |

| Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | Lead by EPA Method 6020 | Moisture Content | | | | | | | | EXPECTED TURNAROUND |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1279SBH1-4[0.5]S | | 9/24/2014 | 1545 | soil | 1 gallon zip-lock bag | X | X | | | | | | | | std. |
| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |

**Special Instructions:**

Prepare ISM for sample prior to analysis. Run moisture after ISM

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com with cc to dcorreia@ekiconsult.com and labs@ekiconsult.com on all correspondence.

USE Presidio QAPP

| Relinquished by: (Signature) | Date: | Time: | Received By: |
|---|---|---|---|
| Daniel Correia | 14-Oct-14 | 1155 | |
| Relinquished by: (Signature) | Date: | Time: | Received By: |
| | | | |
| Relinquished by: (Signature) | Date: | Time: | Received By: |
| | | | |

261692

COC No. 20140924-1
Revision 1a

Remarks

Time:

Time:

Time:

# Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

## CHAIN OF CUSTODY RECORD

261194

1870 Ogden Drive, Burlingame, CA 94010
Phone: (650) 292-9100
Fax: (650) 552-9012

| | |
|---|---|
| **Project Name:** Presidio - Lendrum Court | **Project No.:** B00025.07 T4D |
| **Project Location:** Presidio of San Francisco, CA | **Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900 |
| **Report Results to:** John DeWitt, Labs EKI, Daniel Correia | **Sampled By:** Daniel Correia |

**ANALYSES REQUESTED**

EKI COC No. 20140922-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead only EPA 6020 | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ~~1279TP305-D~~ | ~~DUP~~ | | | | soil | 1 gallon size zip-lock bag | | | | | std. | DUP |
| 1 | 1279 TP305-D[3.5] | | 9/22/14 | 1152 | soil | 1 gallon zip lock bag | X | X | O | | std. | Return Jars to EKI |
| 2 | 1279 TP302-S[0.5] | | | 1320 | | | | | | X | | |
| 3 | 1279 TP301-S[0.5] | | | 1350 | | | | | | X | | |
| 4 | 1279 TP303-S[0.5] | | | 1445 | | | | | | X | | |
| 5 | 1279 TP304-D[3.5] | | | 1515 | | | X | X | O | | | Return Jars to EKI |

**Special Instructions:**

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP + Prepare ESM for All samples prior to Analysis. Return MARKED Samples to EKI for Dioxin Analysis by others.

Run moisture after ISM

| | Date | Time | | Time |
|---|---|---|---|---|
| Relinquished by: (Signature) (Daniel Correia) EKI | 9/24/14 | 1604 | Received By: | 1604 |
| Relinquished by: (Signature) | 9/24/14 | 1730 | Received By: | 1730 |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |

Mat on ice cold RL

# Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

## CHAIN OF CUSTODY RECORD

261194

1870 Ogden Drive, Burlingame, CA 94010
Phone: (650) 292-9100
Fax: (650) 552-9012

**Project Name:** Presidio - Lendrum Court
**Project No.:** B00025.07 T4D
**Project Location:** Presidio of San Francisco, CA
**Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900
**Report Results to:** John DeWitt, Labs EKI, Daniel Correia
**Sampled By:** Daniel Correia

**ANALYSES REQUESTED**

EKI COC No. 20140923-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Title 22 Metals by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Lead only by EPA 6020 | | | | | | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | 1279SBA2-1[0.5]S | | 9/23/14 | 0840 | soil | 1 gallon size zip-lock bag | | | | X | | | | | | std. | |
| 7 | 1279TPA1-1[0.5]S | | | 0900 | | | | | | X | | | | | | | |
| 8 | 1279TPA1-2[2.0]D | | | 0920 | | | X | X | X | | | | | | | | Return Jars to EKI |
| 9 | 1279SBB1-1[0.5]S | | | 1000 | | | | | | X | | | | | | | |
| 10 | 1279SBC1-1[0.5]S | | | 1045 | | | | | | X | | | | | | | |
| 11 | 1279TPC1-1[1.5]D | | | 1100 | | | X | X | X | HOLD | | | | | | | Return Jars to EKI |
| 12 | 1279TPD1-1[3.0]D | | | 1150 | | | X | X | X | HOLD | | | | | | | Return Jars to EKI |
| 13 | 1279SBD1-1[0.5]S | | | 1200 | | | | | | X | | | | | | | |
| 14 | 1279SBE1-1[0.5]S | | | 1415 | | | | | | X | | | | | | | |
| 15 | 1279SBE1-2[0.5]S | | | 1510 | | | | | | X | | | | | | | |

**Special Instructions:**

Run moisture after ISM.

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP • Prepare ISM for all samples prior to Analysis. Return marked ~~JARS~~ samples to EKI for Analysis by others.

| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |
|---|---|---|---|---|
| Daniel Correia EKI | 9/24/14 | 1603 | | 1603 |
| | 9/24/14 | 1730 | | 1730 |
| | Date: | Time: | Received By: | Time: |

intact on ice cold rec

# Erler & Kalinowski, Inc.

CONSULTING ENGINEERS AND SCIENTISTS

## CHAIN OF CUSTODY RECORD

2101194

1870 Ogden Drive, Burlingame, CA 94010

Phone: (650) 292-9100
Fax: (650) 552-9012

**Project Name:** Presidio - Lendrum Court

**Project No.:** B00025.07 T4D

**Project Location:** Presidio of San Francisco, CA

**Laboratory:** Curtis & Tompkins, 2323 5th Street, Berkeley, CA 94710, (510) 486-0900

**Report Results to:** John DeWitt, Labs EKI, Daniel Correia

**Sampled By:** Daniel Correia

EKI COC No. 20140924-1

| | Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | PAHs by EPA Method 8270C w/ SIM | Lead ~~Title 22 Metals~~ by EPA Method 6020 | Dioxins & Furans by EPA Method 1613B | Title 22 Metals EPA 6020 | | | | | Hold | EXPECTED TURNAROUND | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 1279SBH2-1[0.5]S | | 9/24/14 | 0900 | soil | 1 gallon size zip-lock bag | | X | | | | | | | | std. | |
| 17 | 1279 TP F2-1[0.0-1.0]D | | | 0945 | | | X | | O | X | | | | | | | Return Jars to EKI |
| 18 | 1279 TP F2-1[Dup] | | | 0945 | | | X | | O | X | | | | | | | |
| 19 | 1279 TP G1-2[0.5-1.5]D | | | 1045 | | | X | | O | X | | | | | | | |
| 20 | 1279 TP F2-1[1.5]D | | | 1325 | | | X | | O | X | | | | | | | Return Jars to EKI |
| 21 | 1279SBH1-1[0.5]S | | | 1355 | | | | X | | | | | | | | | |
| 22 | 12795BH1-2[0.5]S | | | 1420 | | | | X | | | | | | | | | |
| 23 | 1279SBH1-3[0.5]S | | | 1440 | | | | X | | | | | | | | | |
| 24 | 1279SBG2-1[0.5]S | | | 1525 | | | | X | | | | | | | | | |
| 25 | 1279SBH2-1[0.5]S | | | 1540 | | | | X | | | | | | | | | |
| 26 | 1279SBH1-4[0.5]S | | | 1545 | | | | ~~X~~ MTC | | | | | | | X | | Hold ism also |
| 27 | 1279SBH0-2[0.5]S | | | 1600 | | | | X | | | | | | | | | |

**Special Instructions:**

Run moisture After ISM

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com and cc LABS@ekiconsult.com, and dcorreia@ekiconsult.com on all correspondence.
USE Presidio QAPP. Prepare ISM for All Samples prior to Analysis. Return marked samples to EKI For Dioxin Analysis by others

| | | | | |
|---|---|---|---|---|
| Relinquished by: (Signature) (Daniel Correia) EKI | Date: ~~1602~~ | Time: ~~Date / time~~ 9/24/14 1602 | Received By: | Time: 1602 |
| Relinquished by: (Signature) | Date: 9/24/14 | Time: 1730 | Received By: | Time: 1730 |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |

intact on ice cold Rc

**COOLER RECEIPT CHECKLIST** Curtis & Tompkins, Ltd.

Login # 266194 Date Received 9/24/14 Number of coolers 2
Client EKI Project B000 25.07 TYD

Date Opened 9/24 By (print) AJ (sign) AJ
Date Logged in ____ By (print) ____ (sign) ____

1. Did cooler come with a shipping slip (airbill, etc) ____ YES ~~NO~~
   Shipping info ____
2A. Were custody seals present? .... ☐ YES (circle) on cooler on samples ☐ ~~NO~~
   How many ____ Name ____ Date ____
2B. Were custody seals intact upon arrival? ____ YES NO ~~N/A~~
3. Were custody papers dry and intact when received? ____ ~~YES~~ NO
4. Were custody papers filled out properly (ink, signed, etc)? ____ ~~YES~~ NO
5. Is the project identifiable from custody papers? (If so fill out top of form) ~~YES~~ NO
6. Indicate the packing in cooler: (if other, describe) ____

☐ Bubble Wrap ☐ Foam blocks ☑ Bags ☐ None
☐ Cloth material ☐ Cardboard ☐ Styrofoam ☐ Paper towels

7. Temperature documentation: * Notify PM if temperature exceeds 6°C

Type of ice used: ☑ Wet ☐ Blue/Gel ☐ None Temp(°C) —

☑ Samples Received on ice & cold without a temperature blank; temp. ~~taken with IR gun~~

☐ Samples received on ice directly from the field. Cooling process had begun

8. Were Method 5035 sampling containers present? ____ YES ~~NO~~
   If YES, what time were they transferred to freezer? ____
9. Did all bottles arrive unbroken/unopened? ____ ~~YES~~ NO
10. Are there any missing / extra samples? ____ YES ~~NO~~
11. Are samples in the appropriate containers for indicated tests? ____ ~~YES~~ NO
12. Are sample labels present, in good condition and complete? ____ ~~YES~~ NO
13. Do the sample labels agree with custody papers? ____ YES ~~NO~~
14. Was sufficient amount of sample sent for tests requested? ____ ~~YES~~ NO
15. Are the samples appropriately preserved? ____ YES NO ~~N/A~~
16. Did you check preservatives for all bottles for each sample? ____ YES NO ~~N/A~~
17. Did you document your preservative check? ____ YES NO ~~N/A~~
18. Did you change the hold time in LIMS for unpreserved VOAs? ____ YES NO ~~N/A~~
19. Did you change the hold time in LIMS for preserved terracores? ____ YES NO ~~N/A~~
20. Are bubbles > 6mm absent in VOA samples? ____ YES NO ~~N/A~~
21. Was the client contacted concerning this sample delivery? ____ YES ~~NO~~
   If YES, Who was called? ____ By ____ Date: ____

COMMENTS
13) ~~-~~ 018 listed on COC as 1279 TPE2 - 1 [DUP], sample label lists 092414-DUP1

Rev 10, 9/12

Curtis & Tompkins, Ltd.

# Detections Summary for 261692

Results for any subcontracted analyses are not included in this summary.

Client : Erler & Kalinowski, Inc.
Project : B00025.07 T4D
Location : Presidio - Lendrum Court

Client Sample ID : 1279SBH1-4[0.5]S Laboratory Sample ID : 261692-001

| Analyte | Result | Flags | RL | Units | Basis | IDF | Method | Prep Method |
|---|---|---|---|---|---|---|---|---|
| Lead | 170 | | 0.20 | mg/Kg | Dry | 25.00 | EPA 6020 | EPA 3050B |
| Moisture, Percent | 9 | | 1 | % | As Recd | 1.000 | ASTM D2216/CLP | METHOD |

Curtis & Tompkins, Ltd.

# Lead

| | | | |
|---|---|---|---|
| Lab #: | 261692 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Analyte: | Lead | Batch#: | 216573 |
| Field ID: | 1279SBH1-4[0.5]S | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | Prepared: | 10/20/14 |
| Basis: | dry | Analyzed: | 10/20/14 |
| Diln Fac: | 25.00 | | |

| Type | Lab ID | Result | RL | Moisture |
|---|---|---|---|---|
| SAMPLE | 261692-001 | 170 | 0.20 | 9% |
| BLANK | QC762260 | ND | 0.20 | |

ND= Not Detected
RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Lead

| | | | |
|---|---|---|---|
| Lab #: | 261692 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | EPA 3050B |
| Project#: | B00025.07 T4D | Analysis: | EPA 6020 |
| Analyte: | Lead | Diln Fac: | 25.00 |
| Field ID: | 1279SBH1-4[0.5]S | Batch#: | 216573 |
| MSS Lab ID: | 261692-001 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | mg/Kg | Prepared: | 10/20/14 |
| Basis: | dry | Analyzed: | 10/20/14 |

| Type | Lab ID | MSS Result | Spiked | Result | %REC | Limits | Moisture | RPD | Lim |
|---|---|---|---|---|---|---|---|---|---|
| BS | QC762261 | | 50.00 | 49.54 | 99 | 75-125 | | | |
| BSD | QC762262 | | 50.00 | 53.16 | 106 | 75-125 | | 7 | 30 |
| MS | QC762263 | 167.1 | 54.03 | 229.3 | 115 | 75-125 | 9% | | |
| MSD | QC762264 | | 54.78 | 209.5 | 77 | 75-125 | 9% | 9 | 30 |

RPD= Relative Percent Difference

Curtis & Tompkins, Ltd.

# Moisture

| | | | |
|---|---|---|---|
| Lab #: | 261692 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | ASTM D2216/CLP |
| Analyte: | Moisture, Percent | Diln Fac: | 1.000 |
| Field ID: | 1279SBH1-4[0.5]S | Batch#: | 216480 |
| Lab ID: | 261692-001 | Sampled: | 09/24/14 |
| Matrix: | Soil | Received: | 09/24/14 |
| Units: | % | Analyzed: | 10/15/14 |

| Result | RL |
|---|---|
| 9 | 1 |

RL= Reporting Limit

Curtis & Tompkins, Ltd.

Batch QC Report

## Moisture

| | | | |
|---|---|---|---|
| Lab #: | 261692 | Location: | Presidio - Lendrum Court |
| Client: | Erler & Kalinowski, Inc. | Prep: | METHOD |
| Project#: | B00025.07 T4D | Analysis: | ASTM D2216/CLP |
| Analyte: | Moisture, Percent | Units: | % |
| Field ID: | ZZZZZZZZZZ | Diln Fac: | 1.000 |
| Type: | SDUP | Batch#: | 216480 |
| Matrix: | Soil | Analyzed: | 10/15/14 |

| MSS Lab ID | Lab ID | MSS Result | Result | RL | RPD | Lim | Sampled | Received |
|---|---|---|---|---|---|---|---|---|
| 261718-005 | QC761898 | 31.48 | 31.61 | 1.000 | 0 | 10 | 10/09/14 | 10/14/14 |
| 261724-001 | QC761899 | 10.20 | 10.96 | 1.000 | 7 | 10 | 10/14/14 | 10/15/14 |
| 261732-003 | QC761900 | 9.962 | 10.09 | 1.000 | 1 | 10 | 10/15/14 | 10/15/14 |

RL= Reporting Limit
RPD= Relative Percent Difference

October 16, 2014

**Vista Project I.D.: 1400718**

Mr. John DeWitt
Erler & Kalinowski, Inc
1870 Ogden Drive
Burlingame, CA 94010

Dear Mr. DeWitt,

Enclosed are the results for the sample set received at Vista Analytical Laboratory on October 02, 2014. This sample set was analyzed on a standard turn-around time, under your Project Name 'B00025.07 T4D'.

Vista Analytical Laboratory is committed to serving you effectively. If you require additional information, please contact me at 916-673-1520 or by email at mmaier@vista-analytical.com.

Thank you for choosing Vista as part of your analytical support team.

Sincerely,

Martha Maier
Laboratory Director

**Vista Work Order No. 1400718**
**Case Narrative**

**Sample Condition on Receipt:**

Seven soil samples were received in good condition and within the method temperature requirements. The samples were received and stored securely in accordance with Vista standard operating procedures and EPA methodology.

**Analytical Notes:**

**EPA Method 1613**

These samples were extracted and analyzed for the 2,3,7,8-substituted chlorinated dioxins and furans by EPA Method 1613 using a ZB-5MS GC column. The results are reported to the EPA Method 1613 Minimum Levels.

Holding Times

These samples were extracted and analyzed within the method hold times.

Quality Control

The Initial Calibration and Continuing Calibration Verifications met the method acceptance criteria.

A Method Blank and Ongoing Precision and Recovery (OPR) sample were extracted and analyzed with the preparation batch. No analytes were detected in the Method Blank. The OPR recoveries were within the method acceptance criteria.

Labeled standard recoveries for all QC and field samples were within method acceptance criteria.

TABLE OF CONTENTS

# Sample Inventory Report

| Vista Sample ID | Client Sample ID | Sampled | Received | Components/Containers |
|---|---|---|---|---|
| 1400718-01 | 1279TP305-D[3.5] | 22-Sep-14 11:52 | 02-Oct-14 09:02 | Glass Jar, 120mL |
| | | | | Glass Jar, 120mL |
| 1400718-02 | 1279TP304-D[3.5] | 22-Sep-14 15:15 | 02-Oct-14 09:02 | Glass Jar, 120mL |
| | | | | Glass Jar, 120mL |
| 1400718-03 | 1279TPA1-2[2.0]D | 23-Sep-14 09:20 | 02-Oct-14 09:02 | Glass Jar, 120mL |
| | | | | Glass Jar, 120mL |
| 1400718-04 | 1279TPF2-1[0.0-1.0]D | 24-Sep-14 09:45 | 02-Oct-14 09:02 | Glass Jar, 120mL |
| | | | | Glass Jar, 120mL |
| 1400718-05 | 1279TPF2-1[DUP] | 24-Sep-14 09:45 | 02-Oct-14 09:02 | Glass Jar, 120mL |
| | | | | Glass Jar, 120mL |
| 1400718-06 | 1279TPG1-2[0.5-1.5]D | 24-Sep-14 10:45 | 02-Oct-14 09:02 | Glass Jar, 120mL |
| | | | | Glass Jar, 120mL |
| 1400718-07 | 1279TPF0-1[1.5]D | 24-Sep-14 13:25 | 02-Oct-14 09:02 | Glass Jar, 120mL |
| | | | | Glass Jar, 120mL |

Vista Project: 1400718

Client Project: B00025.07 T4D

# ANALYTICAL RESULTS

## Sample ID: Method Blank

**EPA Method 1613B**

Matrix: Solid
Sample Size: 10.0 g

QC Batch: B4J0030
Date Extracted: 07-Oct-2014 8:30

Lab Sample: B4J0030-BLK1
Date Analyzed : 10-Oct-14 18:11 Column: ZB-5MS Analyst: MAS

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | ND | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | ND | 5.00 | |
| OCDD | ND | 10.0 | |
| 2,3,7,8-TCDF | ND | 1.00 | |
| 1,2,3,7,8-PeCDF | ND | 5.00 | |
| 2,3,4,7,8-PeCDF | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDF | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDF | ND | 5.00 | |
| 2,3,4,6,7,8-HxCDF | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | ND | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | ND | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 88.2 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 92.5 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 99.9 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 101 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 101 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 105 | 23 - 140 | |
| | 13C-OCDD | 100 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 87.4 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 86.4 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 85.5 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 105 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 88.7 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 95.9 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 98.2 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 103 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 116 | 26 - 138 | |
| | 13C-OCDF | 99.1 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 88.6 | 35 - 197 | |

**Toxic Equivalent Quotient (TEQ) Data**

| | |
|---|---|
| TEQMinWHO2005Dioxin | 0.00 |

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

**Sample ID: OPR** **EPA Method 1613B**

| | | | | | |
|---|---|---|---|---|---|
| Matrix: | Solid | QC Batch: | B4J0030 | Lab Sample: | B4J0030-BS1 |
| Sample Size: | 10.0 g | Date Extracted: | 07-Oct-2014 8:30 | Date Analyzed: | 10-Oct-14 15:45 Column: ZB-5MS Analyst: MAS |

| Analyte | Amt Found (pg/g ) | Spike Amt | %R | Limits | | Labeled Standard | %R | LCL-UCL |
|---|---|---|---|---|---|---|---|---|
| 2,3,7,8-TCDD | 19.4 | 20.0 | 97.0 | 67 - 158 | IS | 13C-2,3,7,8-TCDD | 85.6 | 20 - 175 |
| 1,2,3,7,8-PeCDD | 98.1 | 100 | 98.1 | 70 - 142 | | 13C-1,2,3,7,8-PeCDD | 95.0 | 21 - 227 |
| 1,2,3,4,7,8-HxCDD | 96.6 | 100 | 96.6 | 70 - 164 | | 13C-1,2,3,4,7,8-HxCDD | 93.3 | 21 - 193 |
| 1,2,3,6,7,8-HxCDD | 92.9 | 100 | 92.9 | 76 - 134 | | 13C-1,2,3,6,7,8-HxCDD | 96.0 | 25 - 163 |
| 1,2,3,7,8,9-HxCDD | 94.1 | 100 | 94.1 | 64 - 162 | | 13C-1,2,3,7,8,9-HxCDD | 92.1 | 21 - 193 |
| 1,2,3,4,6,7,8-HpCDD | 99.1 | 100 | 99.1 | 70 - 140 | | 13C-1,2,3,4,6,7,8-HpCDD | 89.3 | 26 - 166 |
| OCDD | 186 | 200 | 93.1 | 78 - 144 | | 13C-OCDD | 91.1 | 13 - 199 |
| 2,3,7,8-TCDF | 19.7 | 20.0 | 98.5 | 75 - 158 | | 13C-2,3,7,8-TCDF | 81.5 | 22 - 152 |
| 1,2,3,7,8-PeCDF | 101 | 100 | 101 | 80 - 134 | | 13C-1,2,3,7,8-PeCDF | 91.2 | 21 - 192 |
| 2,3,4,7,8-PeCDF | 103 | 100 | 103 | 68 - 160 | | 13C-2,3,4,7,8-PeCDF | 89.0 | 13 - 328 |
| 1,2,3,4,7,8-HxCDF | 95.6 | 100 | 95.6 | 72 - 134 | | 13C-1,2,3,4,7,8-HxCDF | 104 | 19 - 202 |
| 1,2,3,6,7,8-HxCDF | 96.7 | 100 | 96.7 | 84 - 130 | | 13C-1,2,3,6,7,8-HxCDF | 88.0 | 21 - 159 |
| 2,3,4,6,7,8-HxCDF | 95.6 | 100 | 95.6 | 70 - 156 | | 13C-2,3,4,6,7,8-HxCDF | 89.8 | 22 - 176 |
| 1,2,3,7,8,9-HxCDF | 97.1 | 100 | 97.1 | 78 - 130 | | 13C-1,2,3,7,8,9-HxCDF | 89.0 | 17 - 205 |
| 1,2,3,4,6,7,8-HpCDF | 90.5 | 100 | 90.5 | 82 - 122 | | 13C-1,2,3,4,6,7,8-HpCDF | 93.4 | 21 - 158 |
| 1,2,3,4,7,8,9-HpCDF | 92.2 | 100 | 92.2 | 78 - 138 | | 13C-1,2,3,4,7,8,9-HpCDF | 98.4 | 20 - 186 |
| OCDF | 189 | 200 | 94.6 | 63 - 170 | | 13C-OCDF | 87.8 | 13 - 199 |
| | | | | | CRS | 37Cl-2,3,7,8-TCDD | 86.8 | 31 - 191 |

LCL-UCL - Lower control limit - upper control limit

## Sample ID: 1279TP305-D[3.5]

**EPA Method 1613B**

**Client Data**
Name: Erler & Kalinowski, Inc
Project: B00025.07 T4D
Date Collected: 22-Sep-2014 11:52

**Sample Data**
Matrix: Soil
Sample Size: 10.1 g
% Solids: 95.5

**Laboratory Data**
Lab Sample: 1400718-01 Date Received: 02-Oct-2014 9:02
QC Batch: B4J0030 Date Extracted: 07-Oct-2014 8:30
Date Analyzed : 10-Oct-14 23:01 Column: ZB-5MS Analyst: MAS
13-Oct-14 17:41 Column: DB-225 Analyst: ANP

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | ND | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | ND | 5.00 | |
| OCDD | 29.2 | 10.0 | |
| 2,3,7,8-TCDF | 4.97 | 1.00 | |
| 1,2,3,7,8-PeCDF | ND | 5.00 | |
| 2,3,4,7,8-PeCDF | 5.49 | 5.00 | |
| 1,2,3,4,7,8-HxCDF | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDF | ND | 5.00 | |
| 2,3,4,6,7,8-HxCDF | 6.01 | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | 16.2 | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | ND | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 75.2 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 87.7 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 91.4 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 91.2 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 88.8 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 94.4 | 23 - 140 | |
| | 13C-OCDD | 84.4 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 68.3 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 77.6 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 78.3 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 90.1 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 77.8 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 85.1 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 87.4 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 88.2 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 102 | 26 - 138 | |
| | 13C-OCDF | 82.3 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 75.8 | 35 - 197 | |

**Toxic Equivalent Quotient (TEQ) Data**

TEQMinWHO2005Dioxin 4.90

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

## Sample ID: 1279TP304-D[3.5]

**EPA Method 1613B**

**Client Data**
Name: Erler & Kalinowski, Inc
Project: B00025.07 T4D
Date Collected: 22-Sep-2014 15:15

**Sample Data**
Matrix: Soil
Sample Size: 10.0 g
% Solids: 95.9

**Laboratory Data**
Lab Sample: 1400718-02 Date Received: 02-Oct-2014 9:02
QC Batch: B4J0030 Date Extracted: 07-Oct-2014 8:30
Date Analyzed : 10-Oct-14 23:49 Column: ZB-5MS Analyst: MAS
13-Oct-14 17:09 Column: DB-225 Analyst: ANP

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | ND | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | ND | 5.00 | |
| OCDD | 23.2 | 10.0 | |
| 2,3,7,8-TCDF | 1.63 | 1.00 | |
| 1,2,3,7,8-PeCDF | ND | 5.00 | |
| 2,3,4,7,8-PeCDF | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDF | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDF | ND | 5.00 | |
| 2,3,4,6,7,8-HxCDF | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | ND | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | ND | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 93.4 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 101 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 103 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 106 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 104 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 107 | 23 - 140 | |
| | 13C-OCDD | 112 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 93.1 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 98.1 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 91.0 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 109 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 91.9 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 98.0 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 103 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 101 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 117 | 26 - 138 | |
| | 13C-OCDF | 110 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 94.4 | 35 - 197 | |

**Toxic Equivalent Quotient (TEQ) Data**

TEQMinWHO2005Dioxin 1.26

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

## Sample ID: 1279TPA1-2[2.0]D

**EPA Method 1613B**

**Client Data**
Name: Erler & Kalinowski, Inc
Project: B00025.07 T4D
Date Collected: 23-Sep-2014 9:20

**Sample Data**
Matrix: Soil
Sample Size: 10.0 g
% Solids: 95.9

**Laboratory Data**
Lab Sample: 1400718-03 Date Received: 02-Oct-2014 9:02
QC Batch: B4J0030 Date Extracted: 07-Oct-2014 8:30
Date Analyzed : 11-Oct-14 00:38 Column: ZB-5MS Analyst: MAS
13-Oct-14 16:37 Column: DB-225 Analyst: ANP

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | ND | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | 9.39 | 5.00 | |
| OCDD | 32.4 | 10.0 | |
| 2,3,7,8-TCDF | 12.5 | 1.00 | |
| 1,2,3,7,8-PeCDF | 7.91 | 5.00 | |
| 2,3,4,7,8-PeCDF | 11.9 | 5.00 | |
| 1,2,3,4,7,8-HxCDF | 6.71 | 5.00 | |
| 1,2,3,6,7,8-HxCDF | 6.66 | 5.00 | |
| 2,3,4,6,7,8-HxCDF | 7.99 | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | 29.8 | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | 14.5 | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 94.2 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 105 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 107 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 107 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 105 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 109 | 23 - 140 | |
| | 13C-OCDD | 110 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 93.1 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 90.7 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 97.7 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 107 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 90.4 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 99.7 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 104 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 105 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 117 | 26 - 138 | |
| | 13C-OCDF | 106 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 95.0 | 35 - 197 | |

**Toxic Equivalent Quotient (TEQ) Data**

TEQMinWHO2005Dioxin 9.53

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

## Sample ID: 1279TPF2-1[0.0-1.0]D

**EPA Method 1613B**

**Client Data**
Name: Erler & Kalinowski, Inc
Project: B00025.07 T4D
Date Collected: 24-Sep-2014 9:45

**Sample Data**
Matrix: Soil
Sample Size: 10.5 g
% Solids: 94.7

**Laboratory Data**
Lab Sample: 1400718-04 Date Received: 02-Oct-2014 9:02
QC Batch: B4J0030 Date Extracted: 07-Oct-2014 8:30
Date Analyzed : 11-Oct-14 01:26 Column: ZB-5MS Analyst: MAS
13-Oct-14 16:05 Column: DB-225 Analyst: ANP

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | ND | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | 18.0 | 5.00 | |
| OCDD | 99.9 | 10.0 | |
| 2,3,7,8-TCDF | 12.3 | 1.00 | |
| 1,2,3,7,8-PeCDF | 7.55 | 5.00 | |
| 2,3,4,7,8-PeCDF | 13.5 | 5.00 | |
| 1,2,3,4,7,8-HxCDF | 7.12 | 5.00 | |
| 1,2,3,6,7,8-HxCDF | 7.07 | 5.00 | |
| 2,3,4,6,7,8-HxCDF | 9.17 | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | 34.1 | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | 24.6 | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 94.1 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 99.2 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 107 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 108 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 111 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 107 | 23 - 140 | |
| | 13C-OCDD | 107 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 86.8 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 96.2 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 94.6 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 104 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 91.2 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 97.7 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 106 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 105 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 114 | 26 - 138 | |
| | 13C-OCDF | 104 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 91.0 | 35 - 197 | |

