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August 23, 2017

Ms. Karel Detterman, P.G.
Hazardous Materials Specialist
Alameda County Environmental Health
1131 Harbor Bay Parkway
Alameda, California 94502
karel.detterman@acgov.org

RE: Preliminary Report –Subsurface Investigation , Properties at 760 22nd Street and 2201 Brush Street, Oakland, California 94612

Dear Ms. Detterman:

Please find attached for your review the following document:

Preliminary Report, Properties at 760 22nd Street and 2201 Brush Street, Oakland, California 94612 (ACEH Document No. **RO3153_SWI_SCM_R_2017-08-22**

I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge.

Please call me at (510) 287-5353 ext. 339 if you have any questions.

Sincerely;

Everett Cleveland Jr.
Senior Project Manager
East Bay Asian Local Development Corporation
1825 San Pablo Avenue, Suite 200
Oakland, CA 94612

Attachment

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August 22, 2017

Mr. Everett Cleveland
Senior Project Manager
East Bay Asian Local Development Corporation
1825 San Pablo Avenue, Suite 200
Oakland, California 94612

RE: Report, Ground Water and Soil-Vapor Investigation, Properties at 760 22nd Street and 2201 Brush Street, Oakland, California 94612.
Fuel Leak Case No. RO0003153
GeoTracker Global ID T10000006348

1.0 INTRODUCTION

East Bay Asian Local Development Corporation (EBALDC) has requested that Essel Environmental Consulting (Essel) perform further subsurface environmental investigation at the properties located at 760 22nd Street and 2201 Brush Street in Oakland, California (Plate 1). In a June 6, 2017 electronic mail to EBALDC, Alameda County Department of Environmental Health (ACDEH) requested a work plan proposing additional sampling of the ground water to evaluate whether the recent 2016-2017 rainy season had affected ground-water level and ground-water quality in three areas of petroleum-hydrocarbon impact at the site. In addition, the ACDEH requested that EBALDC assess methane in soil gas at locations where secondary source material has been identified. To meet this request, Essel submitted a work plan, dated June 27, 2017 proposing sampling and analysis of ground water from three borings advanced in the areas of petroleum hydrocarbon impact and installation of one soil vapor probe to assess potential methane concentration near the west-central edge of the site (geophysical anomaly area). After review of the work plan, ACDEH requested an increased scope of work to include installing three additional soil vapor probes in the geophysical anomaly area and sampling all four vapor probes for analysis for methane and naphthalene. These items and a request for a well survey are included in the ACDEH letter dated July 17, 2017. This report presents the results of the investigation.

1.1 Site Description and Background

At present, the northern and larger parcel at 760 22nd Street is occupied by a metal frame/metal siding shop building, contains two mobile trailers and several parked buses, and is paved with concrete. A below grade pit, historically used for servicing large vehicles (trucks and buses) and referred to as the oil-changing pit, is located in the northern portion of the shop building. The smaller south-adjacent and abutting parcel at 2201 Brush Street is unpaved and also used to park buses. A 7,000-gallon diesel underground storage tank (UST) and a 2,000-gallon gasoline UST formerly were located at and next to (off-site, beneath the city sidewalk) the northeastern corner of the site, respectively. A small, raised concrete pedestal located at the east-central edge of the property is the location of a former fuel dispenser. During geophysical utility-locating work in September 2015, an area of unusually low-density soil and a nearby standpipe indicative of a UST vent pipe were identified at the west-central edge of the site. This area is referred to as the geophysical anomaly area. Plate 2 is a Site Plan that presents the locations of the above-described features.

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In 2015 and 2016, Essel conducted three subsurface investigations at the site and off-site to the west to evaluate impacts to soil, soil vapor, and ground water related to the former USTs, former fueling facilities, former vehicle maintenance operations, and the geophysical anomaly. The subsurface investigations identified notable petroleum-hydrocarbon impact to soil and ground water in the areas of the former USTs and geophysical anomaly and moderate petroleum-hydrocarbon impact to soil and ground water at the location of the former fuel dispenser. Minor concentrations of other contaminants of potential concern (COPC) were detected in the soil and ground water at the three locations. Sampling and analysis of soil vapor were performed in the former UST and dispenser island areas. Several COPC were detected in soil vapor; however, a focused human health risk assessment performed to evaluate vapor intrusion risk in the area of the former USTs found insignificant carcinogenic and non-carcinogenic health risk from intrusion of contaminant vapors into a future residential building. Concentrations of methane detected in soil vapor samples were well below the action level of 5,000 parts per million.

