Precision Castparts Corp.

June 18, 2014

RECEIVED

By Alameda County Environmental Health at 3:22 pm, Jun 26, 2014

Mr. Mark Determan
Alameda County Health Agency
1131 Harbor Bay Parkway, #250
Alameda, CA 94502

RE: Former Paco Pump Site, 9201 San Leandro Street, Oakland, CA RO 000320

Dear Mr. Determan:

As a follow up to our on-site meeting on April 22, 2014 concerning the former Paco Pump Site at 9201 San Leandro Street, Oakland, CA, we are enclosing a Data Gap Investigation Workplan ("Workplan") prepared by The Source Group, Inc. ("SGI"). The Workplan addresses the concerns and issues raised in the Alameda County Environmental Health Agency ("ACEHA") March 7, 2014 request for a focused conceptual Site Model and Data Gaps Investigation Workplan, and also addresses additional issues discussed during our April meeting. SGI will be coordinating with you on the proposed investigation schedule.

Please call me if you have any questions. My phone number is 971-295-2359.

I certify under penalty of law that this document and all attachments are prepared under my direction or supervision in accordance with a system designed to ensure that qualified personnel properly gathered and evaluated the information submitted. Based on my inquiry of the person or persons who managed the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

Dave Murray, as designated agent for
PCC Flow Technologies, Inc.

cc: Mr. Peter Serrurier, Stoel Rives
Mr. Mark Zeppetello, Barg Coffin Lewis & Trapp
Mr. Paul Parmentier, The Source Group

June 18, 2014

Mark E. Detterman, PG, CEG
Alameda County Environmental Health
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: **Data Gaps Investigation Work Plan**
Former Paco Pumps Site, Oakland, California

Dear Mr. Detterman:

The Source Group, Inc. (SGI), on behalf of PCC Flow Technologies, LLC (PCC), is submitting this *Data Gaps Investigation Work Plan* (Work Plan) for the former PACO Pumps facility located at 9201 San Leandro Street in Oakland, California (the Site; Figure 1). The work presented herein is in response to the Alameda County Environmental Health (ACEH) letter *Request for Focused SCM and Data Gap Investigation Work Plan*, dated March 7, 2014. The scope of this proposed investigation was further refined during a meeting between ACEH, PCC, SGI, and Stoel Rives LLC (PCC's counsel), conducted at the Site on April 22, 2014. The March 7, 2014 ACEH letter listed issues that ACEH requested to be addressed, and these issues were discussed during the on-Site meeting held on April 22, 2014. During that meeting and associated Site visit, some additional issues of potential concern were noted by ACEH. The enclosed Table 1 presents a summary of the issues listed in the March 7, 2014 ACEH letter and associated responses, and also includes issues raised during the April 22, 2014 site visit.

In response to the ACEH issues of concern, this Work Plan outlines tasks to address all issues related to subsurface contamination concerns at the Site.

WORK PLAN OBJECTIVES

The objectives of the proposed Work Plan are as follows:

- Evaluate the potential presence of polychlorinated biphenyls (PCBs) associated with elevated total extractable petroleum hydrocarbons (TEPH) in shallow soil in the alley along the western portion of the Site, particularly adjacent to monitoring wells MW-10 and MW-11.

- Install one shallow groundwater monitoring well in the southwestern corner of the Site to confirm Site-wide groundwater flow direction and delineate impacted groundwater in along the southwestern portion of the Site.
- Evaluate the presence of TEPH in shallow soil beneath an area that appeared to be stained along the western property boundary.
- Assess groundwater conditions by conducting two Site-wide groundwater monitoring and sampling events.
- Collect additional information relating to the construction of floor drains inside the eastern warehouse (Building 1 shown on Figure 2).

The tasks involved in accomplishing these objectives are presented in further detail below.

SCOPE OF WORK

The scope of work contained in this Work Plan includes the following activities:

- Pre-Field Activities;
- Shallow Soil Borings and Soil Sampling;
- Shallow Monitoring Well Installation;
- Monitoring Well Box Repair;
- Groundwater Monitoring and Sampling; and
- Data Evaluation and Reporting.

Details regarding implementation of each task are provided below.

Pre-Field Activities

Pre-field activities will include acquisition of drilling permits, marking the proposed boring locations, and obtaining clearance for underground utilities by Underground Service Alert (USA) and a private utility locator. Coordinating property access with C Trans (current property owner), and scheduling of subcontractors will be conducted as part of this task. It is assumed all field work will be completed during normal working hours.

Shallow Soil Borings and Soil Sampling

In response to ACEH concerns regarding the potential presence of PCBs in association with elevated concentrations of TEPH detected in shallow soil during the installation of monitoring wells MW-10 and MW-11, SGI plans to collect soil samples from two soil borings. The soil borings will be located adjacent to monitoring wells MW-10 and MW-11.