**Toxic Equivalent Quotient (TEQ) Data**

TEQMinWHO2005Dioxin 12.0

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

## Sample ID: 1279TPF2-1[DUP]

**EPA Method 1613B**

**Client Data**
Name: Erler & Kalinowski, Inc
Project: B00025.07 T4D
Date Collected: 24-Sep-2014 9:45

**Sample Data**
Matrix: Soil
Sample Size: 10.0 g
% Solids: 95.0

**Laboratory Data**
Lab Sample: 1400718-05 Date Received: 02-Oct-2014 9:02
QC Batch: B4J0030 Date Extracted: 07-Oct-2014 8:30
Date Analyzed : 11-Oct-14 09:44 Column: ZB-5MS Analyst: MAS
13-Oct-14 15:33 Column: DB-225 Analyst: ANP

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.14 | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | 19.6 | 5.00 | |
| OCDD | 85.8 | 10.0 | |
| 2,3,7,8-TCDF | 14.6 | 1.00 | |
| 1,2,3,7,8-PeCDF | 8.12 | 5.00 | |
| 2,3,4,7,8-PeCDF | 14.0 | 5.00 | |
| 1,2,3,4,7,8-HxCDF | 7.58 | 5.00 | |
| 1,2,3,6,7,8-HxCDF | 7.61 | 5.00 | |
| 2,3,4,6,7,8-HxCDF | 9.53 | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | 32.4 | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | 15.0 | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 90.4 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 102 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 98.7 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 96.4 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 95.7 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 95.4 | 23 - 140 | |
| | 13C-OCDD | 98.3 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 86.7 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 90.0 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 96.3 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 103 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 87.2 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 93.1 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 95.8 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 98.5 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 104 | 26 - 138 | |
| | 13C-OCDF | 96.2 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 90.8 | 35 - 197 | |

**Toxic Equivalent Quotient (TEQ) Data**

TEQMinWHO2005Dioxin 13.2

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

## Sample ID: 1279TPG1-2[0.5-1.5]D

**EPA Method 1613B**

**Client Data**
Name: Erler & Kalinowski, Inc
Project: B00025.07 T4D
Date Collected: 24-Sep-2014 10:45

**Sample Data**
Matrix: Soil
Sample Size: 9.99 g
% Solids: 94.9

**Laboratory Data**
Lab Sample: 1400718-06 Date Received: 02-Oct-2014 9:02
QC Batch: B4J0030 Date Extracted: 07-Oct-2014 8:30
Date Analyzed : 11-Oct-14 10:33 Column: ZB-5MS Analyst: MAS
13-Oct-14 15:01 Column: DB-225 Analyst: ANP

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | ND | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | 22.7 | 5.00 | |
| OCDD | 95.1 | 10.0 | |
| 2,3,7,8-TCDF | 6.18 | 1.00 | |
| 1,2,3,7,8-PeCDF | ND | 5.00 | |
| 2,3,4,7,8-PeCDF | 8.38 | 5.00 | |
| 1,2,3,4,7,8-HxCDF | 7.28 | 5.00 | |
| 1,2,3,6,7,8-HxCDF | 6.73 | 5.00 | |
| 2,3,4,6,7,8-HxCDF | 8.95 | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | 37.8 | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | 20.6 | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 90.6 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 109 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 94.2 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 97.0 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 98.9 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 97.5 | 23 - 140 | |
| | 13C-OCDD | 103 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 85.8 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 94.1 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 100 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 96.5 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 84.3 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 88.3 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 96.0 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 95.1 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 105 | 26 - 138 | |
| | 13C-OCDF | 100 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 94.9 | 35 - 197 | |

| Toxic Equivalent Quotient (TEQ) Data | |
|---|---|
| TEQMinWHO2005Dioxin | 8.04 |

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

## Sample ID: 1279TPF0-1[1.5]D

**EPA Method 1613B**

**Client Data**
Name: Erler & Kalinowski, Inc
Project: B00025.07 T4D
Date Collected: 24-Sep-2014 13:25

**Sample Data**
Matrix: Soil
Sample Size: 10.0 g
% Solids: 95.9

**Laboratory Data**
Lab Sample: 1400718-07 Date Received: 02-Oct-2014 9:02
QC Batch: B4J0030 Date Extracted: 07-Oct-2014 8:30
Date Analyzed : 11-Oct-14 11:21 Column: ZB-5MS Analyst: MAS
13-Oct-14 14:30 Column: DB-225 Analyst: ANP

| Analyte | Conc. (pg/g ) | RL | Qualifiers |
|---|---|---|---|
| 2,3,7,8-TCDD | 1.05 | 1.00 | |
| 1,2,3,7,8-PeCDD | ND | 5.00 | |
| 1,2,3,4,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,6,7,8-HxCDD | ND | 5.00 | |
| 1,2,3,7,8,9-HxCDD | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDD | 14.2 | 5.00 | |
| OCDD | 34.8 | 10.0 | |
| 2,3,7,8-TCDF | 15.5 | 1.00 | |
| 1,2,3,7,8-PeCDF | 9.50 | 5.00 | |
| 2,3,4,7,8-PeCDF | 17.8 | 5.00 | |
| 1,2,3,4,7,8-HxCDF | 10.2 | 5.00 | |
| 1,2,3,6,7,8-HxCDF | 9.54 | 5.00 | |
| 2,3,4,6,7,8-HxCDF | 12.3 | 5.00 | |
| 1,2,3,7,8,9-HxCDF | ND | 5.00 | |
| 1,2,3,4,6,7,8-HpCDF | 50.1 | 5.00 | |
| 1,2,3,4,7,8,9-HpCDF | ND | 5.00 | |
| OCDF | 17.3 | 10.0 | |

| | Labeled Standard | %R | LCL-UCL | Qualifiers |
|---|---|---|---|---|
| IS | 13C-2,3,7,8-TCDD | 97.4 | 25 - 164 | |
| | 13C-1,2,3,7,8-PeCDD | 108 | 25 - 181 | |
| | 13C-1,2,3,4,7,8-HxCDD | 101 | 32 - 141 | |
| | 13C-1,2,3,6,7,8-HxCDD | 103 | 28 - 130 | |
| | 13C-1,2,3,7,8,9-HxCDD | 104 | 32 - 141 | |
| | 13C-1,2,3,4,6,7,8-HpCDD | 99.2 | 23 - 140 | |
| | 13C-OCDD | 105 | 17 - 157 | |
| | 13C-2,3,7,8-TCDF | 96.2 | 24 - 169 | |
| | 13C-1,2,3,7,8-PeCDF | 108 | 24 - 185 | |
| | 13C-2,3,4,7,8-PeCDF | 105 | 21 - 178 | |
| | 13C-1,2,3,4,7,8-HxCDF | 102 | 26 - 152 | |
| | 13C-1,2,3,6,7,8-HxCDF | 87.8 | 26 - 123 | |
| | 13C-2,3,4,6,7,8-HxCDF | 95.5 | 28 - 136 | |
| | 13C-1,2,3,7,8,9-HxCDF | 102 | 29 - 147 | |
| | 13C-1,2,3,4,6,7,8-HpCDF | 101 | 28 - 143 | |
| | 13C-1,2,3,4,7,8,9-HpCDF | 108 | 26 - 138 | |
| | 13C-OCDF | 102 | 17 - 157 | |
| CRS | 37Cl-2,3,7,8-TCDD | 97.3 | 35 - 197 | |

**Toxic Equivalent Quotient (TEQ) Data**

TEQMinWHO2005Dioxin 15.7

RL - Reporting limit

LCL-UCL- Lower control limit - upper control limit
The results are reported in dry weight. The sample size is reported in wet weight.
Min-The TEQ is calculated using zero for the concentration of congeners that are not detected.

# DATA QUALIFIERS & ABBREVIATIONS

| | |
|---|---|
| **B** | **This compound was also detected in the method blank.** |
| **D** | **Dilution** |
| **E** | **The amount detected is above the High Calibration Limit.** |
| **H** | **Recovery was outside laboratory acceptance limits.** |
| **I** | **Chemical Interference** |
| **J** | **The amount detected is below the Low Calibration Limit.** |
| **P** | **The amount reported is the maximum possible concentration due to possible chlorinated diphenylether interference.** |
| ***** | **See Cover Letter** |
| **Conc.** | **Concentration** |
| **DL** | **Sample-specific estimated detection limit** |
| **MDL** | **Method Detection Limit as determined by 40 CFR 136, Appendix B.** |
| **EMPC** | **Estimated Maximum Possible Concentration** |
| **M** | **Estimated Maximum Possible Concentration (CA Region 2)** |
| **NA** | **Not applicable** |
| **RL** | **Reporting Limit – concentrations that correspond to low calibration point** |
| **ND** | **Not Detected** |
| **TEQ** | **Toxic Equivalency** |

**Unless otherwise noted, solid sample results are reported in dry weight. Tissue samples are reported in wet weight.**

## CERTIFICATIONS

| Accrediting Authority | Certificate Number |
|---|---|
| Alabama Department of Environmental Management | 41610 |
| California Department of Health – ELAP | 2892 |
| DoD ELAP - A2LA Accredited - ISO/IEC 17025:2005 | 3091.01 |
| Florida Department of Health | E87777 |
| Hawaii Department of Health | N/A |
| Louisiana Department of Environmental Quality | 01977 |
| Maine Department of Health | 2014022 |
| Michigan Department of Natural Resources | 9932 |
| Nevada Division of Environmental Protection | CA004132015-1 |
| New Jersey Department of Environmental Protection | CA003 |
| New York Department of Health | 11411 |
| North Carolina Department of Health & Human Services | 06700 |
| Oregon Laboratory Accreditation Program | 4042-002 |
| Pennsylvania Department of Environmental Protection | 011 |
| South Carolina Department of Health | 87002001 |
| Tennessee Department of Environment & Conservation | TN02996 |
| Texas Commission on Environmental Quality | T104704189-14-5 |
| Virginia Department of General Services | 3138 |
| Washington Department of Ecology | C584 |
| Wisconsin Department of Natural Resources | 998036160 |

1400718

4.6°C

# Erler & Kalinowski, Inc. — CHAIN OF CUSTODY RECORD

CONSULTING ENGINEERS AND SCIENTISTS 1870 Ogden Drive, Burlingame, CA 94010 Phone: (650) 292-9100 Fax: (650) 552-9012

| | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Project Name:*** Presidio - Lendrum Ct. | | ***Project No.:*** B00025.07 T4D | | | | **ANALYSES REQUESTED** | | | | | | | | | | EKI COC No. | |
| ***Project Location:*** Presidio of San Francisco, CA | | ***Laboratory:*** Vista Analytical Laboratory 1104 Windfield Way El Dorado Hills, CA 95762 (916) 673-1520 | | | | Dioxins & Furans (EPA 1613), 2,3,7, 8s only | | | | | Hold | | | | EXPECTED TURNAROUND | Remarks |
| ***Report Results to:*** John DeWitt, Daniel Correia | | ***Sampled By:*** Daniel Correia | | | | | | | | | | | | | | | |
| Field Sample Identification | Lab Sample No. | Date | Time | Type of Sample | No. of Containers | | | | | | | | | | | | |
| 1279TP305-D[3.5] | | 9/22/2014 | 1152 | soil | 2 jars | X | | | | | | | | | 21 d | |
| 1279TP304-D[3.5] | | 9/22/2014 | 1515 | soil | 2 jars | X | | | | | | | | | 21 d | |
| 1279TPA1-2[2.0]D | | 9/23/2014 | 0920 | soil | 2 jars | X | | | | | | | | | 21 d | |
| 1279TPF2-1[0.0-1.0]D | | 9/24/2014 | 0945 | soil | 2 jars | X | | | | | | | | | 21 d | |
| 1279TPF2-1[DUP] | | 9/24/2014 | 0945 | soil | 2 jars | X | | | | | | | | | 21 d | |
| 1279TPG1-2[0.5-1.5]D | | 9/24/2014 | 1045 | soil | 2 jars | X | | | | | | | | | 21 d | |
| 1279TPF0-1[1.5]D | | 9/24/2014 | 1325 | soil | 2 jars | X | | | | | | | | | 21 d | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | | |

**Special Instructions:**

All results to be reported in dry weight.

Email laboratory confirmation, EDFs, and pdfs of lab sheets to jdewitt@ekiconsult.com with cc to dcorreia@ekiconsult.com and labs@ekiconsult.com on all correspondence.

Incremental sampling method prep has already been conducted by Curtis & Tompkins ("C&T"). Samples being sent directly from C&T. See Vista Quotation dated 8/1/14.

| | | | | |
|---|---|---|---|---|
| Relinquished by: (Signature) | Date: 10/01 | Time: 1500 | Received By: Bethany A Benedict 10/02/14 | Time: 0931 |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |
| Relinquished by: (Signature) | Date: | Time: | Received By: | Time: |

## SAMPLE LOG-IN CHECKLIST

Vista Analytical Laboratory

**Vista Project #:** 1400718 **TAT** Std

| | | | | | | |
|---|---|---|---|---|---|---|
| **Samples Arrival:** | **Date/Time** 10/02/14 0902 | **Initials:** BSB | **Location:** WR-2 **Shelf/Rack:** NA | | | |
| **Logged In:** | **Date/Time** 10/02/14 1225 | **Initials:** BSB | **Location:** WR-2 **Shelf/Rack:** F6 | | | |
| **Delivered By:** | (FedEx) | UPS | On Trac | DHL | Hand Delivered | Other |
| **Preservation:** | (Ice) | Blue Ice | Dry Ice | None | | |
| **Temp °C:** 4.6 (uncorrected) / **Temp °C:** (corrected) | **Time:** 0930 | **Thermometer ID:** IR-1 | | | | |

| | YES | NO | NA |
|---|---|---|---|
| Adequate Sample Volume Received? A 3, B containers | ✓ | | |
| Holding Time Acceptable? | ✓ | | |
| Shipping Container(s) Intact? | ✓ | | |
| Shipping Custody Seals Intact? | | | ✓ |
| Shipping Documentation Present? | ✓ | | |
| Airbill / Trk # 7713 5257 1725 | ✓ | | |
| Sample Container Intact? | ✓ | | |
| Sample Custody Seals Intact? | | | ✓ |
| Chain of Custody / Sample Documentation Present? | ✓ | | |
| COC Anomaly/Sample Acceptance Form completed? | | ✓ | |
| If Chlorinated or Drinking Water Samples, Acceptable Preservation? | | | ✓ |

| | | | | | |
|---|---|---|---|---|---|
| $Na_2S_2O_3$ Preservation Documented? NA | COC | Sample Container | None | | |
| Shipping Container | Vista | Client | Retain | Return | Dispose |

*Comments:* Samples rec'd in clear glass jars

Sample ID, written on container's cap

*Sample Login 11/2013 ckt*

# Appendix E

Benzo(a)pyrene Potency Equivalent Concentration Calculations

# TABLE E-1
## SOIL RESULTS FOR POLYCYCLIC AROMATIC HYDROCARBONS
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Sample Date | Sample Depth (ft bgs) | Analytical Results (mg/kg) (a)(b) | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Acenaphthene | Acenaphthylene | Anthracene | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(g,h,i)perylene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Fluoranthene | Fluorene | Indeno(1,2,3-cd)pyrene | Naphthalene | Phenanthrene | Pyrene |
| 304 | 1279TP304-D[3.5] | 9/22/2014 | 3.5 | <0.021 | <0.021 | <0.021 | <0.021 | <0.021 | 0.03 | <0.021 | <0.021 | 0.024 | <0.021 | 0.035 | <0.021 | <0.021 | <0.021 | <0.021 | 0.031 |
| 305 | 1279TP305-D[3.5] | 9/22/2014 | 3.5 | <0.021 | <0.021 | <0.021 | 0.045 | 0.049 | 0.076 | 0.028 | <0.021 | 0.06 | <0.021 | 0.076 | <0.021 | 0.023 | <0.021 | 0.032 | 0.072 |
| A1 | 1279TPA1-2[2.0]D | 9/23/2014 | 2.0 | <0.021 | <0.021 | <0.021 | 0.066 | 0.068 | 0.10 | 0.036 | 0.030 | 0.085 | <0.021 | 0.15 | <0.021 | 0.031 | <0.021 | 0.11 | 0.13 |
| F0 | 1279TPF0-1[1.5]D | 9/24/2014 | 1.5 | 0.020 | 0.017 | 0.059 | 0.15 | 0.14 | 0.18 | 0.043 | 0.068 | 0.17 | 0.017 | 0.30 | 0.031 | 0.043 | 0.022 | 0.25 | 0.29 |
| F2 | 1279TPF2-1[0.0-1.0]D | 9/24/2014 | 1.0 | <0.011 | <0.011 | <0.011 | 0.024 | 0.031 | 0.048 | 0.018 | 0.015 | 0.036 | <0.011 | 0.047 | <0.011 | 0.014 | <0.011 | 0.033 | 0.05 |
| | 1279TPF2-1[DUP] | 9/24/2014 | 1.0 | <0.010 | 0.013 | <0.010 | 0.076 | 0.071 | 0.12 | 0.025 | 0.040 | 0.099 | <0.010 | 0.11 | <0.010 | 0.023 | 0.011 | 0.075 | 0.12 |
| G1 | 1279TPG1-2[0.5-1.5]D | 9/24/2014 | 1.5 | <0.010 | <0.010 | <0.010 | 0.015 | 0.016 | 0.027 | <0.010 | <0.010 | 0.020 | <0.010 | 0.023 | <0.010 | <0.010 | <0.010 | 0.013 | 0.024 |
| I2 | 1279TPI2-1[1.5]D | 9/26/2014 | 1.5 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 | <0.10 |

Abbreviations:
<0.50 or ND - Compound not detected at or above indicated laboratory reporting limit
DUP - Duplicate Sample
ft bgs - feet below ground surface
mg/kg - milligrams per kilogram

Notes:
(a) Samples were analyzed by Curtis & Tompkins, Ltd, of Berkeley, California using EPA Method 8270C-SIM for polycyclic aromatic hydrocarbons. Results are reported to two significant figures.
(b) This table presents sample results for calculating benzo(a)pyrene equivalents.

**TABLE E-2**
**POLYCYCLIC AROMATIC HYDROCARBON CONCENTRATIONS**
**FOR CALCULATING THE BENZO(A)PYRENE EQUIVALENT**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Analytical Results (mg/kg) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Indeno(1,2,3-cd)pyrene |
| 304 | 1279TP304-D[3.5] | -0.011 | -0.011 | 0.03 | -0.011 | 0.024 | -0.011 | -0.011 |
| 305 | 1279TP305-D[3.5] | 0.045 | 0.049 | 0.076 | -0.011 | 0.06 | -0.011 | 0.023 |
| A1 | 1279TPA1-2[2.0]D | 0.066 | 0.068 | 0.10 | 0.03 | 0.085 | -0.011 | 0.031 |
| F0 | 1279TPF0-1[1.5]D | 0.15 | 0.14 | 0.18 | 0.068 | 0.17 | 0.017 | 0.043 |
| F2 | 1279TPF2-1[0.0-1.0]D | 0.024 | 0.031 | 0.048 | 0.015 | 0.036 | -0.006 | 0.014 |
| F2 | 1279TPF2-1[DUP] | 0.076 | 0.071 | 0.12 | 0.04 | 0.099 | -0.005 | 0.023 |
| G1 | 1279TPG1-2[0.5-1.5]D | 0.015 | 0.016 | 0.027 | -0.005 | 0.02 | -0.005 | -0.005 |
| I2 | 1279TPI2-1[1.5]D | ND | ND | ND | ND | ND | ND | ND |

Abbreviations:
mg/kg - milligrams per kilogram
ND - Not Detected

Notes:
(a) To account for uncertainty relating to non-detected values, one-half the detection limits were used. The non-detect samples are identified with a negative number.
(b) Polycyclic aromatic hydrocarbons not used in benzo(a)pyrene equivalent calculation have been removed from this table.
(c) No carcinogenic polycyclic aromatic hydrocarbons were detected at trench location I2; therefore, a benzo(a)pyrene equivalent value will not be calculated.

**TABLE E-3**
**BENZO(A)PYRENE EQUIVALENTS**
Lendrum Court Area
Presidio of San Francisco, California

| Trench Location | Sample ID | Analytical Results (mg/kg) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | Benzo(a)anthracene | Benzo(a)pyrene | Benzo(b)fluoranthene | Benzo(k)fluoranthene | Chrysene | Dibenz(a,h)anthracene | Indeno(1,2,3-cd)pyrene | B(a)P Equivalents |
| | TEF (b) | 0.1 | 1 | 0.1 | 0.01 | 0.001 | 1 | 0.1 | |
| **Multiply Analytical Results by TEF Values** | | | | | | | | | |
| 304 | 1279TP304-D[3.5] | 0.001 | 0.011 | 0.003 | 0.0001 | 0.00002 | 0.011 | 0.001 | 0.026 |
| 305 | 1279TP305-D[3.5] | 0.005 | 0.049 | 0.008 | 0.0001 | 0.0001 | 0.011 | 0.002 | 0.074 |
| A1 | 1279TPA1-2[2.0]D | 0.007 | 0.068 | 0.010 | 0.0003 | 0.0001 | 0.011 | 0.003 | 0.099 |
| F0 | 1279TPF0-1[1.5]D | 0.015 | 0.140 | 0.018 | 0.001 | 0.0002 | 0.017 | 0.004 | 0.195 |
| F2 | 1279TPF2-1[0.0-1.0]D | 0.002 | 0.031 | 0.005 | 0.0002 | 0.0000 | 0.006 | 0.001 | 0.045 |
| F2 | 1279TPF2-1[DUP] | 0.008 | 0.071 | 0.012 | 0.0004 | 0.0001 | 0.005 | 0.002 | 0.098 |
| G1 | 1279TPG1-2[0.5-1.5]D | 0.002 | 0.016 | 0.003 | 0.0001 | 0.00002 | 0.005 | 0.001 | 0.026 |
| I2 | 1279TPI2-1[1.5]D | NC | NC | NC | NC | NC | NC | NC | ND |

Abbreviations:
B(a)P - Benzo(a)Pyrene
DTSC - Department of Toxic Substances Control
DUP - Duplicate Sample
mg/kg - milligrams per kilogram
NC - Not Calculated
ND - Not Detected
TEF - Toxicity Equivalent Factor

**TABLE E-3**
**BENZO(A)PYRENE EQUIVALENTS**
Lendrum Court Area
Presidio of San Francisco, California

Notes:

(a) The B(a)P equivalents for each compound were calculated by multiplying the absolute value from Table E-2 by the TEF, and then summing the individual products for each compound.

(b) Toxicity equivalency factors for carcinogenic polycyclic aromatic hydrocarbons are from EPA Region 9 Regional Screening Levels User's Guide, November 2013. For polycyclic aromatic hydrocarbons not included in the November 2013 User's Guide, values from the June 2011 HHRA Note Number 4 were used, as requested by DTSC.

(c) All carcinogenic polycyclic aromatic hydrocarbons were ND for sample 1279 TPI2-1[1.5]D; therefore, a B(a)P equivalent value was not calculated for this sample and the values is assigned ND.

# Appendix F

ProUCL Version 5.0.00 Output

## UCL Statistics for Data Sets with Non-Detects

| | |
|---|---|
| User Selected Options | |
| Date/Time of Computation | 2/14/2015 11:16:38 AM |
| From File | inside input file.xls |
| Full Precision | OFF |
| Confidence Coefficient | 95% |
| Number of Bootstrap Operations | 2000 |

**As_0-2.5**

### General Statistics

| | | | |
|---|---|---|---|
| Total Number of Observations | 29 | Number of Distinct Observations | 21 |
| | | Number of Missing Observations | 0 |
| Minimum | 3.4 | Mean | 5.807 |
| Maximum | 10 | Median | 5.7 |
| SD | 1.498 | Std. Error of Mean | 0.278 |
| Coefficient of Variation | 0.258 | Skewness | 0.856 |

### Normal GOF Test

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.946 | **Shapiro Wilk GOF Test** |
| 5% Shapiro Wilk Critical Value | 0.926 | Data appear Normal at 5% Significance Level |
| Lilliefors Test Statistic | 0.16 | **Lilliefors GOF Test** |
| 5% Lilliefors Critical Value | 0.165 | Data appear Normal at 5% Significance Level |

**Data appear Normal at 5% Significance Level**

### Assuming Normal Distribution

| **95% Normal UCL** | | **95% UCLs (Adjusted for Skewness)** | |
|---|---|---|---|
| 95% Student's-t UCL | 6.28 | 95% Adjusted-CLT UCL (Chen-1995) | 6.312 |
| | | 95% Modified-t UCL (Johnson-1978) | 6.287 |

### Gamma GOF Test

| | | |
|---|---|---|
| A-D Test Statistic | 0.27 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.745 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.133 | **Kolmogrov-Smirnoff Gamma GOF Test** |
| 5% K-S Critical Value | 0.162 | Detected data appear Gamma Distributed at 5% Significance Level |

**Detected data appear Gamma Distributed at 5% Significance Level**

### Gamma Statistics

| | | | |
|---|---|---|---|
| k hat (MLE) | 16.35 | k star (bias corrected MLE) | 14.68 |
| Theta hat (MLE) | 0.355 | Theta star (bias corrected MLE) | 0.395 |
| nu hat (MLE) | 948.4 | nu star (bias corrected) | 851.6 |
| MLE Mean (bias corrected) | 5.807 | MLE Sd (bias corrected) | 1.515 |
| | | Approximate Chi Square Value (0.05) | 784.9 |
| Adjusted Level of Significance | 0.0407 | Adjusted Chi Square Value | 781.1 |