During the September 2015 subsurface investigation, average depth to ground water in temporary wells installed at the site was approximately 14¼ feet below the ground surface. In February and June 2016, ground water was measured at approximately 13 feet below the ground surface. The notable 2015/2016 rainy season resulted in a rise in the ground water level of approximately 1¼ feet.

2.0 FIELD AND LABORATORY WORK

2.1 Permit, Utility Clearance, and Health and Safety

Essel submitted a permit application to advance the borings to the Alameda County Public Works Agency (ACPWA). A copy of the Water Resources Well Permit is included in Appendix A. Essel notified Underground Services Alert of Northern California and Nevada a minimum of 72 hours before the date of planned drilling. Because boring locations were adjacent to earlier borings Essel advanced at the site, the new locations had been previously cleared of underground utilities by a utility subcontractor. The existing site-specific Health and Safety Plan was updated before conducting fieldwork and was available at the site during field activities. Essel and subcontractor personnel were apprised of potential on-site hazards during a field orientation meeting that was conducted before field work began.

2.2 Ground-Water Investigation

Three soil borings were advanced at the following locations, shown on Plate 2, to assess water level and water quality.

- Boring ECB-23 was advanced in the center of the geophysical anomaly area and next to boring ECB-15. The highest concentrations of total petroleum hydrocarbons in ground water in the geophysical anomaly area were detected at the location of boring ECB-15.
- Boring ECB-24 was advanced next to the location of boring ECB-3 where the highest concentrations of total petroleum hydrocarbons were detected in ground water in the former UST area.
- Boring ECB-25 was advanced next to boring ECB-5 at the location of the former fuel dispenser.

Essel subcontracted with PeneCore Drilling (PeneCore) of Woodland, California (C-57 license number 906899) to advance borings on July 28, 2017. PeneCore used a Geoprobe 6610DT, track-mounted, direct-push drill rig to advance borings ECB-23 through ECB-25 to a depth of 20 feet below the ground surface.

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Temporary wells, consisting of ¾-inch-diameter polyvinyl chloride pipe, were placed in the three boreholes to sample the ground water. Before sampling, the depth to ground water was measured through the casings using an electronic water-level indicator. Water samples were collected using ¼-inch-diameter polyethylene tubing, which was fitted with a bottom check valve, was inserted into the PVC casings, and rapidly moved up and down to move water up the tubing. The water samples were placed into 40-milliliter clear glass vials containing hydrochloric acid as a preservative and 1-liter amber bottles that did not contain a preserving solution. Water sample containers were filled completely to eliminate air bubbles. The sample containers were sealed with Teflon-lined caps, labeled, and placed on ice in a closed cooler. Essel completed a Chain-of-Custody form for the water samples and this form accompanied the samples to the laboratory. A copy of this form is included in Appendix B.

After drilling and sampling, the three boreholes were backfilled with neat cement slurry from the total depth of the borings to the ground surface. A representative of the ACPWA was present to witness backfilling of the boreholes. No soil cuttings or waste water were generated during the field work.

2.3 Soil Vapor Investigation

In the work plan, Essel proposed to install a soil vapor probe next to the location of ECB-15 to evaluate the concentration of methane and the fixed gases (nitrogen, oxygen, and carbon dioxide) in the geophysical anomaly area. In the July 17, 2017 directive letter and a subsequent electronic mail, the ACDEH requested that three additional soil vapor probes be installed in the geophysical anomaly area and that all four soil vapor probes be sampled and tested for naphthalene, methane, and the fixed gases.

The borings for soil vapor probes SV-8, SV-9, SV-10, and SV-11 were advanced to respective depths of 7½, 7½, 7½, and 9½ feet below the ground surface, corresponding to depths approximately 5 feet below the foundation of the future building and in the unsaturated zone as close as possible to the maximum petroleum hydrocarbon and naphthalene detections. Vapor probes SV-8 and SV-9 were installed adjacent to the location of previous boring ECB-16 and mid-way between ECB-16 and the location of previous boring ECB-11, respectively. These locations are along the western property line. Vapor probes ECB-10 and ECB-11 were installed at locations near previous boring ECB-15. Plate 3 shows the locations of the four soil vapor probes.