The two soil borings will be completed to approximately five feet below ground surface (bgs) using direct-push technology. Soil samples will be collected from approximately 1.0, 2.5, and 5.0 feet bgs. Following sample collection the borings will be backfilled to surface with cement grout.

Soil samples collected from these two borings will be submitted to TestAmerica Laboratories Inc. in Pleasanton, California for PCB analysis by USEPA Method 8082. SGI will request the laboratory to hold the soil samples from 2.5 and 5.0 feet bgs pending results from the 1.0 feet bgs samples.

Two additional soil samples will be collected from an area of soil observed along the southwestern fence line of the property that appeared to have been impacted with used motor oil. The stained soil was observed during the meeting with ACEH on April 22, 2014. The stained soil will be removed and a confirmation sample will be collected from beneath the stained area. The soil samples will be submitted to TestAmerica Laboratories Inc. in Pleasanton, California for TEPH analysis by USEPA Method 8015.

Shallow Monitoring Well Installation

One shallow groundwater monitoring well will be installed in the southwestern corner of the Site in an effort to determine Site-wide groundwater flow direction and delineate impacted groundwater in along the southwestern portion of the Site. The proposed location of the shallow groundwater monitoring is shown on Figure 2.

Prior to well installation, the concrete ground surface will be cored and a continuous soil boring will be advanced using direct-push technology. The soil boring will be advanced to a total depth of approximately 20 feet bgs. The soil core will be visually evaluated, and a description of soil core will include the following information with depth:

- Percentage of sample recovery;
- Depth to first encountered groundwater;
- Grain size classification (USCS; percentages of gravel, sand, silt, and clay);
- Color (Munsell color chart);
- Density;
- Odor; and
- Degree of moisture.

Soil samples will be screened in the field for volatile organic compounds (VOCs) using an organic vapor monitor (OVM) equipped with a photo-ionization detector (PID). Approximately 20 grams of soil from various sections of the soil core will be placed in a self-sealing plastic bag to allow VOCs that may be present in the pore spaces to volatilize. The headspace in the plastic bag then will be monitored for VOCs with the OVM. Based on field observations, select soil samples will be collected from the soil core and analyzed for TEPH by EPA Method 8015M, and for total petroleum hydrocarbons-gasoline range organics (TPH-GRO), BTEX (benzene, toluene, ethylbenzene, and xylenes), and fuel oxygenates by EPA Method 8260B. One to three soil samples will be collected for laboratory analysis by EPA Method 8260B and field preserved using Terra Core samplers, an approved sampling protocol for EPA Method 5035. Soil samples will be labeled and placed in an ice-filled cooler, and a chain-of-custody record will be initiated in the field to accompany the soil samples to the laboratory.

Following completion of the soil boring, the depth and length of the well screen will be selected based on lithology of the soil core. It is anticipated that the well screen will range from 5 to 10 feet in length. Prior to well construction, the soil boring will be over-drilled with an 8-inch-diameter hollow stem auger.

The well will be constructed using 2-inch diameter schedule 40 polyvinyl chloride (PVC). The well screen will be constructed using 2-inch diameter schedule 40 PVC with 0.020-inch slots. #2/12 Monterey sand will be placed from total depth of well screen to two feet above the well screen. Two feet of bentonite chips will be placed above the sand pack followed by neat cement grout to approximately 1-foot bgs. The well will be completed at grade with 12-inch, flush-mounted well box sealed with concrete.

Following the required curing period, the new well will be developed by surging, bailing, and pumping, to produce representative water quality samples. Development will continue until the water will be clear and generally free of sediment and water quality parameters (pH, temperature, conductivity, and turbidity) stabilize to approximately 10 percent between successive measurements. Well development field data will be documented on groundwater monitoring well development forms. Following development, the well will be surveyed to a common datum, referenced to mean sea level (msl) by a licensed surveyor.

Monitoring Well Box Repair

During the April 22, 2014 on-Site meeting with ACEH at least one well box was observed that needed repair. SGI will inventory all well boxes and arrange for necessary repairs, including complete replacement.

Groundwater Monitoring and Sampling

Following monitoring well installation and development, and monitoring well box repair, two quarterly groundwater monitoring and sampling events will be performed. Groundwater levels will be measured in all accessible groundwater monitoring wells. Groundwater levels in all wells will be gauged from the top of the well casing (TOC) using an electronic water level indicator graduated to 0.01-foot. A groundwater monitoring and sampling matrix is presented as Table 2.

Groundwater samples will be collected from 17 wells as presented on Table 2. Groundwater wells will be purged using standard three well casing purging methods with submersible pumps or disposable bailers. Water quality parameters will be measured and recorded during the groundwater purging to ensure the groundwater samples will be representative of aquifer conditions. Groundwater samples will be collected with disposable bailers and transferred directly into laboratory-supplied containers and placed on ice for transport to a California Department of Health-licensed laboratory under chain-of-custody control. All groundwater samples collected during the sampling event will be analyzed for TEPH by USEPA Method 8015M, and/or TPH-GRO and VOCs by USEPA Method 8260B. A groundwater sampling matrix is presented as Table 2.