### Assuming Gamma Distribution

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL (use when n>=50)) | 6.301 | 95% Adjusted Gamma UCL (use when n<50) | 6.331 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 51 | **Lognormal GOF Test** | | | | | | | | | | | |
| 52 | | | | Shapiro Wilk Test Statistic | | 0.978 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 53 | | | | 5% Shapiro Wilk Critical Value | | 0.926 | Data appear Lognormal at 5% Significance Level | | | | | |
| 54 | | | | Lilliefors Test Statistic | | 0.127 | **Lilliefors Lognormal GOF Test** | | | | | |
| 55 | | | | 5% Lilliefors Critical Value | | 0.165 | Data appear Lognormal at 5% Significance Level | | | | | |
| 56 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 57 | | | | | | | | | | | | |
| 58 | **Lognormal Statistics** | | | | | | | | | | | |
| 59 | | | | Minimum of Logged Data | | 1.224 | Mean of logged Data | | | | | 1.728 |
| 60 | | | | Maximum of Logged Data | | 2.303 | SD of logged Data | | | | | 0.252 |
| 61 | | | | | | | | | | | | |
| 62 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 63 | | | | 95% H-UCL | | 6.327 | 90% Chebyshev (MVUE) UCL | | | | | 6.632 |
| 64 | | | | 95% Chebyshev (MVUE) UCL | | 7.006 | 97.5% Chebyshev (MVUE) UCL | | | | | 7.525 |
| 65 | | | | 99% Chebyshev (MVUE) UCL | | 8.545 | | | | | | |
| 66 | | | | | | | | | | | | |
| 67 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 68 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 69 | | | | | | | | | | | | |
| 70 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 71 | | | | 95% CLT UCL | | 6.264 | 95% Jackknife UCL | | | | | 6.28 |
| 72 | | | | 95% Standard Bootstrap UCL | | 6.258 | 95% Bootstrap-t UCL | | | | | 6.317 |
| 73 | | | | 95% Hall's Bootstrap UCL | | 6.396 | 95% Percentile Bootstrap UCL | | | | | 6.272 |
| 74 | | | | 95% BCA Bootstrap UCL | | 6.328 | | | | | | |
| 75 | | | | 90% Chebyshev(Mean, Sd) UCL | | 6.641 | 95% Chebyshev(Mean, Sd) UCL | | | | | 7.019 |
| 76 | | | | 97.5% Chebyshev(Mean, Sd) UCL | | 7.544 | 99% Chebyshev(Mean, Sd) UCL | | | | | 8.574 |
| 77 | | | | | | | | | | | | |
| 78 | **Suggested UCL to Use** | | | | | | | | | | | |
| 79 | | | | 95% Student's-t UCL | | 6.28 | | | | | | |
| 80 | | | | | | | | | | | | |
| 81 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 82 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 83 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 84 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 85 | | | | | | | | | | | | |
| 86 | | | | | | | | | | | | |
| 87 | **Pb_0-2.5** | | | | | | | | | | | |
| 88 | | | | | | | | | | | | |
| 89 | **General Statistics** | | | | | | | | | | | |
| 90 | | | | Total Number of Observations | | 30 | Number of Distinct Observations | | | | | 28 |
| 91 | | | | | | | Number of Missing Observations | | | | | 0 |
| 92 | | | | Minimum | | 8.4 | Mean | | | | | 687.5 |
| 93 | | | | Maximum | | 2400 | Median | | | | | 400 |
| 94 | | | | SD | | 695.9 | Std. Error of Mean | | | | | 127.1 |
| 95 | | | | Coefficient of Variation | | 1.012 | Skewness | | | | | 1.068 |
| 96 | | | | | | | | | | | | |
| 97 | **Normal GOF Test** | | | | | | | | | | | |
| 98 | | | | Shapiro Wilk Test Statistic | | 0.835 | **Shapiro Wilk GOF Test** | | | | | |
| 99 | | | | 5% Shapiro Wilk Critical Value | | 0.927 | Data Not Normal at 5% Significance Level | | | | | |
| 100 | | | | Lilliefors Test Statistic | | 0.212 | **Lilliefors GOF Test** | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | 5% Lilliefors Critical Value | | | | | 0.162 | Data Not Normal at 5% Significance Level | | | | | |
| 102 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 103 | | | | | | | | | | | | |
| 104 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 105 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 106 | 95% Student's-t UCL | | | | | 903.4 | 95% Adjusted-CLT UCL (Chen-1995) | | | | | 923 |
| 107 | | | | | | | 95% Modified-t UCL (Johnson-1978) | | | | | 907.5 |
| 108 | | | | | | | | | | | | |
| 109 | **Gamma GOF Test** | | | | | | | | | | | |
| 110 | A-D Test Statistic | | | | | 0.403 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 111 | 5% A-D Critical Value | | | | | 0.783 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 112 | K-S Test Statistic | | | | | 0.118 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 113 | 5% K-S Critical Value | | | | | 0.166 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 114 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 115 | | | | | | | | | | | | |
| 116 | **Gamma Statistics** | | | | | | | | | | | |
| 117 | k hat (MLE) | | | | | 0.85 | k star (bias corrected MLE) | | | | | 0.788 |
| 118 | Theta hat (MLE) | | | | | 808.4 | Theta star (bias corrected MLE) | | | | | 872.9 |
| 119 | nu hat (MLE) | | | | | 51.03 | nu star (bias corrected) | | | | | 47.26 |
| 120 | MLE Mean (bias corrected) | | | | | 687.5 | MLE Sd (bias corrected) | | | | | 774.7 |
| 121 | | | | | | | Approximate Chi Square Value (0.05) | | | | | 32.48 |
| 122 | Adjusted Level of Significance | | | | | 0.041 | Adjusted Chi Square Value | | | | | 31.77 |
| 123 | | | | | | | | | | | | |
| 124 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 125 | 95% Approximate Gamma UCL (use when n>=50) | | | | | 1000 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 1023 |
| 126 | | | | | | | | | | | | |
| 127 | **Lognormal GOF Test** | | | | | | | | | | | |
| 128 | Shapiro Wilk Test Statistic | | | | | 0.916 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 129 | 5% Shapiro Wilk Critical Value | | | | | 0.927 | Data Not Lognormal at 5% Significance Level | | | | | |
| 130 | Lilliefors Test Statistic | | | | | 0.0987 | **Lilliefors Lognormal GOF Test** | | | | | |
| 131 | 5% Lilliefors Critical Value | | | | | 0.162 | Data appear Lognormal at 5% Significance Level | | | | | |
| 132 | **Data appear Approximate Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 133 | | | | | | | | | | | | |
| 134 | **Lognormal Statistics** | | | | | | | | | | | |
| 135 | Minimum of Logged Data | | | | | 2.128 | Mean of logged Data | | | | | 5.841 |
| 136 | Maximum of Logged Data | | | | | 7.783 | SD of logged Data | | | | | 1.439 |
| 137 | | | | | | | | | | | | |
| 138 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 139 | 95% H-UCL | | | | | 2202 | 90% Chebyshev (MVUE) UCL | | | | | 1802 |
| 140 | 95% Chebyshev (MVUE) UCL | | | | | 2206 | 97.5% Chebyshev (MVUE) UCL | | | | | 2768 |
| 141 | 99% Chebyshev (MVUE) UCL | | | | | 3872 | | | | | | |
| 142 | | | | | | | | | | | | |
| 143 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 144 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 145 | | | | | | | | | | | | |
| 146 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 147 | 95% CLT UCL | | | | | 896.5 | 95% Jackknife UCL | | | | | 903.4 |
| 148 | 95% Standard Bootstrap UCL | | | | | 897 | 95% Bootstrap-t UCL | | | | | 937.5 |
| 149 | 95% Hall's Bootstrap UCL | | | | | 916 | 95% Percentile Bootstrap UCL | | | | | 900.2 |
| 150 | 95% BCA Bootstrap UCL | | | | | 925.9 | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 151 | 90% Chebyshev(Mean, Sd) UCL | | | | | 1069 | 95% Chebyshev(Mean, Sd) UCL | | | | | 1241 |
| 152 | 97.5% Chebyshev(Mean, Sd) UCL | | | | | 1481 | 99% Chebyshev(Mean, Sd) UCL | | | | | 1952 |
| 153 | | | | | | | | | | | | |
| 154 | **Suggested UCL to Use** | | | | | | | | | | | |
| 155 | 95% Adjusted Gamma UCL | | | | | 1023 | | | | | | |
| 156 | | | | | | | | | | | | |
| 157 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 158 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 159 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 160 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 161 | | | | | | | | | | | | |
| 162 | **b(a)p_0-2.5** | | | | | | | | | | | |
| 163 | | | | | | | | | | | | |
| 164 | **General Statistics** | | | | | | | | | | | |
| 165 | Total Number of Observations | | | | | 29 | Number of Distinct Observations | | | | | 26 |
| 166 | Number of Detects | | | | | 24 | Number of Non-Detects | | | | | 5 |
| 167 | Number of Distinct Detects | | | | | 22 | Number of Distinct Non-Detects | | | | | 4 |
| 168 | Minimum Detect | | | | | 0.0061 | Minimum Non-Detect | | | | | 0.0051 |
| 169 | Maximum Detect | | | | | 0.14 | Maximum Non-Detect | | | | | 0.0054 |
| 170 | Variance Detects | | | | | 0.00117 | Percent Non-Detects | | | | | 17.24% |
| 171 | Mean Detects | | | | | 0.0373 | SD Detects | | | | | 0.0343 |
| 172 | Median Detects | | | | | 0.022 | CV Detects | | | | | 0.919 |
| 173 | Skewness Detects | | | | | 1.49 | Kurtosis Detects | | | | | 2.094 |
| 174 | Mean of Logged Detects | | | | | -3.67 | SD of Logged Detects | | | | | 0.897 |
| 175 | | | | | | | | | | | | |
| 176 | **Normal GOF Test on Detects Only** | | | | | | | | | | | |
| 177 | Shapiro Wilk Test Statistic | | | | | 0.821 | **Shapiro Wilk GOF Test** | | | | | |
| 178 | 5% Shapiro Wilk Critical Value | | | | | 0.916 | Detected Data Not Normal at 5% Significance Level | | | | | |
| 179 | Lilliefors Test Statistic | | | | | 0.234 | **Lilliefors GOF Test** | | | | | |
| 180 | 5% Lilliefors Critical Value | | | | | 0.181 | Detected Data Not Normal at 5% Significance Level | | | | | |
| 181 | **Detected Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 182 | | | | | | | | | | | | |
| 183 | **Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs** | | | | | | | | | | | |
| 184 | Mean | | | | | 0.0318 | Standard Error of Mean | | | | | 0.00623 |
| 185 | SD | | | | | 0.0329 | 95% KM (BCA) UCL | | | | | 0.0424 |
| 186 | 95% KM (t) UCL | | | | | 0.0424 | 95% KM (Percentile Bootstrap) UCL | | | | | 0.0417 |
| 187 | 95% KM (z) UCL | | | | | 0.042 | 95% KM Bootstrap t UCL | | | | | 0.0452 |
| 188 | 90% KM Chebyshev UCL | | | | | 0.0504 | 95% KM Chebyshev UCL | | | | | 0.0589 |
| 189 | 97.5% KM Chebyshev UCL | | | | | 0.0707 | 99% KM Chebyshev UCL | | | | | 0.0938 |
| 190 | | | | | | | | | | | | |
| 191 | **Gamma GOF Tests on Detected Observations Only** | | | | | | | | | | | |
| 192 | A-D Test Statistic | | | | | 0.653 | **Anderson-Darling GOF Test** | | | | | |
| 193 | 5% A-D Critical Value | | | | | 0.762 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 194 | K-S Test Statistic | | | | | 0.166 | **Kolmogrov-Smirnoff GOF** | | | | | |
| 195 | 5% K-S Critical Value | | | | | 0.181 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 196 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 197 | | | | | | | | | | | | |
| 198 | **Gamma Statistics on Detected Data Only** | | | | | | | | | | | |
| 199 | k hat (MLE) | | | | | 1.454 | k star (bias corrected MLE) | | | | | 1.3 |
| 200 | Theta hat (MLE) | | | | | 0.0257 | Theta star (bias corrected MLE) | | | | | 0.0287 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 201 | | | | | nu hat (MLE) | 69.8 | | | | nu star (bias corrected) | | 62.41 |
| 202 | | | | | MLE Mean (bias corrected) | 0.0373 | | | | MLE Sd (bias corrected) | | 0.0327 |
| 203 | | | | | | | | | | | | |
| 204 | **Gamma Kaplan-Meier (KM) Statistics** | | | | | | | | | | | |
| 205 | | | | | k hat (KM) | 0.934 | | | | nu hat (KM) | | 54.17 |
| 206 | | | | | Approximate Chi Square Value (54.17, α) | 38.26 | | | | Adjusted Chi Square Value (54.17, β) | | 37.46 |
| 207 | | | | | 95% Gamma Approximate KM-UCL (use when n>=50) | 0.045 | | | | 95% Gamma Adjusted KM-UCL (use when n<50) | | 0.0459 |
| 208 | | | | | | | | | | | | |
| 209 | **Gamma ROS Statistics using Imputed Non-Detects** | | | | | | | | | | | |
| 210 | GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | | | | | | | |
| 211 | GROS may not be used when kstar of detected data is small such as < 0.1 | | | | | | | | | | | |
| 212 | For such situations, GROS method tends to yield inflated values of UCLs and BTVs | | | | | | | | | | | |
| 213 | For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | | | | | | | |
| 214 | | | | | Minimum | 0.0061 | | | | Mean | | 0.0326 |
| 215 | | | | | Maximum | 0.14 | | | | Median | | 0.017 |
| 216 | | | | | SD | 0.0328 | | | | CV | | 1.006 |
| 217 | | | | | k hat (MLE) | 1.368 | | | | k star (bias corrected MLE) | | 1.25 |
| 218 | | | | | Theta hat (MLE) | 0.0238 | | | | Theta star (bias corrected MLE) | | 0.0261 |
| 219 | | | | | nu hat (MLE) | 79.36 | | | | nu star (bias corrected) | | 72.49 |
| 220 | | | | | MLE Mean (bias corrected) | 0.0326 | | | | MLE Sd (bias corrected) | | 0.0292 |
| 221 | | | | | | | | | | Adjusted Level of Significance (β) | | 0.0407 |
| 222 | | | | | Approximate Chi Square Value (72.49, α) | 53.88 | | | | Adjusted Chi Square Value (72.49, β) | | 52.92 |
| 223 | | | | | 95% Gamma Approximate UCL (use when n>=50) | 0.0439 | | | | 95% Gamma Adjusted UCL (use when n<50) | | 0.0446 |
| 224 | | | | | | | | | | | | |
| 225 | **Lognormal GOF Test on Detected Observations Only** | | | | | | | | | | | |
| 226 | | | | | Shapiro Wilk Test Statistic | 0.955 | | | | **Shapiro Wilk GOF Test** | | |
| 227 | | | | | 5% Shapiro Wilk Critical Value | 0.916 | | | | Detected Data appear Lognormal at 5% Significance Level | | |
| 228 | | | | | Lilliefors Test Statistic | 0.11 | | | | **Lilliefors GOF Test** | | |
| 229 | | | | | 5% Lilliefors Critical Value | 0.181 | | | | Detected Data appear Lognormal at 5% Significance Level | | |
| 230 | **Detected Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 231 | | | | | | | | | | | | |
| 232 | **Lognormal ROS Statistics Using Imputed Non-Detects** | | | | | | | | | | | |
| 233 | | | | | Mean in Original Scale | 0.0314 | | | | Mean in Log Scale | | -4.022 |
| 234 | | | | | SD in Original Scale | 0.0337 | | | | SD in Log Scale | | 1.132 |
| 235 | | | | | 95% t UCL (assumes normality of ROS data) | 0.0421 | | | | 95% Percentile Bootstrap UCL | | 0.0422 |
| 236 | | | | | 95% BCA Bootstrap UCL | 0.0433 | | | | 95% Bootstrap t UCL | | 0.0454 |
| 237 | | | | | 95% H-UCL (Log ROS) | 0.0597 | | | | | | |
| 238 | | | | | | | | | | | | |
| 239 | **UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed** | | | | | | | | | | | |
| 240 | | | | | KM Mean (logged) | -3.948 | | | | 95% H-UCL (KM -Log) | | 0.051 |
| 241 | | | | | KM SD (logged) | 1.004 | | | | 95% Critical H Value (KM-Log) | | 2.472 |
| 242 | | | | | KM Standard Error of Mean (logged) | 0.19 | | | | | | |
| 243 | | | | | | | | | | | | |
| 244 | **DL/2 Statistics** | | | | | | | | | | | |
| 245 | **DL/2 Normal** | | | | | | | | | **DL/2 Log-Transformed** | | |
| 246 | | | | | Mean in Original Scale | 0.0313 | | | | Mean in Log Scale | | -4.062 |
| 247 | | | | | SD in Original Scale | 0.0338 | | | | SD in Log Scale | | 1.193 |
| 248 | | | | | 95% t UCL (Assumes normality) | 0.042 | | | | 95% H-Stat UCL | | 0.0647 |
| 249 | **DL/2 is not a recommended method, provided for comparisons and historical reasons** | | | | | | | | | | | |
| 250 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 251 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 252 | **Detected Data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 253 | | | | | | | | | | | | |
| 254 | **Suggested UCL to Use** | | | | | | | | | | | |
| 255 | | | | | 95% KM (BCA) UCL | 0.0424 | | | 95% GROS Adjusted Gamma UCL | | | 0.0446 |
| 256 | | | | | 95% Adjusted Gamma KM-UCL | 0.0459 | | | | | | |
| 257 | | | | | | | | | | | | |
| 258 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 259 | Recommendations are based upon data size, data distribution, and skewness. | | | | | | | | | | | |
| 260 | These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). | | | | | | | | | | | |
| 261 | However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 262 | | | | | | | | | | | | |
| 263 | **d(a,h)a_0-2.5** | | | | | | | | | | | |
| 264 | | | | | | | | | | | | |
| 265 | **General Statistics** | | | | | | | | | | | |
| 266 | | | | | Total Number of Observations | 29 | | | Number of Distinct Observations | | | 15 |
| 267 | | | | | Number of Detects | 10 | | | Number of Non-Detects | | | 19 |
| 268 | | | | | Number of Distinct Detects | 10 | | | Number of Distinct Non-Detects | | | 8 |
| 269 | | | | | Minimum Detect | 0.0052 | | | Minimum Non-Detect | | | 0.0051 |
| 270 | | | | | Maximum Detect | 0.056 | | | Maximum Non-Detect | | | 0.021 |
| 271 | | | | | Variance Detects | 2.3669E-4 | | | Percent Non-Detects | | | 65.52% |
| 272 | | | | | Mean Detects | 0.0164 | | | SD Detects | | | 0.0154 |
| 273 | | | | | Median Detects | 0.012 | | | CV Detects | | | 0.94 |
| 274 | | | | | Skewness Detects | 2.214 | | | Kurtosis Detects | | | 5.5 |
| 275 | | | | | Mean of Logged Detects | -4.409 | | | SD of Logged Detects | | | 0.773 |
| 276 | | | | | | | | | | | | |
| 277 | **Normal GOF Test on Detects Only** | | | | | | | | | | | |
| 278 | | | | | Shapiro Wilk Test Statistic | 0.734 | | | **Shapiro Wilk GOF Test** | | | |
| 279 | | | | | 5% Shapiro Wilk Critical Value | 0.842 | | | Detected Data Not Normal at 5% Significance Level | | | |
| 280 | | | | | Lilliefors Test Statistic | 0.258 | | | **Lilliefors GOF Test** | | | |
| 281 | | | | | 5% Lilliefors Critical Value | 0.28 | | | Detected Data appear Normal at 5% Significance Level | | | |
| 282 | **Detected Data appear Approximate Normal at 5% Significance Level** | | | | | | | | | | | |
| 283 | | | | | | | | | | | | |
| 284 | **Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs** | | | | | | | | | | | |
| 285 | | | | | Mean | 0.00907 | | | Standard Error of Mean | | | 0.00198 |
| 286 | | | | | SD | 0.0101 | | | 95% KM (BCA) UCL | | | 0.0131 |
| 287 | | | | | 95% KM (t) UCL | 0.0124 | | | 95% KM (Percentile Bootstrap) UCL | | | 0.0125 |
| 288 | | | | | 95% KM (z) UCL | 0.0123 | | | 95% KM Bootstrap t UCL | | | 0.0165 |
| 289 | | | | | 90% KM Chebyshev UCL | 0.015 | | | 95% KM Chebyshev UCL | | | 0.0177 |
| 290 | | | | | 97.5% KM Chebyshev UCL | 0.0215 | | | 99% KM Chebyshev UCL | | | 0.0288 |
| 291 | | | | | | | | | | | | |
| 292 | **Gamma GOF Tests on Detected Observations Only** | | | | | | | | | | | |
| 293 | | | | | A-D Test Statistic | 0.447 | | | **Anderson-Darling GOF Test** | | | |
| 294 | | | | | 5% A-D Critical Value | 0.737 | | | Detected data appear Gamma Distributed at 5% Significance Level | | | |
| 295 | | | | | K-S Test Statistic | 0.153 | | | **Kolmogrov-Smirnoff GOF** | | | |
| 296 | | | | | 5% K-S Critical Value | 0.27 | | | Detected data appear Gamma Distributed at 5% Significance Level | | | |
| 297 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 298 | | | | | | | | | | | | |
| 299 | **Gamma Statistics on Detected Data Only** | | | | | | | | | | | |
| 300 | | | | | k hat (MLE) | 1.836 | | | k star (bias corrected MLE) | | | 1.352 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | | | | | Theta hat (MLE) | 0.00891 | | | | | Theta star (bias corrected MLE) | 0.0121 |
| 302 | | | | | nu hat (MLE) | 36.72 | | | | | nu star (bias corrected) | 27.04 |
| 303 | | | | | MLE Mean (bias corrected) | 0.0164 | | | | | MLE Sd (bias corrected) | 0.0141 |
| 304 | | | | | | | | | | | | |
| 305 | **Gamma Kaplan-Meier (KM) Statistics** | | | | | | | | | | | |
| 306 | | | | | k hat (KM) | 0.807 | | | | | nu hat (KM) | 46.83 |
| 307 | | | | | Approximate Chi Square Value (46.83, α) | 32.13 | | | | | Adjusted Chi Square Value (46.83, β) | 31.4 |
| 308 | | | | | 95% Gamma Approximate KM-UCL (use when n>=50) | 0.0132 | | | | | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.0135 |
| 309 | | | | | | | | | | | | |
| 310 | **Gamma ROS Statistics using Imputed Non-Detects** | | | | | | | | | | | |
| 311 | GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | | | | | | | |
| 312 | GROS may not be used when kstar of detected data is small such as < 0.1 | | | | | | | | | | | |
| 313 | For such situations, GROS method tends to yield inflated values of UCLs and BTVs | | | | | | | | | | | |
| 314 | For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | | | | | | | |
| 315 | | | | | Minimum | 0.0052 | | | | | Mean | 0.0122 |
| 316 | | | | | Maximum | 0.056 | | | | | Median | 0.01 |
| 317 | | | | | SD | 0.00925 | | | | | CV | 0.759 |
| 318 | | | | | k hat (MLE) | 3.983 | | | | | k star (bias corrected MLE) | 3.594 |
| 319 | | | | | Theta hat (MLE) | 0.00306 | | | | | Theta star (bias corrected MLE) | 0.00339 |
| 320 | | | | | nu hat (MLE) | 231 | | | | | nu star (bias corrected) | 208.5 |
| 321 | | | | | MLE Mean (bias corrected) | 0.0122 | | | | | MLE Sd (bias corrected) | 0.00643 |
| 322 | | | | | | | | | | | Adjusted Level of Significance (β) | 0.0407 |
| 323 | | | | | Approximate Chi Square Value (208.47, α) | 176.1 | | | | | Adjusted Chi Square Value (208.47, β) | 174.3 |
| 324 | | | | | 95% Gamma Approximate UCL (use when n>=50) | 0.0144 | | | | | 95% Gamma Adjusted UCL (use when n<50) | 0.0146 |
| 325 | | | | | | | | | | | | |
| 326 | **Lognormal GOF Test on Detected Observations Only** | | | | | | | | | | | |
| 327 | | | | | Shapiro Wilk Test Statistic | 0.926 | **Shapiro Wilk GOF Test** | | | | | |
| 328 | | | | | 5% Shapiro Wilk Critical Value | 0.842 | Detected Data appear Lognormal at 5% Significance Level | | | | | |
| 329 | | | | | Lilliefors Test Statistic | 0.142 | **Lilliefors GOF Test** | | | | | |
| 330 | | | | | 5% Lilliefors Critical Value | 0.28 | Detected Data appear Lognormal at 5% Significance Level | | | | | |
| 331 | **Detected Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 332 | | | | | | | | | | | | |
| 333 | **Lognormal ROS Statistics Using Imputed Non-Detects** | | | | | | | | | | | |
| 334 | | | | | Mean in Original Scale | 0.0069 | | | | | Mean in Log Scale | -5.723 |
| 335 | | | | | SD in Original Scale | 0.0112 | | | | | SD in Log Scale | 1.167 |
| 336 | | | | | 95% t UCL (assumes normality of ROS data) | 0.0104 | | | | | 95% Percentile Bootstrap UCL | 0.0106 |
| 337 | | | | | 95% BCA Bootstrap UCL | 0.0121 | | | | | 95% Bootstrap t UCL | 0.0136 |
| 338 | | | | | 95% H-UCL (Log ROS) | 0.0117 | | | | | | |
| 339 | | | | | | | | | | | | |
| 340 | **UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed** | | | | | | | | | | | |
| 341 | | | | | KM Mean (logged) | -4.966 | | | | | 95% H-UCL (KM -Log) | 0.0105 |
| 342 | | | | | KM SD (logged) | 0.597 | | | | | 95% Critical H Value (KM-Log) | 2.03 |
| 343 | | | | | KM Standard Error of Mean (logged) | 0.118 | | | | | | |
| 344 | | | | | | | | | | | | |
| 345 | **DL/2 Statistics** | | | | | | | | | | | |
| 346 | **DL/2 Normal** | | | | | | **DL/2 Log-Transformed** | | | | | |
| 347 | | | | | Mean in Original Scale | 0.00799 | | | | | Mean in Log Scale | -5.27 |
| 348 | | | | | SD in Original Scale | 0.0108 | | | | | SD in Log Scale | 0.834 |
| 349 | | | | | 95% t UCL (Assumes normality) | 0.0114 | | | | | 95% H-Stat UCL | 0.0104 |
| 350 | **DL/2 is not a recommended method, provided for comparisons and historical reasons** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 351 | | | | | | | | | | | | |
| 352 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 353 | **Detected Data appear Approximate Normal Distributed at 5% Significance Level** | | | | | | | | | | | |
| 354 | | | | | | | | | | | | |
| 355 | **Suggested UCL to Use** | | | | | | | | | | | |
| 356 | 95% KM (t) UCL | | | | 0.0124 | | 95% KM (Percentile Bootstrap) UCL | | | | | 0.0125 |
| 357 | | | | | | | | | | | | |
| 358 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 359 | Recommendations are based upon data size, data distribution, and skewness. | | | | | | | | | | | |
| 360 | These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). | | | | | | | | | | | |
| 361 | However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 362 | | | | | | | | | | | | |
| 363 | | | | | | | | | | | | |
| 364 | **As** | | | | | | | | | | | |
| 365 | | | | | | | | | | | | |
| 366 | **General Statistics** | | | | | | | | | | | |
| 367 | Total Number of Observations | | | | 38 | | Number of Distinct Observations | | | | | 26 |
| 368 | | | | | | | Number of Missing Observations | | | | | 0 |
| 369 | Minimum | | | | 3.4 | | Mean | | | | | 5.563 |
| 370 | Maximum | | | | 10 | | Median | | | | | 5.55 |
| 371 | SD | | | | 1.494 | | Std. Error of Mean | | | | | 0.242 |
| 372 | Coefficient of Variation | | | | 0.269 | | Skewness | | | | | 0.837 |
| 373 | | | | | | | | | | | | |
| 374 | **Normal GOF Test** | | | | | | | | | | | |
| 375 | Shapiro Wilk Test Statistic | | | | 0.946 | | **Shapiro Wilk GOF Test** | | | | | |
| 376 | 5% Shapiro Wilk Critical Value | | | | 0.938 | | Data appear Normal at 5% Significance Level | | | | | |
| 377 | Lilliefors Test Statistic | | | | 0.112 | | **Lilliefors GOF Test** | | | | | |
| 378 | 5% Lilliefors Critical Value | | | | 0.144 | | Data appear Normal at 5% Significance Level | | | | | |
| 379 | **Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 380 | | | | | | | | | | | | |
| 381 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 382 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 383 | 95% Student's-t UCL | | | | 5.972 | | 95% Adjusted-CLT UCL (Chen-1995) | | | | | 5.997 |
| 384 | | | | | | | 95% Modified-t UCL (Johnson-1978) | | | | | 5.978 |
| 385 | | | | | | | | | | | | |
| 386 | **Gamma GOF Test** | | | | | | | | | | | |
| 387 | A-D Test Statistic | | | | 0.229 | | **Anderson-Darling Gamma GOF Test** | | | | | |
| 388 | 5% A-D Critical Value | | | | 0.747 | | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 389 | K-S Test Statistic | | | | 0.0902 | | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 390 | 5% K-S Critical Value | | | | 0.143 | | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 391 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 392 | | | | | | | | | | | | |
| 393 | **Gamma Statistics** | | | | | | | | | | | |
| 394 | k hat (MLE) | | | | 15 | | k star (bias corrected MLE) | | | | | 13.83 |
| 395 | Theta hat (MLE) | | | | 0.371 | | Theta star (bias corrected MLE) | | | | | 0.402 |
| 396 | nu hat (MLE) | | | | 1140 | | nu star (bias corrected) | | | | | 1051 |
| 397 | MLE Mean (bias corrected) | | | | 5.563 | | MLE Sd (bias corrected) | | | | | 1.496 |
| 398 | | | | | | | Approximate Chi Square Value (0.05) | | | | | 976.7 |
| 399 | Adjusted Level of Significance | | | | 0.0434 | | Adjusted Chi Square Value | | | | | 973.8 |
| 400 | | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 401 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 402 | 95% Approximate Gamma UCL (use when n>=50)) | | | | | 5.986 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 6.004 |
| 403 | | | | | | | | | | | | |
| 404 | **Lognormal GOF Test** | | | | | | | | | | | |
| 405 | Shapiro Wilk Test Statistic | | | | | 0.974 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 406 | 5% Shapiro Wilk Critical Value | | | | | 0.938 | Data appear Lognormal at 5% Significance Level | | | | | |
| 407 | Lilliefors Test Statistic | | | | | 0.0861 | **Lilliefors Lognormal GOF Test** | | | | | |
| 408 | 5% Lilliefors Critical Value | | | | | 0.144 | Data appear Lognormal at 5% Significance Level | | | | | |
| 409 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 410 | | | | | | | | | | | | |
| 411 | **Lognormal Statistics** | | | | | | | | | | | |
| 412 | Minimum of Logged Data | | | | | 1.224 | Mean of logged Data | | | | | 1.682 |
| 413 | Maximum of Logged Data | | | | | 2.303 | SD of logged Data | | | | | 0.262 |
| 414 | | | | | | | | | | | | |
| 415 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 416 | 95% H-UCL | | | | | 6.008 | 90% Chebyshev (MVUE) UCL | | | | | 6.281 |
| 417 | 95% Chebyshev (MVUE) UCL | | | | | 6.607 | 97.5% Chebyshev (MVUE) UCL | | | | | 7.06 |
| 418 | 99% Chebyshev (MVUE) UCL | | | | | 7.949 | | | | | | |
| 419 | | | | | | | | | | | | |
| 420 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 421 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 422 | | | | | | | | | | | | |
| 423 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 424 | 95% CLT UCL | | | | | 5.962 | 95% Jackknife UCL | | | | | 5.972 |
| 425 | 95% Standard Bootstrap UCL | | | | | 5.967 | 95% Bootstrap-t UCL | | | | | 6.016 |
| 426 | 95% Hall's Bootstrap UCL | | | | | 6.015 | 95% Percentile Bootstrap UCL | | | | | 5.955 |
| 427 | 95% BCA Bootstrap UCL | | | | | 5.979 | | | | | | |
| 428 | 90% Chebyshev(Mean, Sd) UCL | | | | | 6.29 | 95% Chebyshev(Mean, Sd) UCL | | | | | 6.62 |
| 429 | 97.5% Chebyshev(Mean, Sd) UCL | | | | | 7.077 | 99% Chebyshev(Mean, Sd) UCL | | | | | 7.975 |
| 430 | | | | | | | | | | | | |
| 431 | **Suggested UCL to Use** | | | | | | | | | | | |
| 432 | 95% Student's-t UCL | | | | | 5.972 | | | | | | |
| 433 | | | | | | | | | | | | |
| 434 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 435 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 436 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 437 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 438 | | | | | | | | | | | | |
| 439 | | | | | | | | | | | | |
| 440 | **Pb** | | | | | | | | | | | |
| 441 | | | | | | | | | | | | |
| 442 | **General Statistics** | | | | | | | | | | | |
| 443 | Total Number of Observations | | | | | 39 | Number of Distinct Observations | | | | | 36 |
| 444 | | | | | | | Number of Missing Observations | | | | | 0 |
| 445 | Minimum | | | | | 8.4 | Mean | | | | | 607.7 |
| 446 | Maximum | | | | | 2400 | Median | | | | | 340 |
| 447 | SD | | | | | 644.4 | Std. Error of Mean | | | | | 103.2 |
| 448 | Coefficient of Variation | | | | | 1.06 | Skewness | | | | | 1.286 |
| 449 | | | | | | | | | | | | |
| 450 | **Normal GOF Test** | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 451 | Shapiro Wilk Test Statistic | | | | | 0.823 | **Shapiro Wilk GOF Test** | | | | | |
| 452 | 5% Shapiro Wilk Critical Value | | | | | 0.939 | Data Not Normal at 5% Significance Level | | | | | |
| 453 | Lilliefors Test Statistic | | | | | 0.202 | **Lilliefors GOF Test** | | | | | |
| 454 | 5% Lilliefors Critical Value | | | | | 0.142 | Data Not Normal at 5% Significance Level | | | | | |
| 455 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 456 | | | | | | | | | | | | |
| 457 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 458 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 459 | 95% Student's-t UCL | | | | | 781.7 | 95% Adjusted-CLT UCL (Chen-1995) | | | | | 800.2 |
| 460 | | | | | | | 95% Modified-t UCL (Johnson-1978) | | | | | 785.2 |
| 461 | | | | | | | | | | | | |
| 462 | **Gamma GOF Test** | | | | | | | | | | | |
| 463 | A-D Test Statistic | | | | | 0.221 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 464 | 5% A-D Critical Value | | | | | 0.786 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 465 | K-S Test Statistic | | | | | 0.0715 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 466 | 5% K-S Critical Value | | | | | 0.147 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 467 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 468 | | | | | | | | | | | | |
| 469 | **Gamma Statistics** | | | | | | | | | | | |
| 470 | k hat (MLE) | | | | | 0.812 | k star (bias corrected MLE) | | | | | 0.767 |
| 471 | Theta hat (MLE) | | | | | 748.2 | Theta star (bias corrected MLE) | | | | | 792.5 |
| 472 | nu hat (MLE) | | | | | 63.35 | nu star (bias corrected) | | | | | 59.81 |
| 473 | MLE Mean (bias corrected) | | | | | 607.7 | MLE Sd (bias corrected) | | | | | 694 |
| 474 | | | | | | | Approximate Chi Square Value (0.05) | | | | | 43.03 |