The vapor probes consist of a stainless-steel filter screen inserted into ¼-inch-diameter Teflon tubing. The filter screens for vapor probes SV-8, SV-9, SV-10, and SV-11 were placed at respective depths of approximately 6½, 7, 7, and 9 feet below the ground surface with the tubing extending above the ground surface. A minimum of 6 inches of clean sand (#3 Monterey) was placed below and above the filter screens, followed by approximately 1 foot of dry granular bentonite, and 1-foot-thick lifts of granular bentonite, each of which was hydrated with clean water to provide a seal above the sand and filter screen and around the tubing. The top end of the tubing was capped with a valve to prevent atmospheric air from entering the probe hole. The vapor probes were completed with 6-inch-diameter well boxes, which were set in concrete.

Essel collected vapor samples from SV-8 through SV-11 on August 2, 2017. Vapor probes were each purged of approximately 1 volume of air (300 to 900 milliliters [ml]) using a syringe. Vapor samples for analysis for naphthalene were then collected using TO-17 VI tubes. Approximately 60 ml of vapor were evacuated through each tube after which the tubes were sealed, labeled, wrapped in aluminum foil, and placed on ice in a closed cooler.

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Vapor samples for analysis for methane and the fixed gases were collected in 1-liter Summa canisters, each connected to a manifold assembly containing vacuum gauges, a flow controller, and moisture filter. Each Summa canister was evacuated to a negative pressure (i.e. vacuum) of approximately 30 inches of mercury. Essel performed shut-in tests (approximately 1 minute in length) of the sampling canister and connecting manifold assemblies to check for potential leaks in the system. A shroud (box) was placed over the sampling assemblies and a tracer gas (isopropyl alcohol) was introduced into the shroud as a leak check during sampling. Soil-vapor samples were collected at a controlled flow rate of approximately 167 milliliters per minute. At the completion of sampling, the valves on the sampling canisters were closed, the manifold assemblies disconnected, and the canisters were packaged in boxes. Essel prepared Chain-of-Custody forms for the TO-17 VI tubes and the 1-liter Summa canisters and these forms accompanied the samples to the laboratory. Copies of these forms are included in Appendix C.

Essel returned to the site on August 14 to re-sample vapor probes SV-9, SV-10, and SV-11. Shut-in tests were performed on each sampling assembly for a minimum period of 2 minutes and no drop in vacuum was observed at each assembly. Sampling was performed using the shroud and tracer gas as described above.

2.4 Laboratory Testing

Ground-water samples from borings ECB-23 through ECB-25 were delivered to McCampbell Analytical, Inc. (McCampbell [Laboratory Certificate No. 1644]) in Pittsburg, California for analysis. McCampbell analyzed the samples for total petroleum hydrocarbons as gasoline (TPHg) using United States Environmental Protection Agency (USEPA) Method 8015Bm; total petroleum hydrocarbons as diesel (TPHd) and as motor oil (TPHmo) using USEPA Method 8015B; volatile organic compounds (VOCs) using USEPA Method 8260B; and polynuclear aromatic hydrocarbons (PAHs) using USEPA Method 8270C-Selective Ion Monitoring (SIM).

Soil-vapor samples collected on August 2, 2017 from vapor probes SV-8 through SV-11 were delivered to Eurofins-Air Toxics, Inc. laboratory in Folsom, California for analysis. The laboratory analyzed the vapor samples for naphthalene using USEPA Method TO-17; and for methane, oxygen, nitrogen, and carbon dioxide using American Society for Testing & Materials Method D-1946. Soil-vapor samples collected on August 15, 2017 from vapor probes SV-9, SV-10, and SV-11 were delivered to Eurofins-Air Toxics for analysis for methane and the fixed gases using ASTM D-1946 and for isopropyl alcohol (2-propanol) using USEPA Method TO-15.

3.0 RESULTS OF INVESTIGATION

3.1 Ground Water

Depth to ground water was measured through the temporary casings placed in borings ECB-23 through ECB-25. Ground water was measured at respective depths of 13.45, 13.75, and 13.6 feet below the ground surface in the three boreholes.