Warehouse Construction Plans

Based on the observation of floor drain features in the eastern warehouse (Building 1) observed during the Site visit, SGI has requested as-built construction drawings to determine the function of the floor drain features. SGI has also inquired as to the historical use of the floor drain features and any information regarding why at least one of the features has been sealed with cement.

REPORTING AND PROPOSED SCHEDULE

Following completion soil sampling, well installation, and groundwater sampling events, a technical report will be submitted to ACEH documenting the findings of the Data Gaps Investigation activities and the groundwater monitoring events. The report will include a summary of the drilling and sampling activities, tabulated analytical results, laboratory analytical reports, boring logs, and SGI's conclusions and recommendations. An updated conceptual site model will also be included in the report.

The soil sampling and well installation activities are scheduled for June 26, 2014. Well box repair and the groundwater monitoring and sampling event will be conducted following the well installation activities.

We will be pleased to review this approach and discuss your comments. Please call Paisha Jorgensen at (925) 951-6380 or Paul Parmentier (562) 597-1055, with questions or comments.

The Source Group, Inc.

Paisha Jorgensen, P.G.
Senior Geologist

Paul Parmentier, P.G. 3915
Principal Hydrogeologist

REGISTERED GEOLOGIST
Paul
Parmentier
No. 3915
STATE OF CALIFORNIA

Cc: Dave Murray, Precision Castparts Corporation
Peter Surrurier, Stoel Rives LLP

Attachments:

Figure 1	Site Location Map
Figure 2	Site Plan with Proposed Soil Boring and Monitoring Well Locations
Table 1	Proposed Monitoring Well Sampling Matrix
Appendix A	Response to County Letter March 7, 2014, and to Observations of April 22, 2014 Site Inspection