| 475 | Adjusted Level of Significance | | | | | 0.0437 | Adjusted Chi Square Value | | | | | 42.46 |
| 476 | | | | | | | | | | | | |
| 477 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 478 | 95% Approximate Gamma UCL (use when n>=50) | | | | | 844.7 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 855.9 |
| 479 | | | | | | | | | | | | |
| 480 | **Lognormal GOF Test** | | | | | | | | | | | |
| 481 | Shapiro Wilk Test Statistic | | | | | 0.944 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 482 | 5% Shapiro Wilk Critical Value | | | | | 0.939 | Data appear Lognormal at 5% Significance Level | | | | | |
| 483 | Lilliefors Test Statistic | | | | | 0.0952 | **Lilliefors Lognormal GOF Test** | | | | | |
| 484 | 5% Lilliefors Critical Value | | | | | 0.142 | Data appear Lognormal at 5% Significance Level | | | | | |
| 485 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 486 | | | | | | | | | | | | |
| 487 | **Lognormal Statistics** | | | | | | | | | | | |
| 488 | Minimum of Logged Data | | | | | 2.128 | Mean of logged Data | | | | | 5.68 |
| 489 | Maximum of Logged Data | | | | | 7.783 | SD of logged Data | | | | | 1.444 |
| 490 | | | | | | | | | | | | |
| 491 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 492 | 95% H-UCL | | | | | 1664 | 90% Chebyshev (MVUE) UCL | | | | | 1493 |
| 493 | 95% Chebyshev (MVUE) UCL | | | | | 1812 | 97.5% Chebyshev (MVUE) UCL | | | | | 2254 |
| 494 | 99% Chebyshev (MVUE) UCL | | | | | 3123 | | | | | | |
| 495 | | | | | | | | | | | | |
| 496 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 497 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 498 | | | | | | | | | | | | |
| 499 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 500 | 95% CLT UCL | | | | | 777.4 | 95% Jackknife UCL | | | | | 781.7 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 501 | 95% Standard Bootstrap UCL | | | | | 779.5 | 95% Bootstrap-t UCL | | | | | 800.2 |
| 502 | 95% Hall's Bootstrap UCL | | | | | 800.6 | 95% Percentile Bootstrap UCL | | | | | 784.2 |
| 503 | 95% BCA Bootstrap UCL | | | | | 805.9 | | | | | | |
| 504 | 90% Chebyshev(Mean, Sd) UCL | | | | | 917.3 | 95% Chebyshev(Mean, Sd) UCL | | | | | 1058 |
| 505 | 97.5% Chebyshev(Mean, Sd) UCL | | | | | 1252 | 99% Chebyshev(Mean, Sd) UCL | | | | | 1634 |
| 506 | | | | | | | | | | | | |
| 507 | **Suggested UCL to Use** | | | | | | | | | | | |
| 508 | 95% Adjusted Gamma UCL | | | | | 855.9 | | | | | | |
| 509 | | | | | | | | | | | | |
| 510 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 511 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 512 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 513 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 514 | | | | | | | | | | | | |
| 515 | **b(a)p** | | | | | | | | | | | |
| 516 | | | | | | | | | | | | |
| 517 | **General Statistics** | | | | | | | | | | | |
| 518 | Total Number of Observations | | | | | 38 | Number of Distinct Observations | | | | | 29 |
| 519 | Number of Detects | | | | | 30 | Number of Non-Detects | | | | | 8 |
| 520 | Number of Distinct Detects | | | | | 25 | Number of Distinct Non-Detects | | | | | 5 |
| 521 | Minimum Detect | | | | | 0.0061 | Minimum Non-Detect | | | | | 0.0051 |
| 522 | Maximum Detect | | | | | 0.31 | Maximum Non-Detect | | | | | 0.021 |
| 523 | Variance Detects | | | | | 0.00367 | Percent Non-Detects | | | | | 21.05% |
| 524 | Mean Detects | | | | | 0.0476 | SD Detects | | | | | 0.0606 |
| 525 | Median Detects | | | | | 0.0235 | CV Detects | | | | | 1.271 |
| 526 | Skewness Detects | | | | | 3.121 | Kurtosis Detects | | | | | 12.03 |
| 527 | Mean of Logged Detects | | | | | -3.551 | SD of Logged Detects | | | | | 0.981 |
| 528 | | | | | | | | | | | | |
| 529 | **Normal GOF Test on Detects Only** | | | | | | | | | | | |
| 530 | Shapiro Wilk Test Statistic | | | | | 0.649 | **Shapiro Wilk GOF Test** | | | | | |
| 531 | 5% Shapiro Wilk Critical Value | | | | | 0.927 | Detected Data Not Normal at 5% Significance Level | | | | | |
| 532 | Lilliefors Test Statistic | | | | | 0.246 | **Lilliefors GOF Test** | | | | | |
| 533 | 5% Lilliefors Critical Value | | | | | 0.162 | Detected Data Not Normal at 5% Significance Level | | | | | |
| 534 | **Detected Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 535 | | | | | | | | | | | | |
| 536 | **Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs** | | | | | | | | | | | |
| 537 | Mean | | | | | 0.0388 | Standard Error of Mean | | | | | 0.00917 |
| 538 | SD | | | | | 0.0556 | 95% KM (BCA) UCL | | | | | 0.0565 |
| 539 | 95% KM (t) UCL | | | | | 0.0543 | 95% KM (Percentile Bootstrap) UCL | | | | | 0.0546 |
| 540 | 95% KM (z) UCL | | | | | 0.0539 | 95% KM Bootstrap t UCL | | | | | 0.0663 |
| 541 | 90% KM Chebyshev UCL | | | | | 0.0663 | 95% KM Chebyshev UCL | | | | | 0.0788 |
| 542 | 97.5% KM Chebyshev UCL | | | | | 0.0961 | 99% KM Chebyshev UCL | | | | | 0.13 |
| 543 | | | | | | | | | | | | |
| 544 | **Gamma GOF Tests on Detected Observations Only** | | | | | | | | | | | |
| 545 | A-D Test Statistic | | | | | 0.922 | **Anderson-Darling GOF Test** | | | | | |
| 546 | 5% A-D Critical Value | | | | | 0.772 | Detected Data Not Gamma Distributed at 5% Significance Level | | | | | |
| 547 | K-S Test Statistic | | | | | 0.166 | **Kolmogrov-Smirnoff GOF** | | | | | |
| 548 | 5% K-S Critical Value | | | | | 0.164 | Detected Data Not Gamma Distributed at 5% Significance Level | | | | | |
| 549 | **Detected Data Not Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 550 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 551 | **Gamma Statistics on Detected Data Only** | | | | | | | | | | | |
| 552 | | | | | k hat (MLE) | 1.123 | | | | k star (bias corrected MLE) | | 1.033 |
| 553 | | | | | Theta hat (MLE) | 0.0424 | | | | Theta star (bias corrected MLE) | | 0.0461 |
| 554 | | | | | nu hat (MLE) | 67.37 | | | | nu star (bias corrected) | | 61.96 |
| 555 | | | | | MLE Mean (bias corrected) | 0.0476 | | | | MLE Sd (bias corrected) | | 0.0469 |
| 556 | | | | | | | | | | | | |
| 557 | **Gamma Kaplan-Meier (KM) Statistics** | | | | | | | | | | | |
| 558 | | | | | k hat (KM) | 0.487 | | | | nu hat (KM) | | 37.03 |
| 559 | | | | | Approximate Chi Square Value (37.03, α) | 24.1 | | | | Adjusted Chi Square Value (37.03, β) | | 23.67 |
| 560 | | | | | 95% Gamma Approximate KM-UCL (use when n>=50) | 0.0596 | | | | 95% Gamma Adjusted KM-UCL (use when n<50) | | 0.0607 |
| 561 | | | | | | | | | | | | |
| 562 | **Gamma ROS Statistics using Imputed Non-Detects** | | | | | | | | | | | |
| 563 | GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | | | | | | | |
| 564 | GROS may not be used when kstar of detected data is small such as < 0.1 | | | | | | | | | | | |
| 565 | For such situations, GROS method tends to yield inflated values of UCLs and BTVs | | | | | | | | | | | |
| 566 | For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | | | | | | | |
| 567 | | | | | Minimum | 0.0061 | | | | Mean | | 0.0397 |
| 568 | | | | | Maximum | 0.31 | | | | Median | | 0.017 |
| 569 | | | | | SD | 0.0558 | | | | CV | | 1.405 |
| 570 | | | | | k hat (MLE) | 1.049 | | | | k star (bias corrected MLE) | | 0.984 |
| 571 | | | | | Theta hat (MLE) | 0.0379 | | | | Theta star (bias corrected MLE) | | 0.0404 |
| 572 | | | | | nu hat (MLE) | 79.71 | | | | nu star (bias corrected) | | 74.75 |
| 573 | | | | | MLE Mean (bias corrected) | 0.0397 | | | | MLE Sd (bias corrected) | | 0.04 |
| 574 | | | | | | | | | | Adjusted Level of Significance (β) | | 0.0434 |
| 575 | | | | | Approximate Chi Square Value (74.75, α) | 55.84 | | | | Adjusted Chi Square Value (74.75, β) | | 55.16 |
| 576 | | | | | 95% Gamma Approximate UCL (use when n>=50) | 0.0532 | | | | 95% Gamma Adjusted UCL (use when n<50) | | 0.0538 |
| 577 | | | | | | | | | | | | |
| 578 | **Lognormal GOF Test on Detected Observations Only** | | | | | | | | | | | |
| 579 | | | | | Shapiro Wilk Test Statistic | 0.961 | | | | **Shapiro Wilk GOF Test** | | |
| 580 | | | | | 5% Shapiro Wilk Critical Value | 0.927 | | | | Detected Data appear Lognormal at 5% Significance Level | | |
| 581 | | | | | Lilliefors Test Statistic | 0.107 | | | | **Lilliefors GOF Test** | | |
| 582 | | | | | 5% Lilliefors Critical Value | 0.162 | | | | Detected Data appear Lognormal at 5% Significance Level | | |
| 583 | **Detected Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 584 | | | | | | | | | | | | |
| 585 | **Lognormal ROS Statistics Using Imputed Non-Detects** | | | | | | | | | | | |
| 586 | | | | | Mean in Original Scale | 0.0384 | | | | Mean in Log Scale | | -3.993 |
| 587 | | | | | SD in Original Scale | 0.0566 | | | | SD in Log Scale | | 1.242 |
| 588 | | | | | 95% t UCL (assumes normality of ROS data) | 0.0539 | | | | 95% Percentile Bootstrap UCL | | 0.0547 |
| 589 | | | | | 95% BCA Bootstrap UCL | 0.0606 | | | | 95% Bootstrap t UCL | | 0.0648 |
| 590 | | | | | 95% H-UCL (Log ROS) | 0.069 | | | | | | |
| 591 | | | | | | | | | | | | |
| 592 | **UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed** | | | | | | | | | | | |
| 593 | | | | | KM Mean (logged) | -3.901 | | | | 95% H-UCL (KM -Log) | | 0.0581 |
| 594 | | | | | KM SD (logged) | 1.097 | | | | 95% Critical H Value (KM-Log) | | 2.509 |
| 595 | | | | | KM Standard Error of Mean (logged) | 0.182 | | | | | | |
| 596 | | | | | | | | | | | | |
| 597 | **DL/2 Statistics** | | | | | | | | | | | |
| 598 | **DL/2 Normal** | | | | | | | | | **DL/2 Log-Transformed** | | |
| 599 | | | | | Mean in Original Scale | 0.0384 | | | | Mean in Log Scale | | -4.018 |
| 600 | | | | | SD in Original Scale | 0.0566 | | | | SD in Log Scale | | 1.28 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 601 | 95% t UCL (Assumes normality) | | | | | 0.0539 | | | | | 95% H-Stat UCL | 0.0726 |
| 602 | **DL/2 is not a recommended method, provided for comparisons and historical reasons** | | | | | | | | | | | |
| 603 | | | | | | | | | | | | |
| 604 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 605 | **Detected Data appear Lognormal Distributed at 5% Significance Level** | | | | | | | | | | | |
| 606 | | | | | | | | | | | | |
| 607 | **Suggested UCL to Use** | | | | | | | | | | | |
| 608 | 95% KM (BCA) UCL | | | | | 0.0565 | | | | | | |
| 609 | | | | | | | | | | | | |
| 610 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 611 | Recommendations are based upon data size, data distribution, and skewness. | | | | | | | | | | | |
| 612 | These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). | | | | | | | | | | | |
| 613 | However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 614 | | | | | | | | | | | | |
| 615 | **d(a,h)a** | | | | | | | | | | | |
| 616 | | | | | | | | | | | | |
| 617 | **General Statistics** | | | | | | | | | | | |
| 618 | Total Number of Observations | | | | | 38 | | | | | Number of Distinct Observations | 17 |
| 619 | Number of Detects | | | | | 12 | | | | | Number of Non-Detects | 26 |
| 620 | Number of Distinct Detects | | | | | 12 | | | | | Number of Distinct Non-Detects | 8 |
| 621 | Minimum Detect | | | | | 0.0052 | | | | | Minimum Non-Detect | 0.0051 |
| 622 | Maximum Detect | | | | | 0.69 | | | | | Maximum Non-Detect | 0.021 |
| 623 | Variance Detects | | | | | 0.0378 | | | | | Percent Non-Detects | 68.42% |
| 624 | Mean Detects | | | | | 0.0741 | | | | | SD Detects | 0.195 |
| 625 | Median Detects | | | | | 0.015 | | | | | CV Detects | 2.624 |
| 626 | Skewness Detects | | | | | 3.428 | | | | | Kurtosis Detects | 11.81 |
| 627 | Mean of Logged Detects | | | | | -3.982 | | | | | SD of Logged Detects | 1.371 |
| 628 | | | | | | | | | | | | |
| 629 | **Normal GOF Test on Detects Only** | | | | | | | | | | | |
| 630 | Shapiro Wilk Test Statistic | | | | | 0.389 | | | | | **Shapiro Wilk GOF Test** | |
| 631 | 5% Shapiro Wilk Critical Value | | | | | 0.859 | | | | | Detected Data Not Normal at 5% Significance Level | |
| 632 | Lilliefors Test Statistic | | | | | 0.454 | | | | | **Lilliefors GOF Test** | |
| 633 | 5% Lilliefors Critical Value | | | | | 0.256 | | | | | Detected Data Not Normal at 5% Significance Level | |
| 634 | **Detected Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 635 | | | | | | | | | | | | |
| 636 | **Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs** | | | | | | | | | | | |
| 637 | Mean | | | | | 0.027 | | | | | Standard Error of Mean | 0.0185 |
| 638 | SD | | | | | 0.109 | | | | | 95% KM (BCA) UCL | 0.0633 |
| 639 | 95% KM (t) UCL | | | | | 0.0583 | | | | | 95% KM (Percentile Bootstrap) UCL | 0.0623 |
| 640 | 95% KM (z) UCL | | | | | 0.0575 | | | | | 95% KM Bootstrap t UCL | 0.383 |
| 641 | 90% KM Chebyshev UCL | | | | | 0.0827 | | | | | 95% KM Chebyshev UCL | 0.108 |
| 642 | 97.5% KM Chebyshev UCL | | | | | 0.143 | | | | | 99% KM Chebyshev UCL | 0.212 |
| 643 | | | | | | | | | | | | |
| 644 | **Gamma GOF Tests on Detected Observations Only** | | | | | | | | | | | |
| 645 | A-D Test Statistic | | | | | 1.829 | | | | | **Anderson-Darling GOF Test** | |
| 646 | 5% A-D Critical Value | | | | | 0.792 | | | | | Detected Data Not Gamma Distributed at 5% Significance Level | |
| 647 | K-S Test Statistic | | | | | 0.306 | | | | | **Kolmogrov-Smirnoff GOF** | |
| 648 | 5% K-S Critical Value | | | | | 0.26 | | | | | Detected Data Not Gamma Distributed at 5% Significance Level | |
| 649 | **Detected Data Not Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 650 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 651 | **Gamma Statistics on Detected Data Only** | | | | | | | | | | | |
| 652 | | | | | k hat (MLE) | 0.465 | | | | k star (bias corrected MLE) | | 0.405 |
| 653 | | | | | Theta hat (MLE) | 0.159 | | | | Theta star (bias corrected MLE) | | 0.183 |
| 654 | | | | | nu hat (MLE) | 11.17 | | | | nu star (bias corrected) | | 9.709 |
| 655 | | | | | MLE Mean (bias corrected) | 0.0741 | | | | MLE Sd (bias corrected) | | 0.117 |
| 656 | | | | | | | | | | | | |
| 657 | **Gamma Kaplan-Meier (KM) Statistics** | | | | | | | | | | | |
| 658 | | | | | k hat (KM) | 0.061 | | | | nu hat (KM) | | 4.636 |
| 659 | | | | | Approximate Chi Square Value (4.64, α) | 0.988 | | | | Adjusted Chi Square Value (4.64, β) | | 0.922 |
| 660 | | | | | 95% Gamma Approximate KM-UCL (use when n>=50) | 0.127 | | | | 95% Gamma Adjusted KM-UCL (use when n<50) | | 0.136 |
| 661 | Gamma (KM) may not be used when k hat (KM) is < 0.1 | | | | | | | | | | | |
| 662 | | | | | | | | | | | | |
| 663 | **Gamma ROS Statistics using Imputed Non-Detects** | | | | | | | | | | | |
| 664 | GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | | | | | | | |
| 665 | GROS may not be used when kstar of detected data is small such as < 0.1 | | | | | | | | | | | |
| 666 | For such situations, GROS method tends to yield inflated values of UCLs and BTVs | | | | | | | | | | | |
| 667 | For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | | | | | | | |
| 668 | | | | | Minimum | 0.0052 | | | | Mean | | 0.0303 |
| 669 | | | | | Maximum | 0.69 | | | | Median | | 0.01 |
| 670 | | | | | SD | 0.11 | | | | CV | | 3.645 |
| 671 | | | | | k hat (MLE) | 0.668 | | | | k star (bias corrected MLE) | | 0.633 |
| 672 | | | | | Theta hat (MLE) | 0.0453 | | | | Theta star (bias corrected MLE) | | 0.0478 |
| 673 | | | | | nu hat (MLE) | 50.79 | | | | nu star (bias corrected) | | 48.11 |
| 674 | | | | | MLE Mean (bias corrected) | 0.0303 | | | | MLE Sd (bias corrected) | | 0.038 |
| 675 | | | | | | | | | | Adjusted Level of Significance (β) | | 0.0434 |
| 676 | | | | | Approximate Chi Square Value (48.11, α) | 33.19 | | | | Adjusted Chi Square Value (48.11, β) | | 32.68 |
| 677 | | | | | 95% Gamma Approximate UCL (use when n>=50) | 0.0439 | | | | 95% Gamma Adjusted UCL (use when n<50) | | 0.0445 |
| 678 | | | | | | | | | | | | |
| 679 | **Lognormal GOF Test on Detected Observations Only** | | | | | | | | | | | |
| 680 | | | | | Shapiro Wilk Test Statistic | 0.83 | | | | **Shapiro Wilk GOF Test** | | |
| 681 | | | | | 5% Shapiro Wilk Critical Value | 0.859 | | | | Detected Data Not Lognormal at 5% Significance Level | | |
| 682 | | | | | Lilliefors Test Statistic | 0.177 | | | | **Lilliefors GOF Test** | | |
| 683 | | | | | 5% Lilliefors Critical Value | 0.256 | | | | Detected Data appear Lognormal at 5% Significance Level | | |
| 684 | **Detected Data appear Approximate Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 685 | | | | | | | | | | | | |
| 686 | **Lognormal ROS Statistics Using Imputed Non-Detects** | | | | | | | | | | | |
| 687 | | | | | Mean in Original Scale | 0.024 | | | | Mean in Log Scale | | -6.46 |
| 688 | | | | | SD in Original Scale | 0.112 | | | | SD in Log Scale | | 2.096 |
| 689 | | | | | 95% t UCL (assumes normality of ROS data) | 0.0545 | | | | 95% Percentile Bootstrap UCL | | 0.0598 |
| 690 | | | | | 95% BCA Bootstrap UCL | 0.0791 | | | | 95% Bootstrap t UCL | | 0.326 |
| 691 | | | | | 95% H-UCL (Log ROS) | 0.0538 | | | | | | |
| 692 | | | | | | | | | | | | |
| 693 | **UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed** | | | | | | | | | | | |
| 694 | | | | | KM Mean (logged) | -4.853 | | | | 95% H-UCL (KM -Log) | | 0.0177 |
| 695 | | | | | KM SD (logged) | 0.952 | | | | 95% Critical H Value (KM-Log) | | 2.34 |
| 696 | | | | | KM Standard Error of Mean (logged) | 0.162 | | | | | | |
| 697 | | | | | | | | | | | | |
| 698 | **DL/2 Statistics** | | | | | | | | | | | |
| 699 | **DL/2 Normal** | | | | | | **DL/2 Log-Transformed** | | | | | |
| 700 | | | | | Mean in Original Scale | 0.0261 | | | | Mean in Log Scale | | -5.138 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 701 | | | | SD in Original Scale | 0.111 | | | | | SD in Log Scale | 1.16 | |
| 702 | | | | 95% t UCL (Assumes normality) | 0.0565 | | | | | 95% H-Stat UCL | 0.0188 | |
| 703 | **DL/2 is not a recommended method, provided for comparisons and historical reasons** | | | | | | | | | | | |
| 704 | | | | | | | | | | | | |
| 705 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 706 | **Detected Data appear Approximate Lognormal Distributed at 5% Significance Level** | | | | | | | | | | | |
| 707 | | | | | | | | | | | | |
| 708 | **Suggested UCL to Use** | | | | | | | | | | | |
| 709 | | | | 95% KM (BCA) UCL | 0.0633 | | | | | | | |
| 710 | | | | | | | | | | | | |
| 711 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 712 | Recommendations are based upon data size, data distribution, and skewness. | | | | | | | | | | | |
| 713 | These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). | | | | | | | | | | | |
| 714 | However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 715 | | | | | | | | | | | | |
| 716 | | | | | | | | | | | | |
| 717 | **Ba_0-3.5** | | | | | | | | | | | |
| 718 | | | | | | | | | | | | |
| 719 | **General Statistics** | | | | | | | | | | | |
| 720 | | | | Total Number of Observations | 33 | | | | | Number of Distinct Observations | 25 | |
| 721 | | | | | | | | | | Number of Missing Observations | 0 | |
| 722 | | | | Minimum | 79 | | | | | Mean | 342.3 | |
| 723 | | | | Maximum | 920 | | | | | Median | 210 | |
| 724 | | | | SD | 258.5 | | | | | Std. Error of Mean | 44.99 | |
| 725 | | | | Coefficient of Variation | 0.755 | | | | | Skewness | 0.877 | |
| 726 | | | | | | | | | | | | |
| 727 | **Normal GOF Test** | | | | | | | | | | | |
| 728 | | | | Shapiro Wilk Test Statistic | 0.832 | | | | | **Shapiro Wilk GOF Test** | | |
| 729 | | | | 5% Shapiro Wilk Critical Value | 0.931 | | | | | Data Not Normal at 5% Significance Level | | |
| 730 | | | | Lilliefors Test Statistic | 0.211 | | | | | **Lilliefors GOF Test** | | |
| 731 | | | | 5% Lilliefors Critical Value | 0.154 | | | | | Data Not Normal at 5% Significance Level | | |
| 732 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 733 | | | | | | | | | | | | |
| 734 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 735 | | | | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | |
| 736 | | | | 95% Student's-t UCL | 418.5 | | | | | 95% Adjusted-CLT UCL (Chen-1995) | 423.6 | |
| 737 | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | 419.7 | |
| 738 | | | | | | | | | | | | |
| 739 | **Gamma GOF Test** | | | | | | | | | | | |
| 740 | | | | A-D Test Statistic | 1.478 | | | | | **Anderson-Darling Gamma GOF Test** | | |
| 741 | | | | 5% A-D Critical Value | 0.76 | | | | | Data Not Gamma Distributed at 5% Significance Level | | |
| 742 | | | | K-S Test Statistic | 0.189 | | | | | **Kolmogrov-Smirnoff Gamma GOF Test** | | |
| 743 | | | | 5% K-S Critical Value | 0.155 | | | | | Data Not Gamma Distributed at 5% Significance Level | | |
| 744 | **Data Not Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 745 | | | | | | | | | | | | |
| 746 | **Gamma Statistics** | | | | | | | | | | | |
| 747 | | | | k hat (MLE) | 1.958 | | | | | k star (bias corrected MLE) | 1.8 | |
| 748 | | | | Theta hat (MLE) | 174.8 | | | | | Theta star (bias corrected MLE) | 190.1 | |
| 749 | | | | nu hat (MLE) | 129.2 | | | | | nu star (bias corrected) | 118.8 | |
| 750 | | | | MLE Mean (bias corrected) | 342.3 | | | | | MLE Sd (bias corrected) | 255.1 | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 751 | | | | | | | | | | | Approximate Chi Square Value (0.05) | 94.65 |
| 752 | | | | | Adjusted Level of Significance | 0.0419 | | | | | Adjusted Chi Square Value | 93.54 |
| 753 | | | | | | | | | | | | |
| 754 | | | | | **Assuming Gamma Distribution** | | | | | | | |
| 755 | | | | | 95% Approximate Gamma UCL (use when n>=50)) | 429.7 | | | | | 95% Adjusted Gamma UCL (use when n<50) | 434.8 |
| 756 | | | | | | | | | | | | |
| 757 | | | | | **Lognormal GOF Test** | | | | | | | |
| 758 | | | | | Shapiro Wilk Test Statistic | 0.9 | | | | | **Shapiro Wilk Lognormal GOF Test** | |
| 759 | | | | | 5% Shapiro Wilk Critical Value | 0.931 | | | | | Data Not Lognormal at 5% Significance Level | |
| 760 | | | | | Lilliefors Test Statistic | 0.167 | | | | | **Lilliefors Lognormal GOF Test** | |
| 761 | | | | | 5% Lilliefors Critical Value | 0.154 | | | | | Data Not Lognormal at 5% Significance Level | |
| 762 | | | | | **Data Not Lognormal at 5% Significance Level** | | | | | | | |
| 763 | | | | | | | | | | | | |
| 764 | | | | | **Lognormal Statistics** | | | | | | | |
| 765 | | | | | Minimum of Logged Data | 4.369 | | | | | Mean of logged Data | 5.559 |
| 766 | | | | | Maximum of Logged Data | 6.824 | | | | | SD of logged Data | 0.755 |
| 767 | | | | | | | | | | | | |
| 768 | | | | | **Assuming Lognormal Distribution** | | | | | | | |
| 769 | | | | | 95% H-UCL | 461.2 | | | | | 90% Chebyshev (MVUE) UCL | 489.3 |
| 770 | | | | | 95% Chebyshev (MVUE) UCL | 556.2 | | | | | 97.5% Chebyshev (MVUE) UCL | 649 |
| 771 | | | | | 99% Chebyshev (MVUE) UCL | 831.5 | | | | | | |
| 772 | | | | | | | | | | | | |
| 773 | | | | | **Nonparametric Distribution Free UCL Statistics** | | | | | | | |
| 774 | | | | | **Data do not follow a Discernible Distribution (0.05)** | | | | | | | |
| 775 | | | | | | | | | | | | |
| 776 | | | | | **Nonparametric Distribution Free UCLs** | | | | | | | |
| 777 | | | | | 95% CLT UCL | 416.3 | | | | | 95% Jackknife UCL | 418.5 |
| 778 | | | | | 95% Standard Bootstrap UCL | 416.5 | | | | | 95% Bootstrap-t UCL | 429.5 |
| 779 | | | | | 95% Hall's Bootstrap UCL | 419.6 | | | | | 95% Percentile Bootstrap UCL | 414.4 |
| 780 | | | | | 95% BCA Bootstrap UCL | 426.5 | | | | | | |
| 781 | | | | | 90% Chebyshev(Mean, Sd) UCL | 477.3 | | | | | 95% Chebyshev(Mean, Sd) UCL | 538.4 |
| 782 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 623.3 | | | | | 99% Chebyshev(Mean, Sd) UCL | 790 |
| 783 | | | | | | | | | | | | |
| 784 | | | | | **Suggested UCL to Use** | | | | | | | |
| 785 | | | | | 95% Chebyshev (Mean, Sd) UCL | 538.4 | | | | | | |
| 786 | | | | | | | | | | | | |
| 787 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 788 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 789 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 790 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 791 | | | | | | | | | | | | |
| 792 | | | | | | | | | | | | |
| 793 | **Cu_0-3.5** | | | | | | | | | | | |
| 794 | | | | | | | | | | | | |
| 795 | | | | | **General Statistics** | | | | | | | |
| 796 | | | | | Total Number of Observations | 33 | | | | | Number of Distinct Observations | 29 |
| 797 | | | | | | | | | | | Number of Missing Observations | 0 |
| 798 | | | | | Minimum | 13 | | | | | Mean | 106.3 |
| 799 | | | | | Maximum | 440 | | | | | Median | 68 |
| 800 | | | | | SD | 104.5 | | | | | Std. Error of Mean | 18.18 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 801 | Coefficient of Variation | | | | | 0.983 | Skewness | | | | | 1.559 |
| 802 | | | | | | | | | | | | |
| 803 | **Normal GOF Test** | | | | | | | | | | | |
| 804 | Shapiro Wilk Test Statistic | | | | | 0.819 | **Shapiro Wilk GOF Test** | | | | | |
| 805 | 5% Shapiro Wilk Critical Value | | | | | 0.931 | Data Not Normal at 5% Significance Level | | | | | |
| 806 | Lilliefors Test Statistic | | | | | 0.186 | **Lilliefors GOF Test** | | | | | |
| 807 | 5% Lilliefors Critical Value | | | | | 0.154 | Data Not Normal at 5% Significance Level | | | | | |
| 808 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 809 | | | | | | | | | | | | |
| 810 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 811 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 812 | 95% Student's-t UCL | | | | | 137.1 | 95% Adjusted-CLT UCL (Chen-1995) | | | | | 141.5 |
| 813 | | | | | | | 95% Modified-t UCL (Johnson-1978) | | | | | 137.9 |
| 814 | | | | | | | | | | | | |
| 815 | **Gamma GOF Test** | | | | | | | | | | | |
| 816 | A-D Test Statistic | | | | | 0.728 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 817 | 5% A-D Critical Value | | | | | 0.772 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 818 | K-S Test Statistic | | | | | 0.138 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 819 | 5% K-S Critical Value | | | | | 0.157 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 820 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 821 | | | | | | | | | | | | |
| 822 | **Gamma Statistics** | | | | | | | | | | | |
| 823 | k hat (MLE) | | | | | 1.185 | k star (bias corrected MLE) | | | | | 1.097 |
| 824 | Theta hat (MLE) | | | | | 89.72 | Theta star (bias corrected MLE) | | | | | 96.87 |
| 825 | nu hat (MLE) | | | | | 78.2 | nu star (bias corrected) | | | | | 72.42 |
| 826 | MLE Mean (bias corrected) | | | | | 106.3 | MLE Sd (bias corrected) | | | | | 101.5 |
| 827 | | | | | | | Approximate Chi Square Value (0.05) | | | | | 53.83 |
| 828 | Adjusted Level of Significance | | | | | 0.0419 | Adjusted Chi Square Value | | | | | 53 |
| 829 | | | | | | | | | | | | |
| 830 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 831 | 95% Approximate Gamma UCL (use when n>=50) | | | | | 143 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 145.3 |
| 832 | | | | | | | | | | | | |
| 833 | **Lognormal GOF Test** | | | | | | | | | | | |
| 834 | Shapiro Wilk Test Statistic | | | | | 0.938 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 835 | 5% Shapiro Wilk Critical Value | | | | | 0.931 | Data appear Lognormal at 5% Significance Level | | | | | |
| 836 | Lilliefors Test Statistic | | | | | 0.13 | **Lilliefors Lognormal GOF Test** | | | | | |
| 837 | 5% Lilliefors Critical Value | | | | | 0.154 | Data appear Lognormal at 5% Significance Level | | | | | |
| 838 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 839 | | | | | | | | | | | | |
| 840 | **Lognormal Statistics** | | | | | | | | | | | |
| 841 | Minimum of Logged Data | | | | | 2.565 | Mean of logged Data | | | | | 4.188 |
| 842 | Maximum of Logged Data | | | | | 6.087 | SD of logged Data | | | | | 1.03 |
| 843 | | | | | | | | | | | | |
| 844 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 845 | 95% H-UCL | | | | | 175.8 | 90% Chebyshev (MVUE) UCL | | | | | 177.8 |
| 846 | 95% Chebyshev (MVUE) UCL | | | | | 208.8 | 97.5% Chebyshev (MVUE) UCL | | | | | 251.8 |
| 847 | 99% Chebyshev (MVUE) UCL | | | | | 336.3 | | | | | | |
| 848 | | | | | | | | | | | | |
| 849 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 850 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 851 | | | | | | | | | | | | |
| 852 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 853 | | | | 95% CLT UCL | 136.2 | | | | 95% Jackknife UCL | 137.1 | | |
| 854 | | | | 95% Standard Bootstrap UCL | 135.3 | | | | 95% Bootstrap-t UCL | 145.1 | | |
| 855 | | | | 95% Hall's Bootstrap UCL | 144.1 | | | | 95% Percentile Bootstrap UCL | 137.2 | | |
| 856 | | | | 95% BCA Bootstrap UCL | 140.8 | | | | | | | |
| 857 | | | | 90% Chebyshev(Mean, Sd) UCL | 160.9 | | | | 95% Chebyshev(Mean, Sd) UCL | 185.6 | | |
| 858 | | | | 97.5% Chebyshev(Mean, Sd) UCL | 219.9 | | | | 99% Chebyshev(Mean, Sd) UCL | 287.2 | | |
| 859 | | | | | | | | | | | | |
| 860 | **Suggested UCL to Use** | | | | | | | | | | | |
| 861 | | | | 95% Adjusted Gamma UCL | 145.3 | | | | | | | |
| 862 | | | | | | | | | | | | |
| 863 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 864 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 865 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 866 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 867 | | | | | | | | | | | | |
| 868 | | | | | | | | | | | | |
| 869 | **Pb_0-3.5** | | | | | | | | | | | |
| 870 | | | | | | | | | | | | |
| 871 | **General Statistics** | | | | | | | | | | | |
| 872 | | | | Total Number of Observations | 34 | | | | Number of Distinct Observations | 31 | | |
| 873 | | | | | | | | | Number of Missing Observations | 0 | | |
| 874 | | | | Minimum | 8.4 | | | | Mean | 661.4 | | |
| 875 | | | | Maximum | 2400 | | | | Median | 430 | | |
| 876 | | | | SD | 666.1 | | | | Std. Error of Mean | 114.2 | | |
| 877 | | | | Coefficient of Variation | 1.007 | | | | Skewness | 1.155 | | |
| 878 | | | | | | | | | | | | |
| 879 | **Normal GOF Test** | | | | | | | | | | | |
| 880 | | | | Shapiro Wilk Test Statistic | 0.837 | | | | **Shapiro Wilk GOF Test** | | | |
| 881 | | | | 5% Shapiro Wilk Critical Value | 0.933 | | | | Data Not Normal at 5% Significance Level | | | |
| 882 | | | | Lilliefors Test Statistic | 0.213 | | | | **Lilliefors GOF Test** | | | |
| 883 | | | | 5% Lilliefors Critical Value | 0.152 | | | | Data Not Normal at 5% Significance Level | | | |
| 884 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 885 | | | | | | | | | | | | |
| 886 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 887 | **95% Normal UCL** | | | | | | | | **95% UCLs (Adjusted for Skewness)** | | | |
| 888 | | | | 95% Student's-t UCL | 854.7 | | | | 95% Adjusted-CLT UCL (Chen-1995) | 873.5 | | |
| 889 | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | 858.5 | | |
| 890 | | | | | | | | | | | | |
| 891 | **Gamma GOF Test** | | | | | | | | | | | |
| 892 | | | | A-D Test Statistic | 0.284 | | | | **Anderson-Darling Gamma GOF Test** | | | |
| 893 | | | | 5% A-D Critical Value | 0.782 | | | | Detected data appear Gamma Distributed at 5% Significance Level | | | |
| 894 | | | | K-S Test Statistic | 0.088 | | | | **Kolmogrov-Smirnoff Gamma GOF Test** | | | |
| 895 | | | | 5% K-S Critical Value | 0.156 | | | | Detected data appear Gamma Distributed at 5% Significance Level | | | |
| 896 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 897 | | | | | | | | | | | | |
| 898 | **Gamma Statistics** | | | | | | | | | | | |