3.2 Laboratory Analytical Results for Ground Water

Laboratory analytical results for ground-water samples show the same compounds detected in the former UST and dispenser island areas and the geophysical anomaly area as detected during previous investigations,

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with some fluctuations in detected concentrations. As expected, relatively elevated concentrations of TPHg (350 to 1,200 micrograms per liter [µg/L]), TPHd (710 to 6,600 µg/L), and TPHmo (1,700 to 15,000 µg/L) were detected in water samples from borings ECB-23, ECB-24, and ECB-25. The concentrations detected are comparable to levels previously detected in adjacent borings ECB-15, ECB-3, and ECB-5. Increases in the concentrations of TPHg were noted in samples ECB-23 and ECB-25 relative to TPHg in adjacent borings ECB-15 and ECB-5, which were sampled in February 2016 and September 2015, respectively. Notable declines in the concentrations of TPHg, TPHd, and TPHmo were noted in the water sample from boring ECB-24 relative to the water sample from adjacent boring ECB-3, collected in September 2015.

Notably lower concentrations (relative to the total petroleum hydrocarbon levels) of individual organic compounds were detected in the recent ground-water samples, consistent with the concentrations found during previous investigations. Trace (less than 1.0 µg/L) to low (less than 5.0 µg/L) concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX) were detected in the geophysical anomaly area (boring ECB-23). No BTEX was found in the water samples from the former UST (boring ECB-24) and fuel dispenser (boring ECB-25) areas, also consistent with previous results. Naphthalene was previously detected in ground water in the geophysical anomaly area at a maximum concentration of 89 µg/L (boring ECB-16). Concentrations of 16 (VOC analysis) and 7.5 (PAH analysis) µg/L naphthalene were detected in boring ECB-23. Naphthalene was detected at concentrations of 2.6 and 0.78-µg/L in water samples from borings ECB-24 and ECB-25. Other VOCs and PAHs were detected at concentrations ranging from 0.51- to 33 µg/L. None of the compounds detected in the ground water samples were at concentrations greater than applicable environmental screening levels for vapor intrusion risk. Table 1 presents the results of analyses of water samples from borings ECB-23, ECB-24, and ECB-25 and, for comparison, the previous results from borings ECB-15, ECB-3, and ECB-5, respectively. Appendix B contains a copy of the laboratory analytical report.

3.3 Laboratory Analytical Results for Soil Vapor

Samples from vapor probes SV-8 through SV-11 were analyzed for naphthalene using USEPA Method TO-17. Naphthalene was not detected in any of the four samples at a laboratory-reporting limit of 17 micrograms per cubic meter (µg/m^3). The applicable residential vapor intrusion environmental screening level for naphthalene is 41 µg/m^3.

The results of laboratory analyses for methane show concentrations ranging from 2.2 parts per million vapor (ppmv) in vapor probe SV-9 to 1,600 ppmv in vapor probe SV-8. No methane was detected in the second vapor sample collected from SV-9 on August 15, 2017. The detected concentrations are less than the 5,000-ppm action level for methane. In SV-8 (August 2, 2017 sampling), oxygen and nitrogen were detected at concentrations of 11 and 88 percent, respectively and carbon dioxide was detected at 0.77 percent. In SV-9 (August 15, 2017 sampling), oxygen, nitrogen, and carbon dioxide were detected at 6.8, 89, and 4.4 percent, respectively. Respective concentrations of oxygen and nitrogen were 20 and 80 percent and concentrations of carbon dioxide varied from 0.049- to 0.13-percent in the sample collected from vapor probe SV-9 on August 2, 2017, and in samples collected from vapor probes SV-10 and SV-11 on both August 2, and 15, 2017. Relatively high concentrations of the tracer gas 2-propanol were detected in samples collected from SV-10 and SV-11. Table 2 presents the laboratory analytical results for naphthalene, methane and the fixed gases, and 2-propanol in the soil vapor samples. Copies of the laboratory analytical reports for the soil vapor samples are included in Appendix C.

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3.4 Well Information

As indicated in the remedial action plan (Essel, 2016) prepared for this site, Essel submitted requests in 2015 to both the California Department of Water Resources (DWR) and the Alameda County Public Works Agency to identify nearby sensitive receptor water-supply wells. Alameda County Public Works Agency responded in a timely manner and that agency's records showed that the closest water-supply wells are located more than 2,000 feet to the north of the site. A figure with a Google Earth photograph depicting the site, a 2,000-foot radius circle, and the off-site water-supply wells was presented to ACDEH in December 2015. Essel subsequently (January 2016) received a compact disk from DWR with records of water supply and other wells in Sections 26, 27, and 35, Township 1 South, Range 4 West (Mount Diablo Base and Meridian). The DWR records also indicated that no water-supply wells were located within 1,500 feet of the 760 22nd Street/2201 Brush Street property.