FIGURES

SOURCE: 7.5 MINUTE USGS TOPOGRAPHIC MAP FROM ARCGIS MAP SERVICE

THE SOURCE GROUP, INC.
1962 FREEMAN AVE.
SIGNAL HILL, CA 90755

PROJECT NO.:	DATE:	DR.BY:	APP.BY:
04-PFT-001	10/14/2009	AC	SS

SCALE 1:24,000

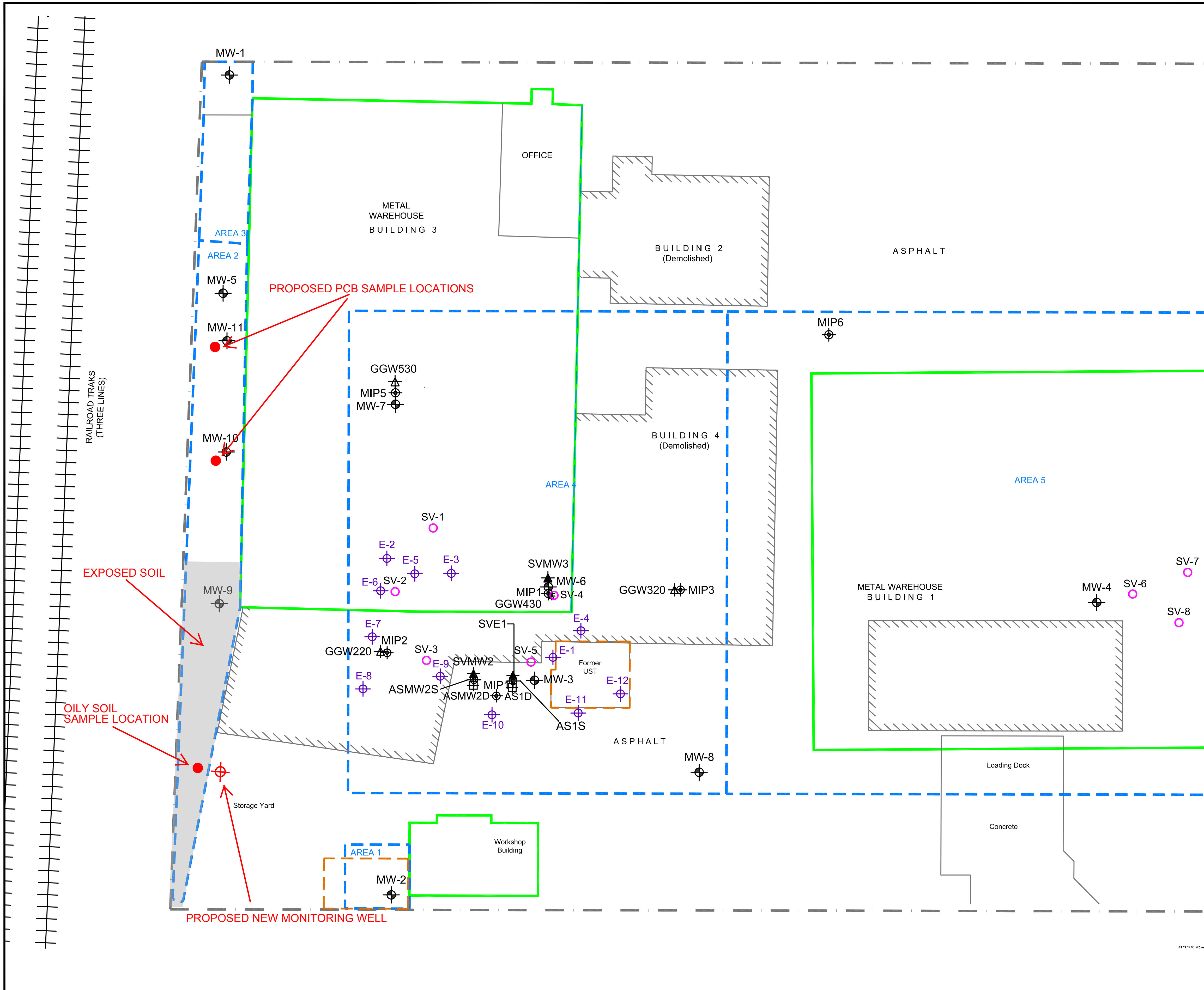
0 875 1,750 3,500 Feet

N

FORMER PACO PUMPS FACILITY
9201 SAN LEANDRO STREET
OAKLAND, CALIFORNIA

SITE LOCATION MAP

FIGURE
1



LEGEND

- Site Boundary
- Project Areas of Concern
- Area of Excavation
- Building Outline
- Former Buildings
- Railroad Tracks
- AS1D — Deep Groundwater Air Injection or Air Injection Monitoring Well by LFR January 2009
- AS1S — Shallow Groundwater Air Injection or Air Injection Monitoring Well LFR January 2009
- MW-1 — Groundwater Monitoring Well
- SV-6 — Soil Vapor Probe by SGI 2013
- E-1 — Groundwater Monitoring Well by SGI 2010
- SVMW3 — Vadose Well by LFR January 2009
- MIP1 — Membrane Interface Probe by LFR January 2009
- GGW220 — Grab Groundwater Sample Location by LFR January 2009
- Proposed Soil Sampling Location
- Proposed Monitoring Well Location

SITE PLAN WITH PROPOSED SOIL SAMPLING AND MONITORING WELL LOCATIONS

FORMER PACO PUMPS SITE
9201 SAN LEANDRO STREET
OAKLAND, CALIFORNIA

PROJECT NO.	DATE	DRAWN BY:	APP. BY:
04-PFT-004	05/07/2013	XX	XX

0 40 80
APPROXIMATE HORIZONTAL SCALE IN FEET

SGI environmental
THE SOURCE GROUP, INC.
3478 BUSKIRK AVENUE, SUITE 100
PLEASANT HILL, CA 94523

FIGURE
2

TABLE

TABLE 1
Proposed Groundwater Sampling Matrix
Former PACO Pumps
9201 San Leandro Street
Oakland, California

Well ID	Depth to Water	VOCs by 8260	TPH-GRO by 8260	TPH as diesel and motor oil by 8015B
MW-1	X			X
MW-2	X			X
MW-3	X	X	X	X
MW-4	X	X	X	X
MW-5	X			X
MW-6	X	X	X	X
MW-7	X			
MW-8	X			
MW-9	X	X	X	X
MW-10	X	X	X	X
MW-11	X	X	X	X
MW-12	X	X	X	X
E-1	X			
E-2	X			X
E-3	X	X	X	X
E-4	X			
E-5	X			
E-6	X	X	X	X
E-7	X	X	X	X
E-8	X	X	X	X
E-9	X			
E-10	X			
E-11	X			
E-12	X	X	X	X
AS-1S	X			
AS-1D	X	X	X	X
AS-MW2S	X			
AS-MW-2D	X			
Sample Total	*28*	*13*		*17*
Field Dups		1		1
QA/QC Total	*0*	*1*		*1*
Grand Total	**28**	**14**		**18**
Bottles		3 - 40ml VOA		2 - 1L glass
Preservative		HCL		none
Analysis		8260B		8015B w/SGC

Notes:
Collect duplicate from MW-3
GRO = gasoline range organics
SGC = silica gel cleanup

APPENDIX A
RESPONSE TO COUNTY LETTER MARCH 7, 2014, AND TO OBSERVATIONS OF APRIL 22, 2014 SITE INSPECTION

June 10, 2014

Mr. Mark E. Detterman, PG, CEG
Environmental Protection
Alameda County Health Care Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Subject: Data Evaluation for Arsenic in Soil
Former Paco Pumps, Inc.
9201 San Leandro Street
Oakland, California