| 899 | | | | k hat (MLE) | 0.874 | | | | k star (bias corrected MLE) | 0.816 | | |
| 900 | | | | Theta hat (MLE) | 757 | | | | Theta star (bias corrected MLE) | 810.4 | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901 | | | | | nu hat (MLE) | 59.41 | | | | | nu star (bias corrected) | 55.5 |
| 902 | | | | | MLE Mean (bias corrected) | 661.4 | | | | | MLE Sd (bias corrected) | 732.1 |
| 903 | | | | | | | | | | | Approximate Chi Square Value (0.05) | 39.38 |
| 904 | | | | | Adjusted Level of Significance | 0.0422 | | | | | Adjusted Chi Square Value | 38.71 |
| 905 | | | | | | | | | | | | |
| 906 | | | | | **Assuming Gamma Distribution** | | | | | | | |
| 907 | | | | | 95% Approximate Gamma UCL (use when n>=50) | 932.2 | | | | | 95% Adjusted Gamma UCL (use when n<50) | 948.4 |
| 908 | | | | | | | | | | | | |
| 909 | | | | | **Lognormal GOF Test** | | | | | | | |
| 910 | | | | | Shapiro Wilk Test Statistic | 0.926 | | | | | **Shapiro Wilk Lognormal GOF Test** | |
| 911 | | | | | 5% Shapiro Wilk Critical Value | 0.933 | | | | | Data Not Lognormal at 5% Significance Level | |
| 912 | | | | | Lilliefors Test Statistic | 0.0984 | | | | | **Lilliefors Lognormal GOF Test** | |
| 913 | | | | | 5% Lilliefors Critical Value | 0.152 | | | | | Data appear Lognormal at 5% Significance Level | |
| 914 | | | | | **Data appear Approximate Lognormal at 5% Significance Level** | | | | | | | |
| 915 | | | | | | | | | | | | |
| 916 | | | | | **Lognormal Statistics** | | | | | | | |
| 917 | | | | | Minimum of Logged Data | 2.128 | | | | | Mean of logged Data | 5.823 |
| 918 | | | | | Maximum of Logged Data | 7.783 | | | | | SD of logged Data | 1.409 |
| 919 | | | | | | | | | | | | |
| 920 | | | | | **Assuming Lognormal Distribution** | | | | | | | |
| 921 | | | | | 95% H-UCL | 1897 | | | | | 90% Chebyshev (MVUE) UCL | 1652 |
| 922 | | | | | 95% Chebyshev (MVUE) UCL | 2008 | | | | | 97.5% Chebyshev (MVUE) UCL | 2504 |
| 923 | | | | | 99% Chebyshev (MVUE) UCL | 3477 | | | | | | |
| 924 | | | | | | | | | | | | |
| 925 | | | | | **Nonparametric Distribution Free UCL Statistics** | | | | | | | |
| 926 | | | | | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | |
| 927 | | | | | | | | | | | | |
| 928 | | | | | **Nonparametric Distribution Free UCLs** | | | | | | | |
| 929 | | | | | 95% CLT UCL | 849.3 | | | | | 95% Jackknife UCL | 854.7 |
| 930 | | | | | 95% Standard Bootstrap UCL | 845.4 | | | | | 95% Bootstrap-t UCL | 882.9 |
| 931 | | | | | 95% Hall's Bootstrap UCL | 875.5 | | | | | 95% Percentile Bootstrap UCL | 852.3 |
| 932 | | | | | 95% BCA Bootstrap UCL | 861.7 | | | | | | |
| 933 | | | | | 90% Chebyshev(Mean, Sd) UCL | 1004 | | | | | 95% Chebyshev(Mean, Sd) UCL | 1159 |
| 934 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 1375 | | | | | 99% Chebyshev(Mean, Sd) UCL | 1798 |
| 935 | | | | | | | | | | | | |
| 936 | | | | | **Suggested UCL to Use** | | | | | | | |
| 937 | | | | | 95% Adjusted Gamma UCL | 948.4 | | | | | | |
| 938 | | | | | | | | | | | | |
| 939 | | | | | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | |
| 940 | | | | | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | |
| 941 | | | | | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | |
| 942 | | | | | For additional insight the user may want to consult a statistician. | | | | | | | |
| 943 | | | | | | | | | | | | |
| 944 | | | | | | | | | | | | |
| 945 | **Zn_0-3.5** | | | | | | | | | | | |
| 946 | | | | | | | | | | | | |
| 947 | | | | | **General Statistics** | | | | | | | |
| 948 | | | | | Total Number of Observations | 33 | | | | | Number of Distinct Observations | 28 |
| 949 | | | | | | | | | | | Number of Missing Observations | 0 |
| 950 | | | | | Minimum | 42 | | | | | Mean | 378.5 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 951 | | | | | Maximum | 1100 | | | | | Median | 190 |
| 952 | | | | | SD | 356.3 | | | | | Std. Error of Mean | 62.03 |
| 953 | | | | | Coefficient of Variation | 0.942 | | | | | Skewness | 0.767 |
| 954 | | | | | | | | | | | | |
| 955 | **Normal GOF Test** | | | | | | | | | | | |
| 956 | | | | | Shapiro Wilk Test Statistic | 0.819 | **Shapiro Wilk GOF Test** | | | | | |
| 957 | | | | | 5% Shapiro Wilk Critical Value | 0.931 | Data Not Normal at 5% Significance Level | | | | | |
| 958 | | | | | Lilliefors Test Statistic | 0.237 | **Lilliefors GOF Test** | | | | | |
| 959 | | | | | 5% Lilliefors Critical Value | 0.154 | Data Not Normal at 5% Significance Level | | | | | |
| 960 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 961 | | | | | | | | | | | | |
| 962 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 963 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 964 | | | | | 95% Student's-t UCL | 483.5 | | | | | 95% Adjusted-CLT UCL (Chen-1995) | 489.3 |
| 965 | | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | 484.9 |
| 966 | | | | | | | | | | | | |
| 967 | **Gamma GOF Test** | | | | | | | | | | | |
| 968 | | | | | A-D Test Statistic | 1.202 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 969 | | | | | 5% A-D Critical Value | 0.774 | Data Not Gamma Distributed at 5% Significance Level | | | | | |
| 970 | | | | | K-S Test Statistic | 0.156 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 971 | | | | | 5% K-S Critical Value | 0.157 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 972 | **Detected data follow Appr. Gamma Distribution at 5% Significance Level** | | | | | | | | | | | |
| 973 | | | | | | | | | | | | |
| 974 | **Gamma Statistics** | | | | | | | | | | | |
| 975 | | | | | k hat (MLE) | 1.066 | | | | | k star (bias corrected MLE) | 0.989 |
| 976 | | | | | Theta hat (MLE) | 355 | | | | | Theta star (bias corrected MLE) | 382.5 |
| 977 | | | | | nu hat (MLE) | 70.36 | | | | | nu star (bias corrected) | 65.3 |
| 978 | | | | | MLE Mean (bias corrected) | 378.5 | | | | | MLE Sd (bias corrected) | 380.5 |
| 979 | | | | | | | | | | | Approximate Chi Square Value (0.05) | 47.71 |
| 980 | | | | | Adjusted Level of Significance | 0.0419 | | | | | Adjusted Chi Square Value | 46.93 |
| 981 | | | | | | | | | | | | |
| 982 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 983 | | | | | 95% Approximate Gamma UCL (use when n>=50) | 518 | | | | | 95% Adjusted Gamma UCL (use when n<50) | 526.6 |
| 984 | | | | | | | | | | | | |
| 985 | **Lognormal GOF Test** | | | | | | | | | | | |
| 986 | | | | | Shapiro Wilk Test Statistic | 0.901 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 987 | | | | | 5% Shapiro Wilk Critical Value | 0.931 | Data Not Lognormal at 5% Significance Level | | | | | |
| 988 | | | | | Lilliefors Test Statistic | 0.131 | **Lilliefors Lognormal GOF Test** | | | | | |
| 989 | | | | | 5% Lilliefors Critical Value | 0.154 | Data appear Lognormal at 5% Significance Level | | | | | |
| 990 | **Data appear Approximate Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 991 | | | | | | | | | | | | |
| 992 | **Lognormal Statistics** | | | | | | | | | | | |
| 993 | | | | | Minimum of Logged Data | 3.738 | | | | | Mean of logged Data | 5.399 |
| 994 | | | | | Maximum of Logged Data | 7.003 | | | | | SD of logged Data | 1.117 |
| 995 | | | | | | | | | | | | |
| 996 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 997 | | | | | 95% H-UCL | 687 | | | | | 90% Chebyshev (MVUE) UCL | 677.4 |
| 998 | | | | | 95% Chebyshev (MVUE) UCL | 802.8 | | | | | 97.5% Chebyshev (MVUE) UCL | 976.7 |
| 999 | | | | | 99% Chebyshev (MVUE) UCL | 1318 | | | | | | |
| 1000 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1001 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 1002 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 1003 | | | | | | | | | | | | |
| 1004 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 1005 | | | | | 95% CLT UCL | 480.5 | | | | 95% Jackknife UCL | | 483.5 |
| 1006 | | | | | 95% Standard Bootstrap UCL | 478.8 | | | | 95% Bootstrap-t UCL | | 497.9 |
| 1007 | | | | | 95% Hall's Bootstrap UCL | 482.1 | | | | 95% Percentile Bootstrap UCL | | 476.8 |
| 1008 | | | | | 95% BCA Bootstrap UCL | 483.4 | | | | | | |
| 1009 | | | | | 90% Chebyshev(Mean, Sd) UCL | 564.5 | | | | 95% Chebyshev(Mean, Sd) UCL | | 648.8 |
| 1010 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 765.8 | | | | 99% Chebyshev(Mean, Sd) UCL | | 995.7 |
| 1011 | | | | | | | | | | | | |
| 1012 | **Suggested UCL to Use** | | | | | | | | | | | |
| 1013 | | | | | 95% Adjusted Gamma UCL | 526.6 | | | | | | |
| 1014 | | | | | | | | | | | | |
| 1015 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 1016 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 1017 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 1018 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 1019 | | | | | | | | | | | | |
| 1020 | | | | | | | | | | | | |
| 1021 | **Bapeq(0-2.5)** | | | | | | | | | | | |
| 1022 | | | | | | | | | | | | |
| 1023 | **General Statistics** | | | | | | | | | | | |
| 1024 | | | | | Total Number of Observations | 27 | | | | Number of Distinct Observations | | 27 |
| 1025 | | | | | | | | | | Number of Missing Observations | | 2 |
| 1026 | | | | | Minimum | 0.00648 | | | | Mean | | 0.0519 |
| 1027 | | | | | Maximum | 0.195 | | | | Median | | 0.0289 |
| 1028 | | | | | SD | 0.0519 | | | | Std. Error of Mean | | 0.00999 |
| 1029 | | | | | Coefficient of Variation | 1 | | | | Skewness | | 1.486 |
| 1030 | | | | | | | | | | | | |
| 1031 | **Normal GOF Test** | | | | | | | | | | | |
| 1032 | | | | | Shapiro Wilk Test Statistic | 0.8 | | | | **Shapiro Wilk GOF Test** | | |
| 1033 | | | | | 5% Shapiro Wilk Critical Value | 0.923 | | | | Data Not Normal at 5% Significance Level | | |
| 1034 | | | | | Lilliefors Test Statistic | 0.228 | | | | **Lilliefors GOF Test** | | |
| 1035 | | | | | 5% Lilliefors Critical Value | 0.171 | | | | Data Not Normal at 5% Significance Level | | |
| 1036 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 1037 | | | | | | | | | | | | |
| 1038 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 1039 | **95% Normal UCL** | | | | | | | | | **95% UCLs (Adjusted for Skewness)** | | |
| 1040 | | | | | 95% Student's-t UCL | 0.0689 | | | | 95% Adjusted-CLT UCL (Chen-1995) | | 0.0713 |
| 1041 | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | | 0.0694 |
| 1042 | | | | | | | | | | | | |
| 1043 | **Gamma GOF Test** | | | | | | | | | | | |
| 1044 | | | | | A-D Test Statistic | 0.605 | | | | **Anderson-Darling Gamma GOF Test** | | |
| 1045 | | | | | 5% A-D Critical Value | 0.769 | | | | Detected data appear Gamma Distributed at 5% Significance Level | | |
| 1046 | | | | | K-S Test Statistic | 0.126 | | | | **Kolmogrov-Smirnoff Gamma GOF Test** | | |
| 1047 | | | | | 5% K-S Critical Value | 0.172 | | | | Detected data appear Gamma Distributed at 5% Significance Level | | |
| 1048 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 1049 | | | | | | | | | | | | |
| 1050 | **Gamma Statistics** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1051 | | | | | k hat (MLE) | 1.214 | | | | k star (bias corrected MLE) | | 1.104 |
| 1052 | | | | | Theta hat (MLE) | 0.0427 | | | | Theta star (bias corrected MLE) | | 0.047 |
| 1053 | | | | | nu hat (MLE) | 65.54 | | | | nu star (bias corrected) | | 59.59 |
| 1054 | | | | | MLE Mean (bias corrected) | 0.0519 | | | | MLE Sd (bias corrected) | | 0.0494 |
| 1055 | | | | | | | | | | Approximate Chi Square Value (0.05) | | 42.84 |
| 1056 | | | | | Adjusted Level of Significance | 0.0401 | | | | Adjusted Chi Square Value | | 41.94 |
| 1057 | | | | | | | | | | | | |
| 1058 | | | | | **Assuming Gamma Distribution** | | | | | | | |
| 1059 | | | | 95% Approximate Gamma UCL (use when n>=50) | | 0.0722 | | | | 95% Adjusted Gamma UCL (use when n<50) | | 0.0737 |
| 1060 | | | | | | | | | | | | |
| 1061 | | | | | **Lognormal GOF Test** | | | | | | | |
| 1062 | | | | | Shapiro Wilk Test Statistic | 0.959 | | | | **Shapiro Wilk Lognormal GOF Test** | | |
| 1063 | | | | | 5% Shapiro Wilk Critical Value | 0.923 | | | | Data appear Lognormal at 5% Significance Level | | |
| 1064 | | | | | Lilliefors Test Statistic | 0.0981 | | | | **Lilliefors Lognormal GOF Test** | | |
| 1065 | | | | | 5% Lilliefors Critical Value | 0.171 | | | | Data appear Lognormal at 5% Significance Level | | |
| 1066 | | | | | **Data appear Lognormal at 5% Significance Level** | | | | | | | |
| 1067 | | | | | | | | | | | | |
| 1068 | | | | | **Lognormal Statistics** | | | | | | | |
| 1069 | | | | | Minimum of Logged Data | -5.039 | | | | Mean of logged Data | | -3.424 |
| 1070 | | | | | Maximum of Logged Data | -1.634 | | | | SD of logged Data | | 1.004 |
| 1071 | | | | | | | | | | | | |
| 1072 | | | | | **Assuming Lognormal Distribution** | | | | | | | |
| 1073 | | | | | 95% H-UCL | 0.0887 | | | | 90% Chebyshev (MVUE) UCL | | 0.0873 |
| 1074 | | | | | 95% Chebyshev (MVUE) UCL | 0.103 | | | | 97.5% Chebyshev (MVUE) UCL | | 0.125 |
| 1075 | | | | | 99% Chebyshev (MVUE) UCL | 0.168 | | | | | | |
| 1076 | | | | | | | | | | | | |
| 1077 | | | | | **Nonparametric Distribution Free UCL Statistics** | | | | | | | |
| 1078 | | | | | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | |
| 1079 | | | | | | | | | | | | |
| 1080 | | | | | **Nonparametric Distribution Free UCLs** | | | | | | | |
| 1081 | | | | | 95% CLT UCL | 0.0683 | | | | 95% Jackknife UCL | | 0.0689 |
| 1082 | | | | | 95% Standard Bootstrap UCL | 0.0673 | | | | 95% Bootstrap-t UCL | | 0.074 |
| 1083 | | | | | 95% Hall's Bootstrap UCL | 0.0736 | | | | 95% Percentile Bootstrap UCL | | 0.0687 |
| 1084 | | | | | 95% BCA Bootstrap UCL | 0.0708 | | | | | | |
| 1085 | | | | | 90% Chebyshev(Mean, Sd) UCL | 0.0818 | | | | 95% Chebyshev(Mean, Sd) UCL | | 0.0954 |
| 1086 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 0.114 | | | | 99% Chebyshev(Mean, Sd) UCL | | 0.151 |
| 1087 | | | | | | | | | | | | |
| 1088 | | | | | **Suggested UCL to Use** | | | | | | | |
| 1089 | | | | | 95% Adjusted Gamma UCL | 0.0737 | | | | | | |
| 1090 | | | | | | | | | | | | |
| 1091 | | | | | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | |
| 1092 | | | | | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | |
| 1093 | | | | | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | |
| 1094 | | | | | For additional insight the user may want to consult a statistician. | | | | | | | |
| 1095 | | | | | | | | | | | | |
| 1096 | | | | | | | | | | | | |
| 1097 | **Bapeq(0-6.5)** | | | | | | | | | | | |
| 1098 | | | | | | | | | | | | |
| 1099 | | | | | **General Statistics** | | | | | | | |
| 1100 | | | | | Total Number of Observations | 35 | | | | Number of Distinct Observations | | 35 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1101 | | | | | | | | | | | Number of Missing Observations | 3 |
| 1102 | | | | | Minimum | 0.0064 | | | | | Mean | 0.0831 |
| 1103 | | | | | Maximum | 1.112 | | | | | Median | 0.0289 |
| 1104 | | | | | SD | 0.187 | | | | | Std. Error of Mean | 0.0316 |
| 1105 | | | | | Coefficient of Variation | 2.251 | | | | | Skewness | 5.194 |
| 1106 | | | | | | | | | | | | |
| 1107 | **Normal GOF Test** | | | | | | | | | | | |
| 1108 | | | | | Shapiro Wilk Test Statistic | 0.384 | **Shapiro Wilk GOF Test** | | | | | |
| 1109 | | | | | 5% Shapiro Wilk Critical Value | 0.934 | Data Not Normal at 5% Significance Level | | | | | |
| 1110 | | | | | Lilliefors Test Statistic | 0.341 | **Lilliefors GOF Test** | | | | | |
| 1111 | | | | | 5% Lilliefors Critical Value | 0.15 | Data Not Normal at 5% Significance Level | | | | | |
| 1112 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 1113 | | | | | | | | | | | | |
| 1114 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 1115 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 1116 | | | | | 95% Student's-t UCL | 0.136 | | | | | 95% Adjusted-CLT UCL (Chen-1995) | 0.165 |
| 1117 | | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | 0.141 |
| 1118 | | | | | | | | | | | | |
| 1119 | **Gamma GOF Test** | | | | | | | | | | | |
| 1120 | | | | | A-D Test Statistic | 1.827 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 1121 | | | | | 5% A-D Critical Value | 0.79 | Data Not Gamma Distributed at 5% Significance Level | | | | | |
| 1122 | | | | | K-S Test Statistic | 0.193 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 1123 | | | | | 5% K-S Critical Value | 0.155 | Data Not Gamma Distributed at 5% Significance Level | | | | | |
| 1124 | **Data Not Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 1125 | | | | | | | | | | | | |
| 1126 | **Gamma Statistics** | | | | | | | | | | | |
| 1127 | | | | | k hat (MLE) | 0.727 | | | | | k star (bias corrected MLE) | 0.683 |
| 1128 | | | | | Theta hat (MLE) | 0.114 | | | | | Theta star (bias corrected MLE) | 0.122 |
| 1129 | | | | | nu hat (MLE) | 50.86 | | | | | nu star (bias corrected) | 47.84 |
| 1130 | | | | | MLE Mean (bias corrected) | 0.0831 | | | | | MLE Sd (bias corrected) | 0.1 |
| 1131 | | | | | | | | | | | Approximate Chi Square Value (0.05) | 32.96 |
| 1132 | | | | | Adjusted Level of Significance | 0.0425 | | | | | Adjusted Chi Square Value | 32.38 |
| 1133 | | | | | | | | | | | | |
| 1134 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 1135 | | | | | 95% Approximate Gamma UCL (use when n>=50)) | 0.121 | | | | | 95% Adjusted Gamma UCL (use when n<50) | 0.123 |
| 1136 | | | | | | | | | | | | |
| 1137 | **Lognormal GOF Test** | | | | | | | | | | | |
| 1138 | | | | | Shapiro Wilk Test Statistic | 0.955 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 1139 | | | | | 5% Shapiro Wilk Critical Value | 0.934 | Data appear Lognormal at 5% Significance Level | | | | | |
| 1140 | | | | | Lilliefors Test Statistic | 0.105 | **Lilliefors Lognormal GOF Test** | | | | | |
| 1141 | | | | | 5% Lilliefors Critical Value | 0.15 | Data appear Lognormal at 5% Significance Level | | | | | |
| 1142 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 1143 | | | | | | | | | | | | |
| 1144 | **Lognormal Statistics** | | | | | | | | | | | |
| 1145 | | | | | Minimum of Logged Data | -5.052 | | | | | Mean of logged Data | -3.316 |
| 1146 | | | | | Maximum of Logged Data | 0.106 | | | | | SD of logged Data | 1.153 |
| 1147 | | | | | | | | | | | | |
| 1148 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 1149 | | | | | 95% H-UCL | 0.119 | | | | | 90% Chebyshev (MVUE) UCL | 0.117 |
| 1150 | | | | | 95% Chebyshev (MVUE) UCL | 0.138 | | | | | 97.5% Chebyshev (MVUE) UCL | 0.168 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1151 | | | | | 99% Chebyshev (MVUE) UCL | 0.228 | | | | | | |
| 1152 | | | | | | | | | | | | |
| 1153 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 1154 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 1155 | | | | | | | | | | | | |
| 1156 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 1157 | | | | | 95% CLT UCL | 0.135 | | | | 95% Jackknife UCL | 0.136 | |
| 1158 | | | | | 95% Standard Bootstrap UCL | 0.134 | | | | 95% Bootstrap-t UCL | 0.256 | |
| 1159 | | | | | 95% Hall's Bootstrap UCL | 0.317 | | | | 95% Percentile Bootstrap UCL | 0.14 | |
| 1160 | | | | | 95% BCA Bootstrap UCL | 0.176 | | | | | | |
| 1161 | | | | | 90% Chebyshev(Mean, Sd) UCL | 0.178 | | | | 95% Chebyshev(Mean, Sd) UCL | 0.221 | |
| 1162 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 0.28 | | | | 99% Chebyshev(Mean, Sd) UCL | 0.397 | |
| 1163 | | | | | | | | | | | | |
| 1164 | **Suggested UCL to Use** | | | | | | | | | | | |
| 1165 | | | | | 95% H-UCL | 0.119 | | | | | | |
| 1166 | | | | | | | | | | | | |
| 1167 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 1168 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 1169 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 1170 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 1171 | | | | | | | | | | | | |
| 1172 | **ProUCL computes and outputs H-statistic based UCLs for historical reasons only.** | | | | | | | | | | | |
| 1173 | **H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.** | | | | | | | | | | | |
| 1174 | **It is therefore recommended to avoid the use of H-statistic based 95% UCLs.** | | | | | | | | | | | |
| 1175 | **Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.** | | | | | | | | | | | |
| 1176 | | | | | | | | | | | | |
| 1177 | | | | | | | | | | | | |
| 1178 | **TCDD_TEQ** | | | | | | | | | | | |
| 1179 | | | | | | | | | | | | |
| 1180 | **General Statistics** | | | | | | | | | | | |
| 1181 | | | | | Total Number of Observations | 13 | | | | Number of Distinct Observations | 13 | |
| 1182 | | | | | | | | | | Number of Missing Observations | 0 | |
| 1183 | | | | | Minimum | 0.00332 | | | | Mean | 7.871 | |
| 1184 | | | | | Maximum | 17.8 | | | | Median | 8.04 | |
| 1185 | | | | | SD | 6.267 | | | | Std. Error of Mean | 1.738 | |
| 1186 | | | | | Coefficient of Variation | 0.796 | | | | Skewness | 0.154 | |
| 1187 | | | | | | | | | | | | |
| 1188 | **Normal GOF Test** | | | | | | | | | | | |
| 1189 | | | | | Shapiro Wilk Test Statistic | 0.916 | | | | **Shapiro Wilk GOF Test** | | |
| 1190 | | | | | 5% Shapiro Wilk Critical Value | 0.866 | | | | Data appear Normal at 5% Significance Level | | |
| 1191 | | | | | Lilliefors Test Statistic | 0.162 | | | | **Lilliefors GOF Test** | | |
| 1192 | | | | | 5% Lilliefors Critical Value | 0.246 | | | | Data appear Normal at 5% Significance Level | | |
| 1193 | **Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 1194 | | | | | | | | | | | | |
| 1195 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 1196 | **95% Normal UCL** | | | | | | | | | **95% UCLs (Adjusted for Skewness)** | | |
| 1197 | | | | | 95% Student's-t UCL | 10.97 | | | | 95% Adjusted-CLT UCL (Chen-1995) | 10.81 | |
| 1198 | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | 10.98 | |
| 1199 | | | | | | | | | | | | |
| 1200 | **Gamma GOF Test** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1201 | | | | | A-D Test Statistic | 0.72 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 1202 | | | | | 5% A-D Critical Value | 0.777 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 1203 | | | | | K-S Test Statistic | 0.205 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 1204 | | | | | 5% K-S Critical Value | 0.247 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 1205 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 1206 | | | | | | | | | | | | |
| 1207 | **Gamma Statistics** | | | | | | | | | | | |
| 1208 | | | | | k hat (MLE) | 0.668 | | | | k star (bias corrected MLE) | 0.565 | |
| 1209 | | | | | Theta hat (MLE) | 11.78 | | | | Theta star (bias corrected MLE) | 13.92 | |
| 1210 | | | | | nu hat (MLE) | 17.37 | | | | nu star (bias corrected) | 14.7 | |
| 1211 | | | | | MLE Mean (bias corrected) | 7.871 | | | | MLE Sd (bias corrected) | 10.47 | |
| 1212 | | | | | | | | | | Approximate Chi Square Value (0.05) | 7.051 | |
| 1213 | | | | | Adjusted Level of Significance | 0.0301 | | | | Adjusted Chi Square Value | 6.31 | |
| 1214 | | | | | | | | | | | | |
| 1215 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 1216 | | | | 95% Approximate Gamma UCL (use when n>=50)) | | 16.41 | | | | 95% Adjusted Gamma UCL (use when n<50) | 18.33 | |
| 1217 | | | | | | | | | | | | |
| 1218 | **Lognormal GOF Test** | | | | | | | | | | | |
| 1219 | | | | | Shapiro Wilk Test Statistic | 0.708 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 1220 | | | | | 5% Shapiro Wilk Critical Value | 0.866 | Data Not Lognormal at 5% Significance Level | | | | | |
| 1221 | | | | | Lilliefors Test Statistic | 0.234 | **Lilliefors Lognormal GOF Test** | | | | | |
| 1222 | | | | | 5% Lilliefors Critical Value | 0.246 | Data appear Lognormal at 5% Significance Level | | | | | |
| 1223 | **Data appear Approximate Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 1224 | | | | | | | | | | | | |
| 1225 | **Lognormal Statistics** | | | | | | | | | | | |
| 1226 | | | | | Minimum of Logged Data | -5.708 | | | | Mean of logged Data | 1.153 | |
| 1227 | | | | | Maximum of Logged Data | 2.879 | | | | SD of logged Data | 2.328 | |
| 1228 | | | | | | | | | | | | |
| 1229 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 1230 | | | | | 95% H-UCL | 1937 | | | | 90% Chebyshev (MVUE) UCL | 86.6 | |
| 1231 | | | | | 95% Chebyshev (MVUE) UCL | 113.2 | | | | 97.5% Chebyshev (MVUE) UCL | 150.1 | |
| 1232 | | | | | 99% Chebyshev (MVUE) UCL | 222.5 | | | | | | |
| 1233 | | | | | | | | | | | | |
| 1234 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 1235 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 1236 | | | | | | | | | | | | |
| 1237 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 1238 | | | | | 95% CLT UCL | 10.73 | | | | 95% Jackknife UCL | 10.97 | |
| 1239 | | | | | 95% Standard Bootstrap UCL | 10.6 | | | | 95% Bootstrap-t UCL | 10.98 | |
| 1240 | | | | | 95% Hall's Bootstrap UCL | 10.57 | | | | 95% Percentile Bootstrap UCL | 10.6 | |
| 1241 | | | | | 95% BCA Bootstrap UCL | 10.74 | | | | | | |
| 1242 | | | | | 90% Chebyshev(Mean, Sd) UCL | 13.09 | | | | 95% Chebyshev(Mean, Sd) UCL | 15.45 | |
| 1243 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 18.73 | | | | 99% Chebyshev(Mean, Sd) UCL | 25.17 | |
| 1244 | | | | | | | | | | | | |
| 1245 | **Suggested UCL to Use** | | | | | | | | | | | |
| 1246 | | | | | 95% Student's-t UCL | 10.97 | | | | | | |
| 1247 | | | | | | | | | | | | |
| 1248 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 1249 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 1250 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1251 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 1252 | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **UCL Statistics for Data Sets with Non-Detects** | | | | | | | | | | | |
| 2 | | | | | | | | | | | | |
| 3 | User Selected Options | | | | | | | | | | | |
| 4 | Date/Time of Computation | 2/14/2015 12:16:41 PM | | | | | | | | | | |
| 5 | From File | outside input file.xls | | | | | | | | | | |
| 6 | Full Precision | OFF | | | | | | | | | | |
| 7 | Confidence Coefficient | 95% | | | | | | | | | | |
| 8 | Number of Bootstrap Operations | 2000 | | | | | | | | | | |
| 9 | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | |
| 11 | **As_0-2.5** | | | | | | | | | | | |
| 12 | | | | | | | | | | | | |
| 13 | **General Statistics** | | | | | | | | | | | |
| 14 | Total Number of Observations | 7 | | | | | Number of Distinct Observations | 6 | | | | |
| 15 | | | | | | | Number of Missing Observations | 0 | | | | |
| 16 | Minimum | 2.5 | | | | | Mean | 3.314 | | | | |
| 17 | Maximum | 3.9 | | | | | Median | 3.5 | | | | |
| 18 | SD | 0.498 | | | | | Std. Error of Mean | 0.188 | | | | |
| 19 | Coefficient of Variation | 0.15 | | | | | Skewness | -0.764 | | | | |
| 20 | | | | | | | | | | | | |
| 21 | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | | | | | |
| 22 | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | | | | | |
| 23 | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | | | | | |
| 24 | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | | | | | |
| 25 | | | | | | | | | | | | |
| 26 | **Normal GOF Test** | | | | | | | | | | | |
| 27 | Shapiro Wilk Test Statistic | 0.925 | | | | | **Shapiro Wilk GOF Test** | | | | | |
| 28 | 5% Shapiro Wilk Critical Value | 0.803 | | | | | Data appear Normal at 5% Significance Level | | | | | |
| 29 | Lilliefors Test Statistic | 0.217 | | | | | **Lilliefors GOF Test** | | | | | |
| 30 | 5% Lilliefors Critical Value | 0.335 | | | | | Data appear Normal at 5% Significance Level | | | | | |
| 31 | **Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 32 | | | | | | | | | | | | |
| 33 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 34 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 35 | 95% Student's-t UCL | 3.68 | | | | | 95% Adjusted-CLT UCL (Chen-1995) | 3.566 | | | | |
| 36 | | | | | | | 95% Modified-t UCL (Johnson-1978) | 3.671 | | | | |
| 37 | | | | | | | | | | | | |
| 38 | **Gamma GOF Test** | | | | | | | | | | | |
| 39 | A-D Test Statistic | 0.407 | | | | | **Anderson-Darling Gamma GOF Test** | | | | | |
| 40 | 5% A-D Critical Value | 0.708 | | | | | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 41 | K-S Test Statistic | 0.238 | | | | | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 42 | 5% K-S Critical Value | 0.311 | | | | | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 43 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 44 | | | | | | | | | | | | |
| 45 | **Gamma Statistics** | | | | | | | | | | | |
| 46 | k hat (MLE) | 48.09 | | | | | k star (bias corrected MLE) | 27.58 | | | | |
| 47 | Theta hat (MLE) | 0.0689 | | | | | Theta star (bias corrected MLE) | 0.12 | | | | |
| 48 | nu hat (MLE) | 673.3 | | | | | nu star (bias corrected) | 386.1 | | | | |
| 49 | MLE Mean (bias corrected) | 3.314 | | | | | MLE Sd (bias corrected) | 0.631 | | | | |
| 50 | | | | | | | Approximate Chi Square Value (0.05) | 341.5 | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 51 | Adjusted Level of Significance | | | | | 0.0158 | Adjusted Chi Square Value | | | | | 328.8 |
| 52 | | | | | | | | | | | | |
| 53 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 54 | 95% Approximate Gamma UCL (use when n>=50)) | | | | | 3.747 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 3.892 |
| 55 | | | | | | | | | | | | |
| 56 | **Lognormal GOF Test** | | | | | | | | | | | |
| 57 | Shapiro Wilk Test Statistic | | | | | 0.902 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 58 | 5% Shapiro Wilk Critical Value | | | | | 0.803 | Data appear Lognormal at 5% Significance Level | | | | | |
| 59 | Lilliefors Test Statistic | | | | | 0.23 | **Lilliefors Lognormal GOF Test** | | | | | |
| 60 | 5% Lilliefors Critical Value | | | | | 0.335 | Data appear Lognormal at 5% Significance Level | | | | | |
| 61 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 62 | | | | | | | | | | | | |
| 63 | **Lognormal Statistics** | | | | | | | | | | | |
| 64 | Minimum of Logged Data | | | | | 0.916 | Mean of logged Data | | | | | 1.188 |
| 65 | Maximum of Logged Data | | | | | 1.361 | SD of logged Data | | | | | 0.159 |
| 66 | | | | | | | | | | | | |
| 67 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 68 | 95% H-UCL | | | | | 3.766 | 90% Chebyshev (MVUE) UCL | | | | | 3.914 |
| 69 | 95% Chebyshev (MVUE) UCL | | | | | 4.185 | 97.5% Chebyshev (MVUE) UCL | | | | | 4.561 |
| 70 | 99% Chebyshev (MVUE) UCL | | | | | 5.3 | | | | | | |
| 71 | | | | | | | | | | | | |
| 72 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 73 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 74 | | | | | | | | | | | | |
| 75 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 76 | 95% CLT UCL | | | | | 3.624 | 95% Jackknife UCL | | | | | 3.68 |
| 77 | 95% Standard Bootstrap UCL | | | | | 3.592 | 95% Bootstrap-t UCL | | | | | 3.632 |
| 78 | 95% Hall's Bootstrap UCL | | | | | 3.557 | 95% Percentile Bootstrap UCL | | | | | 3.586 |
| 79 | 95% BCA Bootstrap UCL | | | | | 3.543 | | | | | | |
| 80 | 90% Chebyshev(Mean, Sd) UCL | | | | | 3.879 | 95% Chebyshev(Mean, Sd) UCL | | | | | 4.135 |
| 81 | 97.5% Chebyshev(Mean, Sd) UCL | | | | | 4.49 | 99% Chebyshev(Mean, Sd) UCL | | | | | 5.187 |
| 82 | | | | | | | | | | | | |
| 83 | **Suggested UCL to Use** | | | | | | | | | | | |
| 84 | 95% Student's-t UCL | | | | | 3.68 | | | | | | |
| 85 | | | | | | | | | | | | |