3.5 Conceptual Site Model

The recent ground water and soil-vapor data do not change the elements of the conceptual site model related to geology, ground water, and the magnitude and extent of COPC impact to soil and ground water. The table in Appendix D has been slightly revised to incorporate the results of the new soil-vapor data.

3.6 Risk Assessment

Essel subcontracted with The Source Group, Inc. to evaluate the laboratory analytical data for ground-water samples recently collected from borings ECB-23, ECB-24, and ECB-25 as well as historical analytical data for water samples collected from respective adjacent borings ECB-15, ECB-3, and ECB-5. The evaluation was performed to assess vapor intrusion health risk to a future residential receptor in a ground surface residence. The Source Group, Inc. performed the risk assessment using methodology contained in applicable California Department of Toxic Substances Control guidance.

The results of the risk evaluation, based on the highest concentrations of COPC detected in ground-water samples, show a total hazard index (i.e., sum of all hazard quotients) of 0.1 and a cumulative excess cancer risk of 1.0 X 10^{-7}. Both results of the assessment are below accepted regulatory thresholds and The Source Group, Inc. concludes that COPC in ground water beneath the Site do not pose a vapor intrusion human health risk to future on-site residents. Details of the methods used, input parameters, and the results of the risk assessment are presented in The Source Group, Inc.'s August 22, 2017 report, which is included in Appendix E.

4.0 FINDINGS AND CONCLUSIONS

4.1 Findings

Essel advanced three borings to sample and analyze ground water for site contaminants of concern and installed four soil vapor probes to sample and analyze soil vapor for naphthalene, methane, and the fixed gases oxygen, nitrogen, and carbon dioxide. Following is a summary of the findings of this latest phase of subsurface environmental investigation.

- Borings ECB-23 through ECB-25 were advanced to a depth of 20 feet below the ground surface at locations where the highest concentrations of petroleum hydrocarbons were previously detected in

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the geophysical anomaly area, the former UST area, and the former fuel dispenser area. Depth to ground water was measured in the borings at 13.45 to 13.75 feet below the ground surface.

- Relatively elevated concentrations of total petroleum hydrocarbons as gasoline, as diesel, and as motor oil were found in the ground water at the three borings. Compared to previous analyses, somewhat higher concentrations of TPHg were detected at the geophysical anomaly and fuel dispenser locations and lower concentrations of TPHg, TPHd, and TPHmo were found in the former UST area. Concentrations of VOCs and PAHs were relatively low (consistent with previous results), ranging from 0.51-µg/L to 33 µg/L. The compounds detected were the same as those detected during previous investigations and none were at concentrations equal to or greater than corresponding environmental screening levels for vapor intrusion health risk.

- The borings for soil vapor probes SV-8, SV-9, SV-10, and SV-11 were advanced to depths of 7½, 7½, 7½, and 9½ feet below the ground surface in the geophysical anomaly area and the vapor filter tips were set in sand at 6½, 7, 7, and 9 feet below the ground surface. Vapor probes SV-8 and SV-9 were installed near the western property line (near and between borings ECB-16 and ECB-11) and vapor probes SV-10 and SV-11 were installed near boring ECB-15 at the geophysical anomaly. The four vapor probes were sampled on August 2, 2017 and vapor probes SV-9, SV-10, and SV-11 were sampled again on August 15, 2017.

- Vapor samples were collected (August 2, 2017) and analyzed for naphthalene using USEPA Method TO-17 and no naphthalene was detected in the four samples.

- Vapor samples were also analyzed for methane, oxygen, nitrogen, and carbon dioxide. The vapor sample from SV-8 (collected August 2, 2017) contained 1,600 ppmv methane, 11 percent oxygen, 88 percent nitrogen, and 0.77 percent carbon dioxide and the vapor sample from SV-9 (collected August 15, 2017) contained 6.8, 89, and 4.4 percent oxygen, nitrogen, and carbon dioxide, respectively. Methane was detected at 2.2 ppmv in SV-9 on August 2 and was not detected in SV-9 on August 15. The samples from vapor probes SV-10 and SV-11 contained low concentrations of methane, uniform concentrations of oxygen (20 percent) and nitrogen (80 percent), and low levels of carbon dioxide in samples collected on August 2 and 15, 2017.

- The results of a human health risk assessment of the maximum concentrations of COPC in ground water beneath the site show a hazard index of 0.1 and a cumulative excess cancer risk of 1.0×10^{-7} for the ground water to indoor air vapor intrusion pathway.