Dear Mr. Detterman:

As discussed at the meeting on April 22, 2014 at the former Paco Pumps in Oakland California (the Site), The Source Group, Inc. (SGI) reviewed the historical arsenic data collected from soil at the Site. Based on the 1992 Site Characterization Report prepared by Jonas & Associates (Jonas, 1992), a total of 21 soil samples were collected and analyzed for arsenic. Three soil samples were collected on October 1, 1991, revealing non-detect concentrations (at a laboratory reporting limit of 0.25 milligrams per kilogram [mg/kg]) to 14 mg/kg of arsenic in the soil sampled collected from Pit 3 at 3 feet below ground surface (bgs). Subsequently, four soil samples were collected on April 9, 1992, revealing non-detect concentrations of arsenic. On April 13, 1992, 14 soil samples were collected. Of the 14 soil samples, arsenic was only detected in soil samples B20, B22, and B26 at concentrations of 3 mg/kg, 3.5 mg/kg, and 5.4 mg/kg, respectively. All soil samples collected in April 1992 were collected from 0 to 1.5 feet bgs. At a distribution of over four samples per acre, which were collected from bare soil and beneath the asphalt/concrete surface, this dataset adequately characterizes the arsenic in Site soil. The arsenic data in soil is summarized on Table 1.

Arsenic is a naturally occurring metal that is often present in Bay Area soil. Therefore, a comparison of maximum detected concentrations with background concentrations will identify if any non-site-related arsenic impacts exist at the Site. U.S. Environmental Protection Agency (USEPA, 1989), Department of Toxic Substances Control (DTSC, 2013), and California Regional Water Quality Control Board (CRWQCB, 2013) recommend that metals detected at background (ambient) levels should be eliminated as chemicals of potential concern COPCs at a site. The maximum detected arsenic concentration in soil was 14 mg/kg; however, the second highest maximum detected arsenic concentration was 5.4 mg/kg.

3478 Buskirk Avenue, Suite 100
Pleasant Hill, California 94523
Telephone: (925) 944-2856
Facsimile: (925) 944-2859

To further evaluate the arsenic data, a 95-percent upper confidence limit of the mean (95UCL) was estimated. It is unlikely that a potential receptor will spend the entire exposure duration (1 year for construction worker receptor, 25 years for commercial/industrial worker receptor, 30 years for resident receptor) residing over maximum detected concentrations in soil. Therefore, it is relevant and appropriate to statistically evaluate the soil data on an area-wide basis. Consistent with USEPA (1989) procedures, when evaluating a reasonable maximum exposure (RME) scenario the lesser of the maximum detected concentration and the 95UCL was selected as the appropriate EPC for comparison with background. The EPC represents the amount of a chemical to which a hypothetical receptor at the Site is assumed exposed. The EPC is a conservative estimate of the average chemical concentration in an environmental medium (e.g., soil). For exposure pathways involving direct contact with soil, the EPCs are estimated from measured soil concentrations. A USEPA software package, ProUCL Version 5.0.00, was used to estimate the 95UCL. The ProUCL and USEPA (2013) guidance make recommendations for estimating 95UCLs and were developed as tools to support risk assessment. The soil data used to estimate a 95UCL is summarized in Table 1. The 95UCL for arsenic in soil was 2.8 mg/kg (Table 2), which is less than the maximum detected concentration so the 95UCL was selected at the appropriate EPC.

The EPC for arsenic was compared with the CRWQCB San Francisco Bay Region arsenic background concentration of 11 mg/kg (Duverge, 2011). This value represents the upper estimate for background arsenic (99th percentile) within undifferentiated urbanized flatland soils.

Arsenic was only detected in 4 out of 21 soil samples (19-percent detection frequency). As shown in the following table, the arsenic EPC is well below the regional arsenic background concentration of 11 mg/kg.

Arsenic in Soil			
Maximum Detected Concentration	**95UCL**	**EPC**	**Regional Background Concentration**
(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
14	2.8	2.8	11

In summary, only one soil sample detected arsenic at a concentration exceeding the regional background concentration of 11 mg/kg. The remaining 20 soil samples for arsenic were either non-detect concentrations (at a laboratory reporting limit of 0.25 mg/kg) or well below the regional background concentration. As a result of further data evaluation, the 95UCL of the arsenic dataset was 2.8 mg/kg, which is well below the regional background concentration. Therefore, arsenic is not a COPC at the former Paco Pumps and does not need to be evaluated further.

Sincerely,

The Source Group, Inc.

Ivy Inouye
Senior Toxicologist

Attachments:

Table 1 Summary of Arsenic Data in Soil
Table 2 ProUCL Statistical Evaluation of Arsenic in Soil

References:

California Regional Water Quality Control Board (CRWQCB). 2013. User's Guide: Derivation and Application of Environmental Screening Levels. Interim Final. California Environmental Protection Agency (CalEPA). December.