| 86 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 87 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 88 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 89 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 90 | | | | | | | | | | | | |
| 91 | **Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be** | | | | | | | | | | | |
| 92 | **reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.** | | | | | | | | | | | |
| 93 | | | | | | | | | | | | |
| 94 | | | | | | | | | | | | |
| 95 | **Pb_0-2.5** | | | | | | | | | | | |
| 96 | | | | | | | | | | | | |
| 97 | **General Statistics** | | | | | | | | | | | |
| 98 | Total Number of Observations | | | | | 43 | Number of Distinct Observations | | | | | 34 |
| 99 | | | | | | | Number of Missing Observations | | | | | 0 |
| 100 | Minimum | | | | | 7 | Mean | | | | | 101 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | | | | | Maximum | 490 | | | | | Median | 62 |
| 102 | | | | | SD | 103.5 | | | | | Std. Error of Mean | 15.79 |
| 103 | | | | | Coefficient of Variation | 1.025 | | | | | Skewness | 2.126 |
| 104 | | | | | | | | | | | | |
| 105 | **Normal GOF Test** | | | | | | | | | | | |
| 106 | | | | | Shapiro Wilk Test Statistic | 0.728 | **Shapiro Wilk GOF Test** | | | | | |
| 107 | | | | | 5% Shapiro Wilk Critical Value | 0.943 | Data Not Normal at 5% Significance Level | | | | | |
| 108 | | | | | Lilliefors Test Statistic | 0.256 | **Lilliefors GOF Test** | | | | | |
| 109 | | | | | 5% Lilliefors Critical Value | 0.135 | Data Not Normal at 5% Significance Level | | | | | |
| 110 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 111 | | | | | | | | | | | | |
| 112 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 113 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 114 | | | | | 95% Student's-t UCL | 127.6 | | | | | 95% Adjusted-CLT UCL (Chen-1995) | 132.4 |
| 115 | | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | 128.4 |
| 116 | | | | | | | | | | | | |
| 117 | **Gamma GOF Test** | | | | | | | | | | | |
| 118 | | | | | A-D Test Statistic | 1.399 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 119 | | | | | 5% A-D Critical Value | 0.768 | Data Not Gamma Distributed at 5% Significance Level | | | | | |
| 120 | | | | | K-S Test Statistic | 0.173 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 121 | | | | | 5% K-S Critical Value | 0.137 | Data Not Gamma Distributed at 5% Significance Level | | | | | |
| 122 | **Data Not Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 123 | | | | | | | | | | | | |
| 124 | **Gamma Statistics** | | | | | | | | | | | |
| 125 | | | | | k hat (MLE) | 1.443 | | | | | k star (bias corrected MLE) | 1.358 |
| 126 | | | | | Theta hat (MLE) | 70 | | | | | Theta star (bias corrected MLE) | 74.39 |
| 127 | | | | | nu hat (MLE) | 124.1 | | | | | nu star (bias corrected) | 116.8 |
| 128 | | | | | MLE Mean (bias corrected) | 101 | | | | | MLE Sd (bias corrected) | 86.68 |
| 129 | | | | | | | | | | | Approximate Chi Square Value (0.05) | 92.81 |
| 130 | | | | | Adjusted Level of Significance | 0.0444 | | | | | Adjusted Chi Square Value | 92.07 |
| 131 | | | | | | | | | | | | |
| 132 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 133 | | | | | 95% Approximate Gamma UCL (use when n>=50)) | 127.1 | | | | | 95% Adjusted Gamma UCL (use when n<50) | 128.1 |
| 134 | | | | | | | | | | | | |
| 135 | **Lognormal GOF Test** | | | | | | | | | | | |
| 136 | | | | | Shapiro Wilk Test Statistic | 0.976 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 137 | | | | | 5% Shapiro Wilk Critical Value | 0.943 | Data appear Lognormal at 5% Significance Level | | | | | |
| 138 | | | | | Lilliefors Test Statistic | 0.113 | **Lilliefors Lognormal GOF Test** | | | | | |
| 139 | | | | | 5% Lilliefors Critical Value | 0.135 | Data appear Lognormal at 5% Significance Level | | | | | |
| 140 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 141 | | | | | | | | | | | | |
| 142 | **Lognormal Statistics** | | | | | | | | | | | |
| 143 | | | | | Minimum of Logged Data | 1.946 | | | | | Mean of logged Data | 4.23 |
| 144 | | | | | Maximum of Logged Data | 6.194 | | | | | SD of logged Data | 0.872 |
| 145 | | | | | | | | | | | | |
| 146 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 147 | | | | | 95% H-UCL | 135.7 | | | | | 90% Chebyshev (MVUE) UCL | 144.3 |
| 148 | | | | | 95% Chebyshev (MVUE) UCL | 164.7 | | | | | 97.5% Chebyshev (MVUE) UCL | 193 |
| 149 | | | | | 99% Chebyshev (MVUE) UCL | 248.5 | | | | | | |
| 150 | | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 151 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 152 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 153 | | | | | | | | | | | | |
| 154 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 155 | | | | | 95% CLT UCL | 127 | | | | 95% Jackknife UCL | 127.6 | |
| 156 | | | | | 95% Standard Bootstrap UCL | 126.8 | | | | 95% Bootstrap-t UCL | 135.8 | |
| 157 | | | | | 95% Hall's Bootstrap UCL | 134 | | | | 95% Percentile Bootstrap UCL | 127.9 | |
| 158 | | | | | 95% BCA Bootstrap UCL | 131.9 | | | | | | |
| 159 | | | | | 90% Chebyshev(Mean, Sd) UCL | 148.4 | | | | 95% Chebyshev(Mean, Sd) UCL | 169.8 | |
| 160 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 199.6 | | | | 99% Chebyshev(Mean, Sd) UCL | 258.1 | |
| 161 | | | | | | | | | | | | |
| 162 | **Suggested UCL to Use** | | | | | | | | | | | |
| 163 | | | | | 95% H-UCL | 135.7 | | | | | | |
| 164 | | | | | | | | | | | | |
| 165 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 166 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 167 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 168 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 169 | | | | | | | | | | | | |
| 170 | **ProUCL computes and outputs H-statistic based UCLs for historical reasons only.** | | | | | | | | | | | |
| 171 | **H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.** | | | | | | | | | | | |
| 172 | **It is therefore recommended to avoid the use of H-statistic based 95% UCLs.** | | | | | | | | | | | |
| 173 | **Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.** | | | | | | | | | | | |
| 174 | | | | | | | | | | | | |
| 175 | **b(a)p_0-2.5** | | | | | | | | | | | |
| 176 | | | | | | | | | | | | |
| 177 | **General Statistics** | | | | | | | | | | | |
| 178 | | | | | Total Number of Observations | 7 | | | | Number of Distinct Observations | 7 | |
| 179 | | | | | Number of Detects | 5 | | | | Number of Non-Detects | 2 | |
| 180 | | | | | Number of Distinct Detects | 5 | | | | Number of Distinct Non-Detects | 2 | |
| 181 | | | | | Minimum Detect | 0.0054 | | | | Minimum Non-Detect | 0.011 | |
| 182 | | | | | Maximum Detect | 0.014 | | | | Maximum Non-Detect | 0.1 | |
| 183 | | | | | Variance Detects | 1.1932E-5 | | | | Percent Non-Detects | 28.57% | |
| 184 | | | | | Mean Detects | 0.00862 | | | | SD Detects | 0.00345 | |
| 185 | | | | | Median Detects | 0.008 | | | | CV Detects | 0.401 | |
| 186 | | | | | Skewness Detects | 1.065 | | | | Kurtosis Detects | 0.726 | |
| 187 | | | | | Mean of Logged Detects | -4.814 | | | | SD of Logged Detects | 0.383 | |
| 188 | | | | | | | | | | | | |
| 189 | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | | | | | |
| 190 | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | | | | | |
| 191 | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | | | | | |
| 192 | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | | | | | |
| 193 | | | | | | | | | | | | |
| 194 | **Normal GOF Test on Detects Only** | | | | | | | | | | | |
| 195 | | | | | Shapiro Wilk Test Statistic | 0.915 | | | | **Shapiro Wilk GOF Test** | | |
| 196 | | | | | 5% Shapiro Wilk Critical Value | 0.762 | | | | Detected Data appear Normal at 5% Significance Level | | |
| 197 | | | | | Lilliefors Test Statistic | 0.177 | | | | **Lilliefors GOF Test** | | |
| 198 | | | | | 5% Lilliefors Critical Value | 0.396 | | | | Detected Data appear Normal at 5% Significance Level | | |
| 199 | **Detected Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 200 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 201 | **Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs** | | | | | | | | | | | |
| 202 | | | | | Mean | 0.0084 | | | | Standard Error of Mean | | 0.00139 |
| 203 | | | | | SD | 0.00295 | | | | 95% KM (BCA) UCL | | 0.0106 |
| 204 | | | | | 95% KM (t) UCL | 0.0111 | | | | 95% KM (Percentile Bootstrap) UCL | | 0.0107 |
| 205 | | | | | 95% KM (z) UCL | 0.0107 | | | | 95% KM Bootstrap t UCL | | 0.0134 |
| 206 | | | | | 90% KM Chebyshev UCL | 0.0126 | | | | 95% KM Chebyshev UCL | | 0.0145 |
| 207 | | | | | 97.5% KM Chebyshev UCL | 0.0171 | | | | 99% KM Chebyshev UCL | | 0.0222 |
| 208 | | | | | | | | | | | | |
| 209 | **Gamma GOF Tests on Detected Observations Only** | | | | | | | | | | | |
| 210 | | | | | A-D Test Statistic | 0.255 | **Anderson-Darling GOF Test** | | | | | |
| 211 | | | | | 5% A-D Critical Value | 0.679 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 212 | | | | | K-S Test Statistic | 0.209 | **Kolmogrov-Smirnoff GOF** | | | | | |
| 213 | | | | | 5% K-S Critical Value | 0.358 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 214 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 215 | | | | | | | | | | | | |
| 216 | **Gamma Statistics on Detected Data Only** | | | | | | | | | | | |
| 217 | | | | | k hat (MLE) | 8.451 | | | | k star (bias corrected MLE) | | 3.514 |
| 218 | | | | | Theta hat (MLE) | 0.00102 | | | | Theta star (bias corrected MLE) | | 0.00245 |
| 219 | | | | | nu hat (MLE) | 84.51 | | | | nu star (bias corrected) | | 35.14 |
| 220 | | | | | MLE Mean (bias corrected) | 0.00862 | | | | MLE Sd (bias corrected) | | 0.0046 |
| 221 | | | | | | | | | | | | |
| 222 | **Gamma Kaplan-Meier (KM) Statistics** | | | | | | | | | | | |
| 223 | | | | | k hat (KM) | 8.114 | | | | nu hat (KM) | | 113.6 |
| 224 | | | | | Approximate Chi Square Value (113.60, α) | 90 | | | | Adjusted Chi Square Value (113.60, β) | | 83.66 |
| 225 | | | | | 95% Gamma Approximate KM-UCL (use when n>=50) | 0.0106 | | | | 95% Gamma Adjusted KM-UCL (use when n<50) | | 0.0114 |
| 226 | | | | | | | | | | | | |
| 227 | **Gamma ROS Statistics using Imputed Non-Detects** | | | | | | | | | | | |
| 228 | GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | | | | | | | |
| 229 | GROS may not be used when kstar of detected data is small such as < 0.1 | | | | | | | | | | | |
| 230 | For such situations, GROS method tends to yield inflated values of UCLs and BTVs | | | | | | | | | | | |
| 231 | For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | | | | | | | |
| 232 | | | | | Minimum | 0.0054 | | | | Mean | | 0.00901 |
| 233 | | | | | Maximum | 0.014 | | | | Median | | 0.0097 |
| 234 | | | | | SD | 0.0029 | | | | CV | | 0.322 |
| 235 | | | | | k hat (MLE) | 11.18 | | | | k star (bias corrected MLE) | | 6.484 |
| 236 | | | | | Theta hat (MLE) | 8.0628E-4 | | | | Theta star (bias corrected MLE) | | 0.00139 |
| 237 | | | | | nu hat (MLE) | 156.5 | | | | nu star (bias corrected) | | 90.77 |
| 238 | | | | | MLE Mean (bias corrected) | 0.00901 | | | | MLE Sd (bias corrected) | | 0.00354 |
| 239 | | | | | | | | | | Adjusted Level of Significance (β) | | 0.0158 |
| 240 | | | | | Approximate Chi Square Value (90.77, α) | 69.8 | | | | Adjusted Chi Square Value (90.77, β) | | 64.27 |
| 241 | | | | | 95% Gamma Approximate UCL (use when n>=50) | 0.0117 | | | | 95% Gamma Adjusted UCL (use when n<50) | | 0.0127 |
| 242 | | | | | | | | | | | | |
| 243 | **Lognormal GOF Test on Detected Observations Only** | | | | | | | | | | | |
| 244 | | | | | Shapiro Wilk Test Statistic | 0.957 | **Shapiro Wilk GOF Test** | | | | | |
| 245 | | | | | 5% Shapiro Wilk Critical Value | 0.762 | Detected Data appear Lognormal at 5% Significance Level | | | | | |
| 246 | | | | | Lilliefors Test Statistic | 0.185 | **Lilliefors GOF Test** | | | | | |
| 247 | | | | | 5% Lilliefors Critical Value | 0.396 | Detected Data appear Lognormal at 5% Significance Level | | | | | |
| 248 | **Detected Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 249 | | | | | | | | | | | | |
| 250 | **Lognormal ROS Statistics Using Imputed Non-Detects** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 251 | Mean in Original Scale | | | | | 0.0083 | Mean in Log Scale | | | | | -4.837 |
| 252 | SD in Original Scale | | | | | 0.00288 | SD in Log Scale | | | | | 0.316 |
| 253 | 95% t UCL (assumes normality of ROS data) | | | | | 0.0104 | 95% Percentile Bootstrap UCL | | | | | 0.0102 |
| 254 | 95% BCA Bootstrap UCL | | | | | 0.0106 | 95% Bootstrap t UCL | | | | | 0.0121 |
| 255 | 95% H-UCL (Log ROS) | | | | | 0.0111 | | | | | | |
| 256 | | | | | | | | | | | | |
| 257 | **UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed** | | | | | | | | | | | |
| 258 | KM Mean (logged) | | | | | -4.837 | 95% H-UCL (KM -Log) | | | | | 0.0114 |
| 259 | KM SD (logged) | | | | | 0.331 | 95% Critical H Value (KM-Log) | | | | | 2.252 |
| 260 | KM Standard Error of Mean (logged) | | | | | 0.158 | | | | | | |
| 261 | | | | | | | | | | | | |
| 262 | **DL/2 Statistics** | | | | | | | | | | | |
| 263 | **DL/2 Normal** | | | | | | **DL/2 Log-Transformed** | | | | | |
| 264 | Mean in Original Scale | | | | | 0.0141 | Mean in Log Scale | | | | | -4.61 |
| 265 | SD in Original Scale | | | | | 0.0161 | SD in Log Scale | | | | | 0.791 |
| 266 | 95% t UCL (Assumes normality) | | | | | 0.0259 | 95% H-Stat UCL | | | | | 0.0374 |
| 267 | **DL/2 is not a recommended method, provided for comparisons and historical reasons** | | | | | | | | | | | |
| 268 | | | | | | | | | | | | |
| 269 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 270 | **Detected Data appear Normal Distributed at 5% Significance Level** | | | | | | | | | | | |
| 271 | | | | | | | | | | | | |
| 272 | **Suggested UCL to Use** | | | | | | | | | | | |
| 273 | 95% KM (t) UCL | | | | | 0.0111 | 95% KM (Percentile Bootstrap) UCL | | | | | 0.0107 |
| 274 | | | | | | | | | | | | |
| 275 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 276 | Recommendations are based upon data size, data distribution, and skewness. | | | | | | | | | | | |
| 277 | These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). | | | | | | | | | | | |
| 278 | However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 279 | | | | | | | | | | | | |
| 280 | | | | | | | | | | | | |
| 281 | **As** | | | | | | | | | | | |
| 282 | | | | | | | | | | | | |
| 283 | **General Statistics** | | | | | | | | | | | |
| 284 | Total Number of Observations | | | | | 8 | Number of Distinct Observations | | | | | 7 |
| 285 | | | | | | | Number of Missing Observations | | | | | 0 |
| 286 | Minimum | | | | | 2.5 | Mean | | | | | 3.3 |
| 287 | Maximum | | | | | 3.9 | Median | | | | | 3.4 |
| 288 | SD | | | | | 0.463 | Std. Error of Mean | | | | | 0.164 |
| 289 | Coefficient of Variation | | | | | 0.14 | Skewness | | | | | -0.657 |
| 290 | | | | | | | | | | | | |
| 291 | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | | | | | |
| 292 | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | | | | | |
| 293 | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | | | | | |
| 294 | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | | | | | |
| 295 | | | | | | | | | | | | |
| 296 | **Normal GOF Test** | | | | | | | | | | | |
| 297 | Shapiro Wilk Test Statistic | | | | | 0.953 | **Shapiro Wilk GOF Test** | | | | | |
| 298 | 5% Shapiro Wilk Critical Value | | | | | 0.818 | Data appear Normal at 5% Significance Level | | | | | |
| 299 | Lilliefors Test Statistic | | | | | 0.167 | **Lilliefors GOF Test** | | | | | |
| 300 | 5% Lilliefors Critical Value | | | | | 0.313 | Data appear Normal at 5% Significance Level | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 301 | **Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 302 | | | | | | | | | | | | |
| 303 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 304 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 305 | 95% Student's-t UCL | | | | | 3.61 | 95% Adjusted-CLT UCL (Chen-1995) | | | | | 3.529 |
| 306 | | | | | | | 95% Modified-t UCL (Johnson-1978) | | | | | 3.604 |
| 307 | | | | | | | | | | | | |
| 308 | **Gamma GOF Test** | | | | | | | | | | | |
| 309 | A-D Test Statistic | | | | | 0.315 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 310 | 5% A-D Critical Value | | | | | 0.715 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 311 | K-S Test Statistic | | | | | 0.186 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 312 | 5% K-S Critical Value | | | | | 0.293 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 313 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 314 | | | | | | | | | | | | |
| 315 | **Gamma Statistics** | | | | | | | | | | | |
| 316 | k hat (MLE) | | | | | 54.54 | k star (bias corrected MLE) | | | | | 34.17 |
| 317 | Theta hat (MLE) | | | | | 0.0605 | Theta star (bias corrected MLE) | | | | | 0.0966 |
| 318 | nu hat (MLE) | | | | | 872.7 | nu star (bias corrected) | | | | | 546.8 |
| 319 | MLE Mean (bias corrected) | | | | | 3.3 | MLE Sd (bias corrected) | | | | | 0.565 |
| 320 | | | | | | | Approximate Chi Square Value (0.05) | | | | | 493.5 |
| 321 | Adjusted Level of Significance | | | | | 0.0195 | Adjusted Chi Square Value | | | | | 480.7 |
| 322 | | | | | | | | | | | | |
| 323 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 324 | 95% Approximate Gamma UCL (use when n>=50)) | | | | | 3.656 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 3.754 |
| 325 | | | | | | | | | | | | |
| 326 | **Lognormal GOF Test** | | | | | | | | | | | |
| 327 | Shapiro Wilk Test Statistic | | | | | 0.93 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 328 | 5% Shapiro Wilk Critical Value | | | | | 0.818 | Data appear Lognormal at 5% Significance Level | | | | | |
| 329 | Lilliefors Test Statistic | | | | | 0.192 | **Lilliefors Lognormal GOF Test** | | | | | |
| 330 | 5% Lilliefors Critical Value | | | | | 0.313 | Data appear Lognormal at 5% Significance Level | | | | | |
| 331 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 332 | | | | | | | | | | | | |
| 333 | **Lognormal Statistics** | | | | | | | | | | | |
| 334 | Minimum of Logged Data | | | | | 0.916 | Mean of logged Data | | | | | 1.185 |
| 335 | Maximum of Logged Data | | | | | 1.361 | SD of logged Data | | | | | 0.147 |
| 336 | | | | | | | | | | | | |
| 337 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 338 | 95% H-UCL | | | | | 3.673 | 90% Chebyshev (MVUE) UCL | | | | | 3.818 |
| 339 | 95% Chebyshev (MVUE) UCL | | | | | 4.052 | 97.5% Chebyshev (MVUE) UCL | | | | | 4.377 |
| 340 | 99% Chebyshev (MVUE) UCL | | | | | 5.015 | | | | | | |
| 341 | | | | | | | | | | | | |
| 342 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 343 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 344 | | | | | | | | | | | | |
| 345 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 346 | 95% CLT UCL | | | | | 3.569 | 95% Jackknife UCL | | | | | 3.61 |
| 347 | 95% Standard Bootstrap UCL | | | | | 3.555 | 95% Bootstrap-t UCL | | | | | 3.577 |
| 348 | 95% Hall's Bootstrap UCL | | | | | 3.527 | 95% Percentile Bootstrap UCL | | | | | 3.55 |
| 349 | 95% BCA Bootstrap UCL | | | | | 3.513 | | | | | | |
| 350 | 90% Chebyshev(Mean, Sd) UCL | | | | | 3.791 | 95% Chebyshev(Mean, Sd) UCL | | | | | 4.013 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 351 | | | | 97.5% Chebyshev(Mean, Sd) UCL | | 4.322 | | | | 99% Chebyshev(Mean, Sd) UCL | | 4.928 |
| 352 | | | | | | | | | | | | |
| 353 | | | | | | **Suggested UCL to Use** | | | | | | |
| 354 | | | | 95% Student's-t UCL | | 3.61 | | | | | | |
| 355 | | | | | | | | | | | | |
| 356 | | | | | | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | |
| 357 | | | | | | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | |
| 358 | | | | | | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | |
| 359 | | | | | | For additional insight the user may want to consult a statistician. | | | | | | |
| 360 | | | | | | | | | | | | |
| 361 | | | | | | **Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be** | | | | | | |
| 362 | | | | | | **reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.** | | | | | | |
| 363 | | | | | | | | | | | | |
| 364 | | | | | | | | | | | | |
| 365 | **Pb** | | | | | | | | | | | |
| 366 | | | | | | | | | | | | |
| 367 | | | | | | **General Statistics** | | | | | | |
| 368 | | | | Total Number of Observations | | 44 | | | | Number of Distinct Observations | | 35 |
| 369 | | | | | | | | | | Number of Missing Observations | | 0 |
| 370 | | | | Minimum | | 6.2 | | | | Mean | | 98.85 |
| 371 | | | | Maximum | | 490 | | | | Median | | 61 |
| 372 | | | | SD | | 103.3 | | | | Std. Error of Mean | | 15.57 |
| 373 | | | | Coefficient of Variation | | 1.045 | | | | Skewness | | 2.134 |
| 374 | | | | | | | | | | | | |
| 375 | | | | | | **Normal GOF Test** | | | | | | |
| 376 | | | | Shapiro Wilk Test Statistic | | 0.73 | | | | **Shapiro Wilk GOF Test** | | |
| 377 | | | | 5% Shapiro Wilk Critical Value | | 0.944 | | | | Data Not Normal at 5% Significance Level | | |
| 378 | | | | Lilliefors Test Statistic | | 0.252 | | | | **Lilliefors GOF Test** | | |
| 379 | | | | 5% Lilliefors Critical Value | | 0.134 | | | | Data Not Normal at 5% Significance Level | | |
| 380 | | | | | | **Data Not Normal at 5% Significance Level** | | | | | | |
| 381 | | | | | | | | | | | | |
| 382 | | | | | | **Assuming Normal Distribution** | | | | | | |
| 383 | | | | | | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** |
| 384 | | | | 95% Student's-t UCL | | 125 | | | | 95% Adjusted-CLT UCL (Chen-1995) | | 129.8 |
| 385 | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | | 125.9 |
| 386 | | | | | | | | | | | | |
| 387 | | | | | | **Gamma GOF Test** | | | | | | |
| 388 | | | | A-D Test Statistic | | 1.203 | | | | **Anderson-Darling Gamma GOF Test** | | |
| 389 | | | | 5% A-D Critical Value | | 0.771 | | | | Data Not Gamma Distributed at 5% Significance Level | | |
| 390 | | | | K-S Test Statistic | | 0.162 | | | | **Kolmogrov-Smirnoff Gamma GOF Test** | | |
| 391 | | | | 5% K-S Critical Value | | 0.136 | | | | Data Not Gamma Distributed at 5% Significance Level | | |
| 392 | | | | | | **Data Not Gamma Distributed at 5% Significance Level** | | | | | | |
| 393 | | | | | | | | | | | | |
| 394 | | | | | | **Gamma Statistics** | | | | | | |
| 395 | | | | k hat (MLE) | | 1.338 | | | | k star (bias corrected MLE) | | 1.262 |
| 396 | | | | Theta hat (MLE) | | 73.87 | | | | Theta star (bias corrected MLE) | | 78.32 |
| 397 | | | | nu hat (MLE) | | 117.8 | | | | nu star (bias corrected) | | 111.1 |
| 398 | | | | MLE Mean (bias corrected) | | 98.85 | | | | MLE Sd (bias corrected) | | 87.99 |
| 399 | | | | | | | | | | Approximate Chi Square Value (0.05) | | 87.73 |
| 400 | | | | Adjusted Level of Significance | | 0.0445 | | | | Adjusted Chi Square Value | | 87.03 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 401 | | | | | | | | | | | | |
| 402 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 403 | 95% Approximate Gamma UCL (use when n>=50)) | | | | | 125.1 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 126.1 |
| 404 | | | | | | | | | | | | |
| 405 | **Lognormal GOF Test** | | | | | | | | | | | |
| 406 | Shapiro Wilk Test Statistic | | | | | 0.968 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 407 | 5% Shapiro Wilk Critical Value | | | | | 0.944 | Data appear Lognormal at 5% Significance Level | | | | | |
| 408 | Lilliefors Test Statistic | | | | | 0.0992 | **Lilliefors Lognormal GOF Test** | | | | | |
| 409 | 5% Lilliefors Critical Value | | | | | 0.134 | Data appear Lognormal at 5% Significance Level | | | | | |
| 410 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 411 | | | | | | | | | | | | |
| 412 | **Lognormal Statistics** | | | | | | | | | | | |
| 413 | Minimum of Logged Data | | | | | 1.825 | Mean of logged Data | | | | | 4.175 |
| 414 | Maximum of Logged Data | | | | | 6.194 | SD of logged Data | | | | | 0.935 |
| 415 | | | | | | | | | | | | |
| 416 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 417 | 95% H-UCL | | | | | 139.8 | 90% Chebyshev (MVUE) UCL | | | | | 147.8 |
| 418 | 95% Chebyshev (MVUE) UCL | | | | | 169.8 | 97.5% Chebyshev (MVUE) UCL | | | | | 200.2 |
| 419 | 99% Chebyshev (MVUE) UCL | | | | | 260 | | | | | | |
| 420 | | | | | | | | | | | | |
| 421 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 422 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 423 | | | | | | | | | | | | |
| 424 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 425 | 95% CLT UCL | | | | | 124.5 | 95% Jackknife UCL | | | | | 125 |
| 426 | 95% Standard Bootstrap UCL | | | | | 124.5 | 95% Bootstrap-t UCL | | | | | 132.9 |
| 427 | 95% Hall's Bootstrap UCL | | | | | 132.4 | 95% Percentile Bootstrap UCL | | | | | 125.8 |
| 428 | 95% BCA Bootstrap UCL | | | | | 129.8 | | | | | | |
| 429 | 90% Chebyshev(Mean, Sd) UCL | | | | | 145.6 | 95% Chebyshev(Mean, Sd) UCL | | | | | 166.7 |
| 430 | 97.5% Chebyshev(Mean, Sd) UCL | | | | | 196.1 | 99% Chebyshev(Mean, Sd) UCL | | | | | 253.8 |
| 431 | | | | | | | | | | | | |
| 432 | **Suggested UCL to Use** | | | | | | | | | | | |
| 433 | 95% H-UCL | | | | | 139.8 | | | | | | |
| 434 | | | | | | | | | | | | |
| 435 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 436 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 437 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 438 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 439 | | | | | | | | | | | | |
| 440 | **ProUCL computes and outputs H-statistic based UCLs for historical reasons only.** | | | | | | | | | | | |
| 441 | **H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.** | | | | | | | | | | | |
| 442 | **It is therefore recommended to avoid the use of H-statistic based 95% UCLs.** | | | | | | | | | | | |
| 443 | **Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.** | | | | | | | | | | | |
| 444 | | | | | | | | | | | | |
| 445 | **b(a)p** | | | | | | | | | | | |
| 446 | | | | | | | | | | | | |
| 447 | **General Statistics** | | | | | | | | | | | |
| 448 | Total Number of Observations | | | | | 8 | Number of Distinct Observations | | | | | 8 |
| 449 | Number of Detects | | | | | 5 | Number of Non-Detects | | | | | 3 |
| 450 | Number of Distinct Detects | | | | | 5 | Number of Distinct Non-Detects | | | | | 3 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 451 | | | | | Minimum Detect | 0.0054 | | | | | Minimum Non-Detect | 0.0055 |
| 452 | | | | | Maximum Detect | 0.014 | | | | | Maximum Non-Detect | 0.1 |
| 453 | | | | | Variance Detects | 1.1932E-5 | | | | | Percent Non-Detects | 37.5% |
| 454 | | | | | Mean Detects | 0.00862 | | | | | SD Detects | 0.00345 |
| 455 | | | | | Median Detects | 0.008 | | | | | CV Detects | 0.401 |
| 456 | | | | | Skewness Detects | 1.065 | | | | | Kurtosis Detects | 0.726 |
| 457 | | | | | Mean of Logged Detects | -4.814 | | | | | SD of Logged Detects | 0.383 |
| 458 | | | | | | | | | | | | |
| 459 | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | | | | | |
| 460 | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | | | | | |
| 461 | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | | | | | |
| 462 | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | | | | | |
| 463 | | | | | | | | | | | | |
| 464 | **Normal GOF Test on Detects Only** | | | | | | | | | | | |
| 465 | | | | | Shapiro Wilk Test Statistic | 0.915 | **Shapiro Wilk GOF Test** | | | | | |
| 466 | | | | | 5% Shapiro Wilk Critical Value | 0.762 | Detected Data appear Normal at 5% Significance Level | | | | | |
| 467 | | | | | Lilliefors Test Statistic | 0.177 | **Lilliefors GOF Test** | | | | | |
| 468 | | | | | 5% Lilliefors Critical Value | 0.396 | Detected Data appear Normal at 5% Significance Level | | | | | |
| 469 | **Detected Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 470 | | | | | | | | | | | | |
| 471 | **Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs** | | | | | | | | | | | |
| 472 | | | | | Mean | 0.00791 | | | | | Standard Error of Mean | 0.00128 |
| 473 | | | | | SD | 0.00294 | | | | | 95% KM (BCA) UCL | 0.00988 |
| 474 | | | | | 95% KM (t) UCL | 0.0103 | | | | | 95% KM (Percentile Bootstrap) UCL | 0.00989 |
| 475 | | | | | 95% KM (z) UCL | 0.01 | | | | | 95% KM Bootstrap t UCL | 0.0116 |
| 476 | | | | | 90% KM Chebyshev UCL | 0.0117 | | | | | 95% KM Chebyshev UCL | 0.0135 |
| 477 | | | | | 97.5% KM Chebyshev UCL | 0.0159 | | | | | 99% KM Chebyshev UCL | 0.0206 |
| 478 | | | | | | | | | | | | |
| 479 | **Gamma GOF Tests on Detected Observations Only** | | | | | | | | | | | |
| 480 | | | | | A-D Test Statistic | 0.255 | **Anderson-Darling GOF Test** | | | | | |
| 481 | | | | | 5% A-D Critical Value | 0.679 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 482 | | | | | K-S Test Statistic | 0.209 | **Kolmogrov-Smirnoff GOF** | | | | | |
| 483 | | | | | 5% K-S Critical Value | 0.358 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 484 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 485 | | | | | | | | | | | | |
| 486 | **Gamma Statistics on Detected Data Only** | | | | | | | | | | | |
| 487 | | | | | k hat (MLE) | 8.451 | | | | | k star (bias corrected MLE) | 3.514 |
| 488 | | | | | Theta hat (MLE) | 0.00102 | | | | | Theta star (bias corrected MLE) | 0.00245 |
| 489 | | | | | nu hat (MLE) | 84.51 | | | | | nu star (bias corrected) | 35.14 |
| 490 | | | | | MLE Mean (bias corrected) | 0.00862 | | | | | MLE Sd (bias corrected) | 0.0046 |
| 491 | | | | | | | | | | | | |
| 492 | **Gamma Kaplan-Meier (KM) Statistics** | | | | | | | | | | | |
| 493 | | | | | k hat (KM) | 7.254 | | | | | nu hat (KM) | 116.1 |
| 494 | | | | | Approximate Chi Square Value (116.07, α) | 92.19 | | | | | Adjusted Chi Square Value (116.07, β) | 86.82 |
| 495 | | | | | 95% Gamma Approximate KM-UCL (use when n>=50) | 0.00996 | | | | | 95% Gamma Adjusted KM-UCL (use when n<50) | 0.0106 |
| 496 | | | | | | | | | | | | |
| 497 | **Gamma ROS Statistics using Imputed Non-Detects** | | | | | | | | | | | |
| 498 | GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs | | | | | | | | | | | |
| 499 | GROS may not be used when kstar of detected data is small such as < 0.1 | | | | | | | | | | | |
| 500 | For such situations, GROS method tends to yield inflated values of UCLs and BTVs | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 501 | For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates | | | | | | | | | | | |
| 502 | | | | | Minimum | 0.0054 | | | | Mean | | 0.00914 |
| 503 | | | | | Maximum | 0.014 | | | | Median | | 0.00985 |
| 504 | | | | | SD | 0.00271 | | | | CV | | 0.296 |
| 505 | | | | | k hat (MLE) | 12.57 | | | | k star (bias corrected MLE) | | 7.937 |
| 506 | | | | | Theta hat (MLE) | 7.2720E-4 | | | | Theta star (bias corrected MLE) | | 0.00115 |
| 507 | | | | | nu hat (MLE) | 201 | | | | nu star (bias corrected) | | 127 |
| 508 | | | | | MLE Mean (bias corrected) | 0.00914 | | | | MLE Sd (bias corrected) | | 0.00324 |
| 509 | | | | | | | | | | Adjusted Level of Significance (β) | | 0.0195 |
| 510 | | | | | Approximate Chi Square Value (126.99, α) | 102 | | | | Adjusted Chi Square Value (126.99, β) | | 96.29 |
| 511 | | | | | 95% Gamma Approximate UCL (use when n>=50) | 0.0114 | | | | 95% Gamma Adjusted UCL (use when n<50) | | 0.0121 |