4.2 Conclusion

Based on the findings of this subsurface investigation, Essel concludes the following.

- The types and concentrations of organic compounds detected in the three ground-water samples are consistent with the results of previous investigations and present no increase in risk to human health or the environment than was concluded during earlier investigations.

- Laboratory analytical results indicate that naphthalene does not appear to be of concern for vapor intrusion risk in the geophysical anomaly area.

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- The methane and fixed gases data from vapor well SV-8 (August 2, 2017) and SV-9 (August 15) likely represent subsurface vapor conditions at and nearby these vapor probe locations. The proximity of vapor probe SV-8 to the locations of SV-10 and SV-11 also suggest data from SV-8 are representative of the geophysical anomaly area. Furthermore, the data from vapor probes SV-8 and SV-9 indicate that naphthalene is not a vapor intrusion risk and methane is not an explosive hazard at the site or at the west-adjacent residential property.

- Contaminants of potential concern in ground water beneath the Site do not pose a vapor intrusion human health risk to future on-site residents.

Limitations to this investigation are included in Appendix F.

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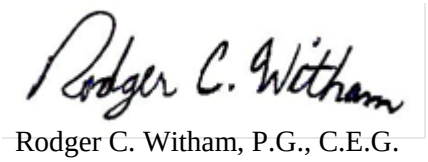
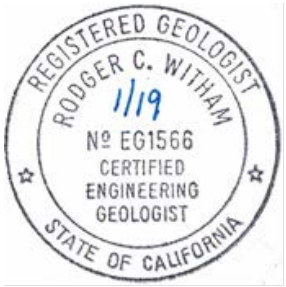




Rodger C. Witham, P.G., C.E.G.
Senior Geologist

Nik Lahiri
Principal

Reference:

Essel Environmental Consulting, 2016, *Remedial Action Plan, properties at 760 22nd Street and 2201 Brush Street, Oakland, California 94612*, Project No. 15166, October 10, 2016.

Table 1 Comparison of Organic Compound Concentrations in Ground-Water Samples
Table 2 Methane, Fixed Gases, and Naphthalene Concentrations in Soil-Vapor Samples, Geophysical Anomaly Area

Plate 1 – Site Vicinity Map
Plate 2 - Site Plan and Boring Locations
Plate 3 – Soil Vapor Probe Locations, Geophysical Anomaly Area

Appendix A – Drilling Permit
Appendix B – Chain-of-Custody Form and Laboratory Analytical Report for Ground-Water Samples
Appendix C – Chain-of-Custody Forms and Laboratory Analytical Reports for Soil Vapor Samples
Appendix D – Site Conceptual Model
Appendix E – Focused Human Health Risk Assessment
Appendix F – Limitations

TABLE 1
Comparison of Organic Compound Concentrations in Ground-Water Samples
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