Department of Toxic Substance Control (DTSC). 2013. Preliminary Endangerment Assessment Guidance Manual. California Environmental Protection Agency (CalEPA). October.

Duverge, Dylan Jacques. 2011. Establishing Background Arsenic in Soil of the Urbanized San Francisco Bay Region. A thesis submitted to the faculty of San Francisco State University. December.

Jonas & Associates, Inc. 1992. Site Characterization Report. Paco Pumps, Inc. October 16.

U.S. Environmental Protection Agency (USEPA). 1989. Risk Assessment Guidance for Superfund, Human Health Evaluation Manual, Part A. Interim Final. Solid Waste and Emergency Response. December.

USEPA. 2013. ProUCL Version 5.0.00 [Software, accompanied by "ProUCL User's Guide."]. Prepared for USEPA by Lockheed Martin. September.

Table 1
Summary of Arsenic Data in Soil
Former Paco Pumps
Oakland, California

Boring	Date sampled	Matrix	Sample Depth (feet)	Arsenic (mg/kg)
B6	10/01/91	Soil	0-0.5	ND<0.25
B7	10/01/91	Soil	0-0.5	ND<0.25
Pit 3	10/01/91	Soil	3	14
B11	04/09/92	Soil	0-0.5/1-1.5	ND<0.25
B12	04/09/92	Soil	0-0.5/1-1.5	ND<0.25
B13	04/09/92	Soil	0-0.5/1-1.5	ND<0.25
B14	04/09/92	Soil	0-0.5/1-1.5	ND<0.25
B8	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B9	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B10	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B16	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B17	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B18	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B19	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B20	04/13/92	Soil	0-0.5/1-1.5	3.5
B21	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B22	04/13/92	Soil	0-0.5/1-1.5	3
B23	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B24	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B25	04/13/92	Soil	0-0.5/1-1.5	ND<0.25
B26	04/13/92	Soil	0-0.5/1-1.5	5.4

Notes:
Data from 1992 Site Characterization Report by Jonas & Associates.
mg/kg = milligram per kilogram.
ND = not detected above laboratory reporting limit indicated.

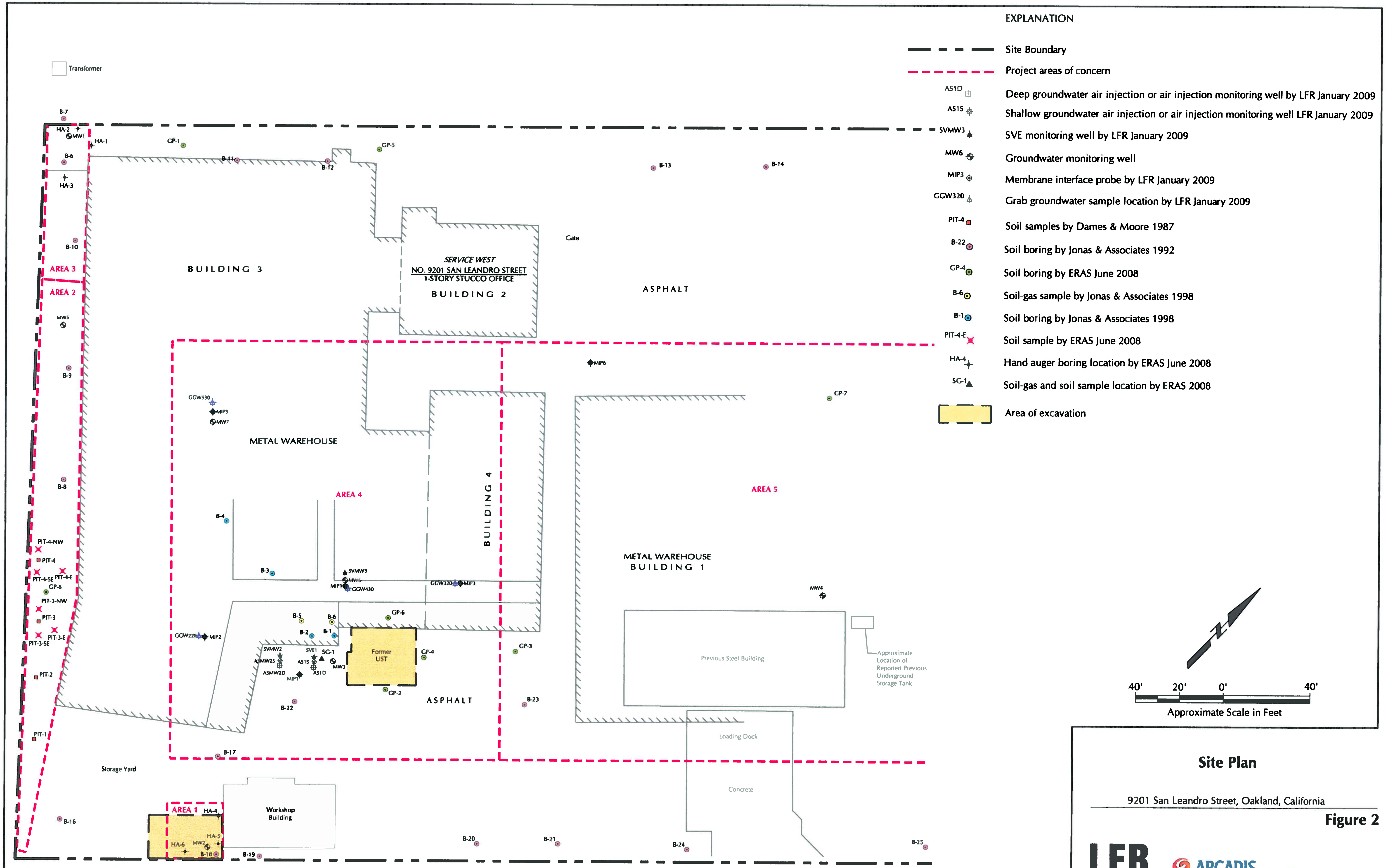
Table 2
ProUCL Statistical Evaluation of Arsenic in Soil
Former Paco Pumps
Oakland, California