| 512 | | | | | | | | | | | | |
| 513 | **Lognormal GOF Test on Detected Observations Only** | | | | | | | | | | | |
| 514 | | | | | Shapiro Wilk Test Statistic | 0.957 | **Shapiro Wilk GOF Test** | | | | | |
| 515 | | | | | 5% Shapiro Wilk Critical Value | 0.762 | Detected Data appear Lognormal at 5% Significance Level | | | | | |
| 516 | | | | | Lilliefors Test Statistic | 0.185 | **Lilliefors GOF Test** | | | | | |
| 517 | | | | | 5% Lilliefors Critical Value | 0.396 | Detected Data appear Lognormal at 5% Significance Level | | | | | |
| 518 | **Detected Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 519 | | | | | | | | | | | | |
| 520 | **Lognormal ROS Statistics Using Imputed Non-Detects** | | | | | | | | | | | |
| 521 | | | | | Mean in Original Scale | 0.00775 | | | | Mean in Log Scale | | -4.914 |
| 522 | | | | | SD in Original Scale | 0.00295 | | | | SD in Log Scale | | 0.34 |
| 523 | | | | | 95% t UCL (assumes normality of ROS data) | 0.00973 | | | | 95% Percentile Bootstrap UCL | | 0.00951 |
| 524 | | | | | 95% BCA Bootstrap UCL | 0.0098 | | | | 95% Bootstrap t UCL | | 0.0114 |
| 525 | | | | | 95% H-UCL (Log ROS) | 0.0102 | | | | | | |
| 526 | | | | | | | | | | | | |
| 527 | **UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed** | | | | | | | | | | | |
| 528 | | | | | KM Mean (logged) | -4.899 | | | | 95% H-UCL (KM -Log) | | 0.0103 |
| 529 | | | | | KM SD (logged) | 0.336 | | | | 95% Critical H Value (KM-Log) | | 2.105 |
| 530 | | | | | KM Standard Error of Mean (logged) | 0.148 | | | | | | |
| 531 | | | | | | | | | | | | |
| 532 | **DL/2 Statistics** | | | | | | | | | | | |
| 533 | **DL/2 Normal** | | | | | | **DL/2 Log-Transformed** | | | | | |
| 534 | | | | | Mean in Original Scale | 0.0127 | | | | Mean in Log Scale | | -4.771 |
| 535 | | | | | SD in Original Scale | 0.0155 | | | | SD in Log Scale | | 0.862 |
| 536 | | | | | 95% t UCL (Assumes normality) | 0.023 | | | | 95% H-Stat UCL | | 0.0337 |
| 537 | **DL/2 is not a recommended method, provided for comparisons and historical reasons** | | | | | | | | | | | |
| 538 | | | | | | | | | | | | |
| 539 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 540 | **Detected Data appear Normal Distributed at 5% Significance Level** | | | | | | | | | | | |
| 541 | | | | | | | | | | | | |
| 542 | **Suggested UCL to Use** | | | | | | | | | | | |
| 543 | | | | | 95% KM (t) UCL | 0.0103 | | | | 95% KM (Percentile Bootstrap) UCL | | 0.00989 |
| 544 | | | | | | | | | | | | |
| 545 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 546 | Recommendations are based upon data size, data distribution, and skewness. | | | | | | | | | | | |
| 547 | These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006). | | | | | | | | | | | |
| 548 | However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 549 | | | | | | | | | | | | |
| 550 | | | | | | | | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 551 | **Ba_0-3.5** | | | | | | | | | | | |
| 552 | | | | | | | | | | | | |
| 553 | **General Statistics** | | | | | | | | | | | |
| 554 | Total Number of Observations | | | | | 8 | Number of Distinct Observations | | | | | 7 |
| 555 | | | | | | | Number of Missing Observations | | | | | 0 |
| 556 | Minimum | | | | | 89 | Mean | | | | | 98.13 |
| 557 | Maximum | | | | | 120 | Median | | | | | 94.5 |
| 558 | SD | | | | | 11.23 | Std. Error of Mean | | | | | 3.971 |
| 559 | Coefficient of Variation | | | | | 0.114 | Skewness | | | | | 1.337 |
| 560 | | | | | | | | | | | | |
| 561 | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | | | | | |
| 562 | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | | | | | |
| 563 | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | | | | | |
| 564 | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | | | | | |
| 565 | | | | | | | | | | | | |
| 566 | **Normal GOF Test** | | | | | | | | | | | |
| 567 | Shapiro Wilk Test Statistic | | | | | 0.824 | **Shapiro Wilk GOF Test** | | | | | |
| 568 | 5% Shapiro Wilk Critical Value | | | | | 0.818 | Data appear Normal at 5% Significance Level | | | | | |
| 569 | Lilliefors Test Statistic | | | | | 0.254 | **Lilliefors GOF Test** | | | | | |
| 570 | 5% Lilliefors Critical Value | | | | | 0.313 | Data appear Normal at 5% Significance Level | | | | | |
| 571 | **Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 572 | | | | | | | | | | | | |
| 573 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 574 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 575 | 95% Student's-t UCL | | | | | 105.6 | 95% Adjusted-CLT UCL (Chen-1995) | | | | | 106.7 |
| 576 | | | | | | | 95% Modified-t UCL (Johnson-1978) | | | | | 106 |
| 577 | | | | | | | | | | | | |
| 578 | **Gamma GOF Test** | | | | | | | | | | | |
| 579 | A-D Test Statistic | | | | | 0.628 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 580 | 5% A-D Critical Value | | | | | 0.715 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 581 | K-S Test Statistic | | | | | 0.241 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 582 | 5% K-S Critical Value | | | | | 0.294 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 583 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 584 | | | | | | | | | | | | |
| 585 | **Gamma Statistics** | | | | | | | | | | | |
| 586 | k hat (MLE) | | | | | 93.26 | k star (bias corrected MLE) | | | | | 58.37 |
| 587 | Theta hat (MLE) | | | | | 1.052 | Theta star (bias corrected MLE) | | | | | 1.681 |
| 588 | nu hat (MLE) | | | | | 1492 | nu star (bias corrected) | | | | | 933.9 |
| 589 | MLE Mean (bias corrected) | | | | | 98.13 | MLE Sd (bias corrected) | | | | | 12.84 |
| 590 | | | | | | | Approximate Chi Square Value (0.05) | | | | | 864 |
| 591 | Adjusted Level of Significance | | | | | 0.0195 | Adjusted Chi Square Value | | | | | 846.9 |
| 592 | | | | | | | | | | | | |
| 593 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 594 | 95% Approximate Gamma UCL (use when n>=50)) | | | | | 106.1 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 108.2 |
| 595 | | | | | | | | | | | | |
| 596 | **Lognormal GOF Test** | | | | | | | | | | | |
| 597 | Shapiro Wilk Test Statistic | | | | | 0.841 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 598 | 5% Shapiro Wilk Critical Value | | | | | 0.818 | Data appear Lognormal at 5% Significance Level | | | | | |
| 599 | Lilliefors Test Statistic | | | | | 0.235 | **Lilliefors Lognormal GOF Test** | | | | | |
| 600 | 5% Lilliefors Critical Value | | | | | 0.313 | Data appear Lognormal at 5% Significance Level | | | | | |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 601 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 602 | | | | | | | | | | | | |
| 603 | **Lognormal Statistics** | | | | | | | | | | | |
| 604 | | | | | Minimum of Logged Data | 4.489 | | | | Mean of logged Data | | 4.581 |
| 605 | | | | | Maximum of Logged Data | 4.787 | | | | SD of logged Data | | 0.109 |
| 606 | | | | | | | | | | | | |
| 607 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 608 | | | | | 95% H-UCL | 106 | | | | 90% Chebyshev (MVUE) UCL | | 109.5 |
| 609 | | | | | 95% Chebyshev (MVUE) UCL | 114.6 | | | | 97.5% Chebyshev (MVUE) UCL | | 121.7 |
| 610 | | | | | 99% Chebyshev (MVUE) UCL | 135.8 | | | | | | |
| 611 | | | | | | | | | | | | |
| 612 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 613 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 614 | | | | | | | | | | | | |
| 615 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 616 | | | | | 95% CLT UCL | 104.7 | | | | 95% Jackknife UCL | | 105.6 |
| 617 | | | | | 95% Standard Bootstrap UCL | 104.2 | | | | 95% Bootstrap-t UCL | | 115.6 |
| 618 | | | | | 95% Hall's Bootstrap UCL | 143.2 | | | | 95% Percentile Bootstrap UCL | | 104.8 |
| 619 | | | | | 95% BCA Bootstrap UCL | 106.3 | | | | | | |
| 620 | | | | | 90% Chebyshev(Mean, Sd) UCL | 110 | | | | 95% Chebyshev(Mean, Sd) UCL | | 115.4 |
| 621 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 122.9 | | | | 99% Chebyshev(Mean, Sd) UCL | | 137.6 |
| 622 | | | | | | | | | | | | |
| 623 | **Suggested UCL to Use** | | | | | | | | | | | |
| 624 | | | | | 95% Student's-t UCL | 105.6 | | | | | | |
| 625 | | | | | | | | | | | | |
| 626 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 627 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 628 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 629 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 630 | | | | | | | | | | | | |
| 631 | | | | | | | | | | | | |
| 632 | **Cu_0-3.5** | | | | | | | | | | | |
| 633 | | | | | | | | | | | | |
| 634 | **General Statistics** | | | | | | | | | | | |
| 635 | | | | | Total Number of Observations | 8 | | | | Number of Distinct Observations | | 5 |
| 636 | | | | | | | | | | Number of Missing Observations | | 0 |
| 637 | | | | | Minimum | 12 | | | | Mean | | 17.25 |
| 638 | | | | | Maximum | 30 | | | | Median | | 15 |
| 639 | | | | | SD | 5.898 | | | | Std. Error of Mean | | 2.085 |
| 640 | | | | | Coefficient of Variation | 0.342 | | | | Skewness | | 1.648 |
| 641 | | | | | | | | | | | | |
| 642 | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | | | | | |
| 643 | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | | | | | |
| 644 | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | | | | | |
| 645 | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | | | | | |
| 646 | | | | | | | | | | | | |
| 647 | **Normal GOF Test** | | | | | | | | | | | |
| 648 | | | | | Shapiro Wilk Test Statistic | 0.819 | | | | **Shapiro Wilk GOF Test** | | |
| 649 | | | | | 5% Shapiro Wilk Critical Value | 0.818 | | | | Data appear Normal at 5% Significance Level | | |
| 650 | | | | | Lilliefors Test Statistic | 0.274 | | | | **Lilliefors GOF Test** | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 651 | 5% Lilliefors Critical Value | | | | | 0.313 | Data appear Normal at 5% Significance Level | | | | | |
| 652 | **Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 653 | | | | | | | | | | | | |
| 654 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 655 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 656 | 95% Student's-t UCL | | | | | 21.2 | 95% Adjusted-CLT UCL (Chen-1995) | | | | | 21.98 |
| 657 | | | | | | | 95% Modified-t UCL (Johnson-1978) | | | | | 21.4 |
| 658 | | | | | | | | | | | | |
| 659 | **Gamma GOF Test** | | | | | | | | | | | |
| 660 | A-D Test Statistic | | | | | 0.508 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 661 | 5% A-D Critical Value | | | | | 0.715 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 662 | K-S Test Statistic | | | | | 0.269 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 663 | 5% K-S Critical Value | | | | | 0.294 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 664 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 665 | | | | | | | | | | | | |
| 666 | **Gamma Statistics** | | | | | | | | | | | |
| 667 | k hat (MLE) | | | | | 11.69 | k star (bias corrected MLE) | | | | | 7.387 |
| 668 | Theta hat (MLE) | | | | | 1.476 | Theta star (bias corrected MLE) | | | | | 2.335 |
| 669 | nu hat (MLE) | | | | | 187 | nu star (bias corrected) | | | | | 118.2 |
| 670 | MLE Mean (bias corrected) | | | | | 17.25 | MLE Sd (bias corrected) | | | | | 6.347 |
| 671 | | | | | | | Approximate Chi Square Value (0.05) | | | | | 94.09 |
| 672 | Adjusted Level of Significance | | | | | 0.0195 | Adjusted Chi Square Value | | | | | 88.66 |
| 673 | | | | | | | | | | | | |
| 674 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 675 | 95% Approximate Gamma UCL (use when n>=50)) | | | | | 21.67 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 23 |
| 676 | | | | | | | | | | | | |
| 677 | **Lognormal GOF Test** | | | | | | | | | | | |
| 678 | Shapiro Wilk Test Statistic | | | | | 0.89 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 679 | 5% Shapiro Wilk Critical Value | | | | | 0.818 | Data appear Lognormal at 5% Significance Level | | | | | |
| 680 | Lilliefors Test Statistic | | | | | 0.25 | **Lilliefors Lognormal GOF Test** | | | | | |
| 681 | 5% Lilliefors Critical Value | | | | | 0.313 | Data appear Lognormal at 5% Significance Level | | | | | |
| 682 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 683 | | | | | | | | | | | | |
| 684 | **Lognormal Statistics** | | | | | | | | | | | |
| 685 | Minimum of Logged Data | | | | | 2.485 | Mean of logged Data | | | | | 2.804 |
| 686 | Maximum of Logged Data | | | | | 3.401 | SD of logged Data | | | | | 0.303 |
| 687 | | | | | | | | | | | | |
| 688 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 689 | 95% H-UCL | | | | | 21.91 | 90% Chebyshev (MVUE) UCL | | | | | 22.75 |
| 690 | 95% Chebyshev (MVUE) UCL | | | | | 25.27 | 97.5% Chebyshev (MVUE) UCL | | | | | 28.76 |
| 691 | 99% Chebyshev (MVUE) UCL | | | | | 35.62 | | | | | | |
| 692 | | | | | | | | | | | | |
| 693 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 694 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 695 | | | | | | | | | | | | |
| 696 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 697 | 95% CLT UCL | | | | | 20.68 | 95% Jackknife UCL | | | | | 21.2 |
| 698 | 95% Standard Bootstrap UCL | | | | | 20.44 | 95% Bootstrap-t UCL | | | | | 23.99 |
| 699 | 95% Hall's Bootstrap UCL | | | | | 34.85 | 95% Percentile Bootstrap UCL | | | | | 21 |
| 700 | 95% BCA Bootstrap UCL | | | | | 21.38 | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 701 | | | | 90% Chebyshev(Mean, Sd) UCL | 23.51 | | | | 95% Chebyshev(Mean, Sd) UCL | 26.34 | | |
| 702 | | | | 97.5% Chebyshev(Mean, Sd) UCL | 30.27 | | | | 99% Chebyshev(Mean, Sd) UCL | 38 | | |
| 703 | | | | | | | | | | | | |
| 704 | **Suggested UCL to Use** | | | | | | | | | | | |
| 705 | | | | 95% Student's-t UCL | 21.2 | | | | | | | |
| 706 | | | | | | | | | | | | |
| 707 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 708 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 709 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 710 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 711 | | | | | | | | | | | | |
| 712 | | | | | | | | | | | | |
| 713 | **Pb_0-3.5** | | | | | | | | | | | |
| 714 | | | | | | | | | | | | |
| 715 | **General Statistics** | | | | | | | | | | | |
| 716 | | | | Total Number of Observations | 44 | | | | Number of Distinct Observations | 35 | | |
| 717 | | | | | | | | | Number of Missing Observations | 0 | | |
| 718 | | | | Minimum | 6.2 | | | | Mean | 98.85 | | |
| 719 | | | | Maximum | 490 | | | | Median | 61 | | |
| 720 | | | | SD | 103.3 | | | | Std. Error of Mean | 15.57 | | |
| 721 | | | | Coefficient of Variation | 1.045 | | | | Skewness | 2.134 | | |
| 722 | | | | | | | | | | | | |
| 723 | **Normal GOF Test** | | | | | | | | | | | |
| 724 | | | | Shapiro Wilk Test Statistic | 0.73 | | | | **Shapiro Wilk GOF Test** | | | |
| 725 | | | | 5% Shapiro Wilk Critical Value | 0.944 | | | | Data Not Normal at 5% Significance Level | | | |
| 726 | | | | Lilliefors Test Statistic | 0.252 | | | | **Lilliefors GOF Test** | | | |
| 727 | | | | 5% Lilliefors Critical Value | 0.134 | | | | Data Not Normal at 5% Significance Level | | | |
| 728 | **Data Not Normal at 5% Significance Level** | | | | | | | | | | | |
| 729 | | | | | | | | | | | | |
| 730 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 731 | **95% Normal UCL** | | | | | | | | **95% UCLs (Adjusted for Skewness)** | | | |
| 732 | | | | 95% Student's-t UCL | 125 | | | | 95% Adjusted-CLT UCL (Chen-1995) | 129.8 | | |
| 733 | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | 125.9 | | |
| 734 | | | | | | | | | | | | |
| 735 | **Gamma GOF Test** | | | | | | | | | | | |
| 736 | | | | A-D Test Statistic | 1.203 | | | | **Anderson-Darling Gamma GOF Test** | | | |
| 737 | | | | 5% A-D Critical Value | 0.771 | | | | Data Not Gamma Distributed at 5% Significance Level | | | |
| 738 | | | | K-S Test Statistic | 0.162 | | | | **Kolmogrov-Smirnoff Gamma GOF Test** | | | |
| 739 | | | | 5% K-S Critical Value | 0.136 | | | | Data Not Gamma Distributed at 5% Significance Level | | | |
| 740 | **Data Not Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 741 | | | | | | | | | | | | |
| 742 | **Gamma Statistics** | | | | | | | | | | | |
| 743 | | | | k hat (MLE) | 1.338 | | | | k star (bias corrected MLE) | 1.262 | | |
| 744 | | | | Theta hat (MLE) | 73.87 | | | | Theta star (bias corrected MLE) | 78.32 | | |
| 745 | | | | nu hat (MLE) | 117.8 | | | | nu star (bias corrected) | 111.1 | | |
| 746 | | | | MLE Mean (bias corrected) | 98.85 | | | | MLE Sd (bias corrected) | 87.99 | | |
| 747 | | | | | | | | | Approximate Chi Square Value (0.05) | 87.73 | | |
| 748 | | | | Adjusted Level of Significance | 0.0445 | | | | Adjusted Chi Square Value | 87.03 | | |
| 749 | | | | | | | | | | | | |
| 750 | **Assuming Gamma Distribution** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 751 | 95% Approximate Gamma UCL (use when n>=50)) | | | | | 125.1 | 95% Adjusted Gamma UCL (use when n<50) | | | | | 126.1 |
| 752 | | | | | | | | | | | | |
| 753 | **Lognormal GOF Test** | | | | | | | | | | | |
| 754 | Shapiro Wilk Test Statistic | | | | | 0.968 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 755 | 5% Shapiro Wilk Critical Value | | | | | 0.944 | Data appear Lognormal at 5% Significance Level | | | | | |
| 756 | Lilliefors Test Statistic | | | | | 0.0992 | **Lilliefors Lognormal GOF Test** | | | | | |
| 757 | 5% Lilliefors Critical Value | | | | | 0.134 | Data appear Lognormal at 5% Significance Level | | | | | |
| 758 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 759 | | | | | | | | | | | | |
| 760 | **Lognormal Statistics** | | | | | | | | | | | |
| 761 | Minimum of Logged Data | | | | | 1.825 | Mean of logged Data | | | | | 4.175 |
| 762 | Maximum of Logged Data | | | | | 6.194 | SD of logged Data | | | | | 0.935 |
| 763 | | | | | | | | | | | | |
| 764 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 765 | 95% H-UCL | | | | | 139.8 | 90% Chebyshev (MVUE) UCL | | | | | 147.8 |
| 766 | 95% Chebyshev (MVUE) UCL | | | | | 169.8 | 97.5% Chebyshev (MVUE) UCL | | | | | 200.2 |
| 767 | 99% Chebyshev (MVUE) UCL | | | | | 260 | | | | | | |
| 768 | | | | | | | | | | | | |
| 769 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 770 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 771 | | | | | | | | | | | | |
| 772 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 773 | 95% CLT UCL | | | | | 124.5 | 95% Jackknife UCL | | | | | 125 |
| 774 | 95% Standard Bootstrap UCL | | | | | 123.6 | 95% Bootstrap-t UCL | | | | | 131.6 |
| 775 | 95% Hall's Bootstrap UCL | | | | | 131 | 95% Percentile Bootstrap UCL | | | | | 124.8 |
| 776 | 95% BCA Bootstrap UCL | | | | | 132.3 | | | | | | |
| 777 | 90% Chebyshev(Mean, Sd) UCL | | | | | 145.6 | 95% Chebyshev(Mean, Sd) UCL | | | | | 166.7 |
| 778 | 97.5% Chebyshev(Mean, Sd) UCL | | | | | 196.1 | 99% Chebyshev(Mean, Sd) UCL | | | | | 253.8 |
| 779 | | | | | | | | | | | | |
| 780 | **Suggested UCL to Use** | | | | | | | | | | | |
| 781 | 95% H-UCL | | | | | 139.8 | | | | | | |
| 782 | | | | | | | | | | | | |
| 783 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 784 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 785 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 786 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 787 | | | | | | | | | | | | |
| 788 | **ProUCL computes and outputs H-statistic based UCLs for historical reasons only.** | | | | | | | | | | | |
| 789 | **H-statistic often results in unstable (both high and low) values of UCL95 as shown in examples in the Technical Guide.** | | | | | | | | | | | |
| 790 | **It is therefore recommended to avoid the use of H-statistic based 95% UCLs.** | | | | | | | | | | | |
| 791 | **Use of nonparametric methods are preferred to compute UCL95 for skewed data sets which do not follow a gamma distribution.** | | | | | | | | | | | |
| 792 | | | | | | | | | | | | |
| 793 | | | | | | | | | | | | |
| 794 | **Zn_0-3.5** | | | | | | | | | | | |
| 795 | | | | | | | | | | | | |
| 796 | **General Statistics** | | | | | | | | | | | |
| 797 | Total Number of Observations | | | | | 8 | Number of Distinct Observations | | | | | 7 |
| 798 | | | | | | | Number of Missing Observations | | | | | 0 |
| 799 | Minimum | | | | | 40 | Mean | | | | | 62.5 |
| 800 | Maximum | | | | | 97 | Median | | | | | 58.5 |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 801 | | | | | SD | 18.31 | | | | Std. Error of Mean | | 6.475 |
| 802 | | | | | Coefficient of Variation | 0.293 | | | | Skewness | | 1.013 |
| 803 | | | | | | | | | | | | |
| 804 | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | | | | | |
| 805 | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | | | | | |
| 806 | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | | | | | |
| 807 | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | | | | | |
| 808 | | | | | | | | | | | | |
| 809 | **Normal GOF Test** | | | | | | | | | | | |
| 810 | | | | | Shapiro Wilk Test Statistic | 0.915 | **Shapiro Wilk GOF Test** | | | | | |
| 811 | | | | | 5% Shapiro Wilk Critical Value | 0.818 | Data appear Normal at 5% Significance Level | | | | | |
| 812 | | | | | Lilliefors Test Statistic | 0.239 | **Lilliefors GOF Test** | | | | | |
| 813 | | | | | 5% Lilliefors Critical Value | 0.313 | Data appear Normal at 5% Significance Level | | | | | |
| 814 | **Data appear Normal at 5% Significance Level** | | | | | | | | | | | |
| 815 | | | | | | | | | | | | |
| 816 | **Assuming Normal Distribution** | | | | | | | | | | | |
| 817 | **95% Normal UCL** | | | | | | **95% UCLs (Adjusted for Skewness)** | | | | | |
| 818 | | | | | 95% Student's-t UCL | 74.77 | | | | 95% Adjusted-CLT UCL (Chen-1995) | | 75.63 |
| 819 | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | | 75.15 |
| 820 | | | | | | | | | | | | |
| 821 | **Gamma GOF Test** | | | | | | | | | | | |
| 822 | | | | | A-D Test Statistic | 0.302 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 823 | | | | | 5% A-D Critical Value | 0.716 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 824 | | | | | K-S Test Statistic | 0.203 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 825 | | | | | 5% K-S Critical Value | 0.294 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 826 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 827 | | | | | | | | | | | | |
| 828 | **Gamma Statistics** | | | | | | | | | | | |
| 829 | | | | | k hat (MLE) | 14.44 | | | | k star (bias corrected MLE) | | 9.106 |
| 830 | | | | | Theta hat (MLE) | 4.329 | | | | Theta star (bias corrected MLE) | | 6.864 |
| 831 | | | | | nu hat (MLE) | 231 | | | | nu star (bias corrected) | | 145.7 |
| 832 | | | | | MLE Mean (bias corrected) | 62.5 | | | | MLE Sd (bias corrected) | | 20.71 |
| 833 | | | | | | | | | | Approximate Chi Square Value (0.05) | | 118.8 |
| 834 | | | | | Adjusted Level of Significance | 0.0195 | | | | Adjusted Chi Square Value | | 112.7 |
| 835 | | | | | | | | | | | | |
| 836 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 837 | | | | | 95% Approximate Gamma UCL (use when n>=50)) | 76.65 | | | | 95% Adjusted Gamma UCL (use when n<50) | | 80.83 |
| 838 | | | | | | | | | | | | |
| 839 | **Lognormal GOF Test** | | | | | | | | | | | |
| 840 | | | | | Shapiro Wilk Test Statistic | 0.962 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 841 | | | | | 5% Shapiro Wilk Critical Value | 0.818 | Data appear Lognormal at 5% Significance Level | | | | | |
| 842 | | | | | Lilliefors Test Statistic | 0.189 | **Lilliefors Lognormal GOF Test** | | | | | |
| 843 | | | | | 5% Lilliefors Critical Value | 0.313 | Data appear Lognormal at 5% Significance Level | | | | | |
| 844 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 845 | | | | | | | | | | | | |
| 846 | **Lognormal Statistics** | | | | | | | | | | | |
| 847 | | | | | Minimum of Logged Data | 3.689 | | | | Mean of logged Data | | 4.1 |
| 848 | | | | | Maximum of Logged Data | 4.575 | | | | SD of logged Data | | 0.279 |
| 849 | | | | | | | | | | | | |
| 850 | **Assuming Lognormal Distribution** | | | | | | | | | | | |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 851 | | | | | 95% H-UCL | 77.74 | | | | 90% Chebyshev (MVUE) UCL | | 80.98 |
| 852 | | | | | 95% Chebyshev (MVUE) UCL | 89.38 | | | | 97.5% Chebyshev (MVUE) UCL | | 101 |
| 853 | | | | | 99% Chebyshev (MVUE) UCL | 123.9 | | | | | | |
| 854 | | | | | | | | | | | | |
| 855 | | | | | **Nonparametric Distribution Free UCL Statistics** | | | | | | | |
| 856 | | | | | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | |
| 857 | | | | | | | | | | | | |
| 858 | | | | | **Nonparametric Distribution Free UCLs** | | | | | | | |
| 859 | | | | | 95% CLT UCL | 73.15 | | | | 95% Jackknife UCL | | 74.77 |
| 860 | | | | | 95% Standard Bootstrap UCL | 72.37 | | | | 95% Bootstrap-t UCL | | 83.69 |
| 861 | | | | | 95% Hall's Bootstrap UCL | 153.2 | | | | 95% Percentile Bootstrap UCL | | 72.75 |
| 862 | | | | | 95% BCA Bootstrap UCL | 73.75 | | | | | | |
| 863 | | | | | 90% Chebyshev(Mean, Sd) UCL | 81.93 | | | | 95% Chebyshev(Mean, Sd) UCL | | 90.72 |
| 864 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 102.9 | | | | 99% Chebyshev(Mean, Sd) UCL | | 126.9 |
| 865 | | | | | | | | | | | | |
| 866 | | | | | **Suggested UCL to Use** | | | | | | | |
| 867 | | | | | 95% Student's-t UCL | 74.77 | | | | | | |
| 868 | | | | | | | | | | | | |
| 869 | | | | | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | |
| 870 | | | | | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | |
| 871 | | | | | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | |
| 872 | | | | | For additional insight the user may want to consult a statistician. | | | | | | | |
| 873 | | | | | | | | | | | | |
| 874 | | | | | | | | | | | | |
| 875 | **Bapeq(0-2.5)** | | | | | | | | | | | |
| 876 | | | | | | | | | | | | |
| 877 | | | | | **General Statistics** | | | | | | | |
| 878 | | | | | Total Number of Observations | 6 | | | | Number of Distinct Observations | | 6 |
| 879 | | | | | | | | | | Number of Missing Observations | | 1 |
| 880 | | | | | Minimum | 0.00975 | | | | Mean | | 0.0151 |
| 881 | | | | | Maximum | 0.0265 | | | | Median | | 0.0132 |
| 882 | | | | | SD | 0.00593 | | | | Std. Error of Mean | | 0.00242 |
| 883 | | | | | Coefficient of Variation | 0.394 | | | | Skewness | | 1.893 |
| 884 | | | | | | | | | | | | |
| 885 | | | | | **Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use** | | | | | | | |
| 886 | | | | | **guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.** | | | | | | | |
| 887 | | | | | **For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).** | | | | | | | |
| 888 | | | | | **Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0** | | | | | | | |
| 889 | | | | | | | | | | | | |
| 890 | | | | | **Normal GOF Test** | | | | | | | |
| 891 | | | | | Shapiro Wilk Test Statistic | 0.797 | | | | **Shapiro Wilk GOF Test** | | |
| 892 | | | | | 5% Shapiro Wilk Critical Value | 0.788 | | | | Data appear Normal at 5% Significance Level | | |
| 893 | | | | | Lilliefors Test Statistic | 0.3 | | | | **Lilliefors GOF Test** | | |
| 894 | | | | | 5% Lilliefors Critical Value | 0.362 | | | | Data appear Normal at 5% Significance Level | | |
| 895 | | | | | **Data appear Normal at 5% Significance Level** | | | | | | | |
| 896 | | | | | | | | | | | | |
| 897 | | | | | **Assuming Normal Distribution** | | | | | | | |
| 898 | | | | | **95% Normal UCL** | | | | | **95% UCLs (Adjusted for Skewness)** | | |
| 899 | | | | | 95% Student's-t UCL | 0.0199 | | | | 95% Adjusted-CLT UCL (Chen-1995) | | 0.021 |
| 900 | | | | | | | | | | 95% Modified-t UCL (Johnson-1978) | | 0.0202 |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 901 | | | | | | | | | | | | |
| 902 | **Gamma GOF Test** | | | | | | | | | | | |
| 903 | | | | | A-D Test Statistic | 0.492 | **Anderson-Darling Gamma GOF Test** | | | | | |
| 904 | | | | | 5% A-D Critical Value | 0.698 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 905 | | | | | K-S Test Statistic | 0.251 | **Kolmogrov-Smirnoff Gamma GOF Test** | | | | | |
| 906 | | | | | 5% K-S Critical Value | 0.333 | Detected data appear Gamma Distributed at 5% Significance Level | | | | | |
| 907 | **Detected data appear Gamma Distributed at 5% Significance Level** | | | | | | | | | | | |
| 908 | | | | | | | | | | | | |
| 909 | **Gamma Statistics** | | | | | | | | | | | |
| 910 | | | | | k hat (MLE) | 9.613 | k star (bias corrected MLE) | 4.918 | | | | |
| 911 | | | | | Theta hat (MLE) | 0.00157 | Theta star (bias corrected MLE) | 0.00306 | | | | |
| 912 | | | | | nu hat (MLE) | 115.4 | nu star (bias corrected) | 59.01 | | | | |
| 913 | | | | | MLE Mean (bias corrected) | 0.0151 | MLE Sd (bias corrected) | 0.00679 | | | | |
| 914 | | | | | | | Approximate Chi Square Value (0.05) | 42.35 | | | | |
| 915 | | | | | Adjusted Level of Significance | 0.0122 | Adjusted Chi Square Value | 37.31 | | | | |
| 916 | | | | | | | | | | | | |
| 917 | **Assuming Gamma Distribution** | | | | | | | | | | | |
| 918 | | | | | 95% Approximate Gamma UCL (use when n>=50)) | 0.021 | 95% Adjusted Gamma UCL (use when n<50) | 0.0238 | | | | |
| 919 | | | | | | | | | | | | |
| 920 | **Lognormal GOF Test** | | | | | | | | | | | |
| 921 | | | | | Shapiro Wilk Test Statistic | 0.897 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 922 | | | | | 5% Shapiro Wilk Critical Value | 0.788 | Data appear Lognormal at 5% Significance Level | | | | | |
| 923 | | | | | Lilliefors Test Statistic | 0.234 | **Lilliefors Lognormal GOF Test** | | | | | |
| 924 | | | | | 5% Lilliefors Critical Value | 0.362 | Data appear Lognormal at 5% Significance Level | | | | | |
| 925 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 926 | | | | | | | | | | | | |
| 927 | **Lognormal Statistics** | | | | | | | | | | | |
| 928 | | | | | Minimum of Logged Data | -4.63 | Mean of logged Data | -4.249 | | | | |
| 929 | | | | | Maximum of Logged Data | -3.63 | SD of logged Data | 0.34 | | | | |
| 930 | | | | | | | | | | | | |
| 931 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 932 | | | | | 95% H-UCL | 0.0215 | 90% Chebyshev (MVUE) UCL | 0.0212 | | | | |
| 933 | | | | | 95% Chebyshev (MVUE) UCL | 0.024 | 97.5% Chebyshev (MVUE) UCL | 0.028 | | | | |
| 934 | | | | | 99% Chebyshev (MVUE) UCL | 0.0357 | | | | | | |
| 935 | | | | | | | | | | | | |
| 936 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 937 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 938 | | | | | | | | | | | | |
| 939 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 940 | | | | | 95% CLT UCL | 0.019 | 95% Jackknife UCL | 0.0199 | | | | |
| 941 | | | | | 95% Standard Bootstrap UCL | 0.0187 | 95% Bootstrap-t UCL | 0.0268 | | | | |
| 942 | | | | | 95% Hall's Bootstrap UCL | 0.0397 | 95% Percentile Bootstrap UCL | 0.0191 | | | | |
| 943 | | | | | 95% BCA Bootstrap UCL | 0.0203 | | | | | | |
| 944 | | | | | 90% Chebyshev(Mean, Sd) UCL | 0.0223 | 95% Chebyshev(Mean, Sd) UCL | 0.0256 | | | | |
| 945 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 0.0302 | 99% Chebyshev(Mean, Sd) UCL | 0.0391 | | | | |
| 946 | | | | | | | | | | | | |
| 947 | **Suggested UCL to Use** | | | | | | | | | | | |
| 948 | | | | | 95% Student's-t UCL | 0.0199 | | | | | | |
| 949 | | | | | | | | | | | | |
| 950 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |

These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. For additional insight the user may want to consult a statistician.

**Bapeq(0-6.5)**

**General Statistics**

| | | | |
|---|---|---|---|
| Total Number of Observations | 6 | Number of Distinct Observations | 6 |
| | | Number of Missing Observations | 2 |
| Minimum | 0.00975 | Mean | 0.0151 |
| Maximum | 0.0265 | Median | 0.0132 |
| SD | 0.00593 | Std. Error of Mean | 0.00242 |
| Coefficient of Variation | 0.394 | Skewness | 1.893 |

**Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest. For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012). Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0**

**Normal GOF Test**

| | | |
|---|---|---|
| Shapiro Wilk Test Statistic | 0.797 | **Shapiro Wilk GOF Test** |
| 5% Shapiro Wilk Critical Value | 0.788 | Data appear Normal at 5% Significance Level |
| Lilliefors Test Statistic | 0.3 | **Lilliefors GOF Test** |
| 5% Lilliefors Critical Value | 0.362 | Data appear Normal at 5% Significance Level |

**Data appear Normal at 5% Significance Level**

**Assuming Normal Distribution**

| **95% Normal UCL** | | **95% UCLs (Adjusted for Skewness)** | |
|---|---|---|---|
| 95% Student's-t UCL | 0.0199 | 95% Adjusted-CLT UCL (Chen-1995) | 0.021 |
| | | 95% Modified-t UCL (Johnson-1978) | 0.0202 |

**Gamma GOF Test**

| | | |
|---|---|---|
| A-D Test Statistic | 0.492 | **Anderson-Darling Gamma GOF Test** |
| 5% A-D Critical Value | 0.698 | Detected data appear Gamma Distributed at 5% Significance Level |
| K-S Test Statistic | 0.251 | **Kolmogrov-Smirnoff Gamma GOF Test** |
| 5% K-S Critical Value | 0.333 | Detected data appear Gamma Distributed at 5% Significance Level |

**Detected data appear Gamma Distributed at 5% Significance Level**

**Gamma Statistics**

| | | | |
|---|---|---|---|
| k hat (MLE) | 9.613 | k star (bias corrected MLE) | 4.918 |
| Theta hat (MLE) | 0.00157 | Theta star (bias corrected MLE) | 0.00306 |
| nu hat (MLE) | 115.4 | nu star (bias corrected) | 59.01 |
| MLE Mean (bias corrected) | 0.0151 | MLE Sd (bias corrected) | 0.00679 |
| | | Approximate Chi Square Value (0.05) | 42.35 |
| Adjusted Level of Significance | 0.0122 | Adjusted Chi Square Value | 37.31 |

**Assuming Gamma Distribution**

| | | | |
|---|---|---|---|
| 95% Approximate Gamma UCL (use when n>=50)) | 0.021 | 95% Adjusted Gamma UCL (use when n<50) | 0.0238 |

| | A | B | C | D | E | F | G | H | I | J | K | L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1001 | **Lognormal GOF Test** | | | | | | | | | | | |
| 1002 | | | | | Shapiro Wilk Test Statistic | 0.897 | **Shapiro Wilk Lognormal GOF Test** | | | | | |
| 1003 | | | | | 5% Shapiro Wilk Critical Value | 0.788 | Data appear Lognormal at 5% Significance Level | | | | | |
| 1004 | | | | | Lilliefors Test Statistic | 0.234 | **Lilliefors Lognormal GOF Test** | | | | | |
| 1005 | | | | | 5% Lilliefors Critical Value | 0.362 | Data appear Lognormal at 5% Significance Level | | | | | |
| 1006 | **Data appear Lognormal at 5% Significance Level** | | | | | | | | | | | |
| 1007 | | | | | | | | | | | | |
| 1008 | **Lognormal Statistics** | | | | | | | | | | | |
| 1009 | | | | | Minimum of Logged Data | -4.63 | Mean of logged Data | -4.249 | | | | |
| 1010 | | | | | Maximum of Logged Data | -3.63 | SD of logged Data | 0.34 | | | | |
| 1011 | | | | | | | | | | | | |
| 1012 | **Assuming Lognormal Distribution** | | | | | | | | | | | |
| 1013 | | | | | 95% H-UCL | 0.0215 | 90% Chebyshev (MVUE) UCL | 0.0212 | | | | |
| 1014 | | | | | 95% Chebyshev (MVUE) UCL | 0.024 | 97.5% Chebyshev (MVUE) UCL | 0.028 | | | | |
| 1015 | | | | | 99% Chebyshev (MVUE) UCL | 0.0357 | | | | | | |
| 1016 | | | | | | | | | | | | |
| 1017 | **Nonparametric Distribution Free UCL Statistics** | | | | | | | | | | | |
| 1018 | **Data appear to follow a Discernible Distribution at 5% Significance Level** | | | | | | | | | | | |
| 1019 | | | | | | | | | | | | |
| 1020 | **Nonparametric Distribution Free UCLs** | | | | | | | | | | | |
| 1021 | | | | | 95% CLT UCL | 0.019 | 95% Jackknife UCL | 0.0199 | | | | |
| 1022 | | | | | 95% Standard Bootstrap UCL | 0.0187 | 95% Bootstrap-t UCL | 0.0275 | | | | |
| 1023 | | | | | 95% Hall's Bootstrap UCL | 0.0398 | 95% Percentile Bootstrap UCL | 0.019 | | | | |
| 1024 | | | | | 95% BCA Bootstrap UCL | 0.0204 | | | | | | |
| 1025 | | | | | 90% Chebyshev(Mean, Sd) UCL | 0.0223 | 95% Chebyshev(Mean, Sd) UCL | 0.0256 | | | | |
| 1026 | | | | | 97.5% Chebyshev(Mean, Sd) UCL | 0.0302 | 99% Chebyshev(Mean, Sd) UCL | 0.0391 | | | | |
| 1027 | | | | | | | | | | | | |
| 1028 | **Suggested UCL to Use** | | | | | | | | | | | |
| 1029 | | | | | 95% Student's-t UCL | 0.0199 | | | | | | |
| 1030 | | | | | | | | | | | | |
| 1031 | Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL. | | | | | | | | | | | |
| 1032 | These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002) | | | | | | | | | | | |
| 1033 | and Singh and Singh (2003). However, simulations results will not cover all Real World data sets. | | | | | | | | | | | |
| 1034 | For additional insight the user may want to consult a statistician. | | | | | | | | | | | |
| 1035 | | | | | | | | | | | | |