General Statistics			
Total Number of Observations	21	Number of Distinct Observations	5
Number of Detects	4	Number of Non-Detects	17
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	3	Minimum Non-Detect	0.25
Maximum Detect	14	Maximum Non-Detect	0.25
Variance Detects	26.24	Percent Non-Detects	80.95%
Mean Detects	6.475	SD Detects	5.122
Median Detects	4.45	CV Detects	0.791
Skewness Detects	1.769	Kurtosis Detects	3.12
Mean of Logged Detects	1.669	SD of Logged Detects	0.693
Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.788	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.333	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.443	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			
Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
Mean	1.436	Standard Error of Mean	0.786
SD	3.118	95% KM (BCA) UCL	N/A
95% KM (t) UCL	2.791	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	2.728	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	3.793	95% KM Chebyshev UCL	4.861
97.5% KM Chebyshev UCL	6.342	99% KM Chebyshev UCL	9.253
Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	0.447	**Anderson-Darling GOF Test**	
5% A-D Critical Value	0.66	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.282	**Kolmogrov-Smirnoff GOF**	
5% K-S Critical Value	0.397	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			
Gamma Statistics on Detected Data Only			
k hat (MLE)	2.671	k star (bias corrected MLE)	0.834
Theta hat (MLE)	2.424	Theta star (bias corrected MLE)	7.76
nu hat (MLE)	21.37	nu star (bias corrected)	6.675
MLE Mean (bias corrected)	6.475	MLE Sd (bias corrected)	7.089
Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.212	nu hat (KM)	8.904
Approximate Chi Square Value (8.90, α)	3.269	Adjusted Chi Square Value (8.90, β)	3.011
95% Gamma Approximate KM-UCL (use when n>=50)	3.911	95% Gamma Adjusted KM-UCL (use when n<50)	4.245
Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			
For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	1.241
Maximum	14	Median	0.01
SD	3.271	CV	2.635
k hat (MLE)	0.203	k star (bias corrected MLE)	0.205
Theta hat (MLE)	6.129	Theta star (bias corrected MLE)	6.045
nu hat (MLE)	8.507	nu star (bias corrected)	8.625
MLE Mean (bias corrected)	1.241	MLE Sd (bias corrected)	2.74
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (8.62, α)	3.102	Adjusted Chi Square Value (8.62, β)	2.852
95% Gamma Approximate UCL (use when n>=50)	3.452	95% Gamma Adjusted UCL (use when n<50)	N/A
Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.889	**Shapiro Wilk GOF Test**	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.24	**Lilliefors GOF Test**	
5% Lilliefors Critical Value	0.443	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Table 2
ProUCL Statistical Evaluation of Arsenic in Soil
Former Paco Pumps
Oakland, California

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	1.512	Mean in Log Scale	-1.179
SD in Original Scale	3.185	SD in Log Scale	1.948
95% t UCL (assumes normality of ROS data)	2.711	95% Percentile Bootstrap UCL	2.727
95% BCA Bootstrap UCL	3.385	95% Bootstrap t UCL	4.815
95% H-UCL (Log ROS)	11.99		
UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed			
KM Mean (logged)	-0.804	95% H-UCL (KM -Log)	2.103
KM SD (logged)	1.228	95% Critical H Value (KM-Log)	2.89
KM Standard Error of Mean (logged)	0.309		
DL/2 Statistics			
DL/2 Normal		**DL/2 Log-Transformed**	
Mean in Original Scale	1.335	Mean in Log Scale	-1.365
SD in Original Scale	3.235	SD in Log Scale	1.532
95% t UCL (Assumes normality)	2.552	95% H-Stat UCL	2.612
DL/2 is not a recommended method, provided for comparisons and historical reasons			
Nonparametric Distribution Free UCL Statistics			
Detected Data appear Normal Distributed at 5% Significance Level			
Suggested UCL to Use			
95% KM (t) UCL	**2.791**	95% KM (Percentile Bootstrap) UCL	N/A

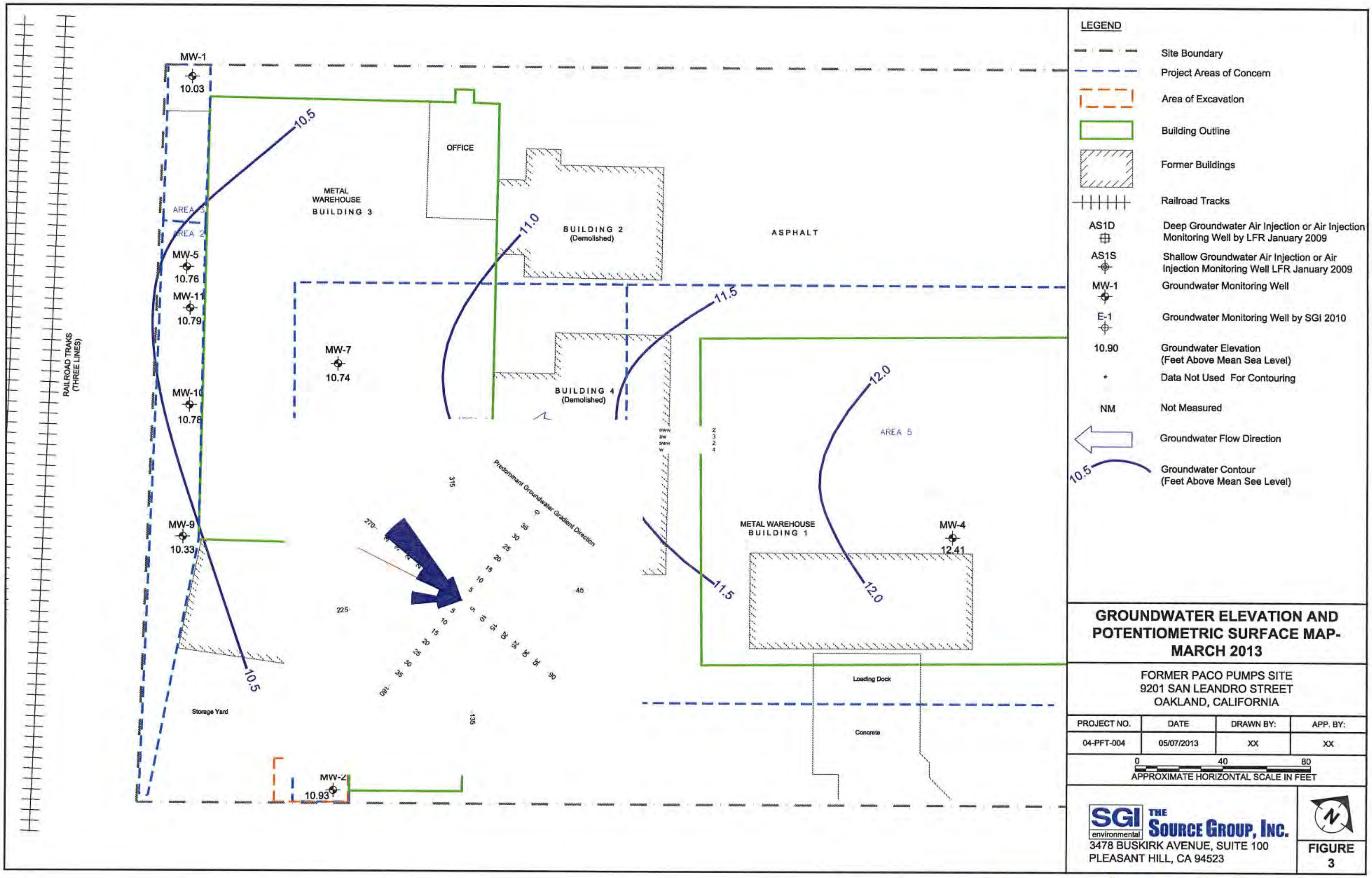
ATTACHMENT 2



I:\Design\001\09679\San Leandro Street PER SURVEY 2009.dwg May 06,2009-2:58pm

Source: LFR, 2009

ATTACHMENT 3



GROUNDWATER GRADIENT ROSE DIAGRAM (11 AVAILABLE DATA)