Boring	ECB-23	ECB-15	ECB-24	ECB-3	ECB-25	ECB-5	Tier I
Sample Number	W-ECB23	W-ECB15	W-ECB24	W-ECB3	W-ECB25	W-ECB5	Vapor Intrusion
Date Sampled	7/28/17	2/16/16	7/28/17	9/24/15	7/28/17	9/25/15	ESL*
Analyte							
Petroleum Hydrocarbons							
TPH-gas	**480**	**120**	**350**	**710**	**1,200**	**430**	**No Value**
TPH-diesel	**3,100**	**3,400**	**6,600**	**24,000**	**710**	**100**	**No Value**
TPH-motor oil	**15,000**	**24,000**	**1,700**	**7,300**	<500	<250	**No Value**
VOCs							
Benzene	<0.50	**0.54**	<0.50	<0.50	<1.0	<0.50	**30**
Toluene	**3.0**	**1.3**	<0.50	<0.50	<1.0	<0.50	**10,000**
Ethylbenzene	**0.58**	<0.50	<0.50	<0.50	<1.0	<0.50	**370**
Xylenes	**5.1**	**4.6**	<0.50	<0.50	<1.0	**0.56**	**38,000**
Methyl tertiary butyl ether	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**15,000**
tert-Butyl alcohol	<2.0	<2.0	<2.0	<2.0	<4.0	<2.0	**No Value**
Naphthalene	**16**	**6.1**	<0.50	<0.50	<1.0	<0.50	**180**
Acetone	**15**	<10	<10	**18**	<20	**12**	**140,000,000**
Bromomethane	**0.99**	<0.50	<0.50	<0.50	<1.0	<0.50	**6,500**
2-Butanone (MEK)	**3.3**	<2.0	<2.0	<2.0	<4.0	**3.6**	**22,000,000**
n-Butyl benzene	**4.3**	**1.1**	**0.67**	**0.91**	**11**	**0.92**	**NA**
sec-Butyl benzene	**3.6**	**0.63**	**1.1**	**1.4**	**6.2**	**1.4**	**NA**
tert-Butyl benzene	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**NA**
2-Hexanone	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**NA**
Isopropylbenzene	**5.8**	**0.95**	<0.50	<0.50	**8.7**	**1.1**	**NA**
4-Isopropyl toluene	**4.1**	**1.9**	<0.50	<0.50	<1.0	<0.50	**NA**
4-Methyl-2-pentanone (MIBK)	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**11,000,000**
n-Propyl benzene	**6.6**	**1.3**	<0.50	**0.67**	**27**	**1.3**	**NA**
1,2,4-Trimethylbenzene	**33**	**19**	<0.50	<0.50	<1.0	**0.62**	**NA**
1,3,5-Trimethylbenzene	**4.0**	**2.2**	<0.50	<0.50	<1.0	<0.50	**NA**
cis -1,2-Dichloroethene	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**15,000**
Vinyl chloride	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**2.0**
PAHs							
Acenaphthene	<0.50	<5.0	**4.9**	**1.9**	<0.50	<0.50	**No Value**
Anthracene	<0.50	<5.0	**1.1**	<0.50	<0.50	<0.50	**No Value**
1-Methylnaphthalene	**5.1**	**15**	<0.50	<0.50	**9.3**	<0.50	**NA**
2-Methylnaphthalene	**2.7**	**19**	<0.50	<0.50	<0.50	<0.50	**No Value**
Naphthalene	**7.5**	**36**	**2.6**	<0.50	**0.78**	<0.50	**180**
Phenanthrene	**0.71**	<5.0	**10**	**3.3**	**0.51**	<0.50	**No Value**

Results and screening levels are in micrograms per liter = parts per billion.
Detectable concentrations are in boldface type.
TPH = total petroleum hydrocarbons
VOCs = volatile organic compounds
PAHs - polynuclear aromatic hydrocarbons
ESL = Environmental Screening Level
* Groundwater Vapor Intrusion Human Health Risk Levels (Table GW-3), Deep Groundwater, Residential, Fine to Coarse Scenario.
< = less than the laboratory reporting limit shown.
No Value = compound listed in ESL table, but no value indicated
NA = not available, compound not listed in ESL table
Environmental screening levels for vapor intrusion risk are taken from San Francisco Bay Regional Water Quality Control Board Environmental Screening Levels, February 2016, Revision 3.

TABLE 2
Methane, Fixed Gases, and Naphthalene Concentrations in Soil-Vapor Samples
Geophysical Anomaly Area
Properties at 760 22nd Street and 2201 Brush Street, Oakland, California

Soil Probe	SV-8	SV-9		SV-10		SV-11		SFBRWQCB Screening Level	DTSC Action Level
Date	08/02/17	08/02/17	08/15/17	08/02/17	08/15/17	08/02/17	08/15/17		
Sample Number	SV-8	SV-9	SV-9	SV-10	SV-10	SV-11	SV-11		
Depth of Sample (feet)	7.50	7.50		7.50		9.50		Residential	Residential
Analyte									
Naphthalene	<17	<17	--	<17	--	<17	--	41	
Methane (percent)	**0.16**	**0.00022**	<0.00021	**0.00090**	**0.0099**	**0.010**	**0.0092**	--	--
Methane (ppmv)	**1,600**	**2.2**	<2.1	**9.0**	**99**	**100**	**92**	--	5,000
Oxygen (percent)	**11**	**20**	**6.8**	**20**	**20**	**20**	**20**	--	--
Nitrogen (percent)	**88**	**80**	**89**	**80**	**80**	**80**	**80**	--	--
Carbon Dioxide (percent)	**0.77**	**0.049**	**4.4**	**0.050**	**0.15**	**0.13**	**0.22**	--	--
2-propanol (isopropyl alcohol)	**710**	--	**26**	--	**33,000**	--	**50,000**	--	--

Results for volatile organic compounds and screening levels are in micrograms per cubic meter.

Action level for methane is in parts per million vapor.

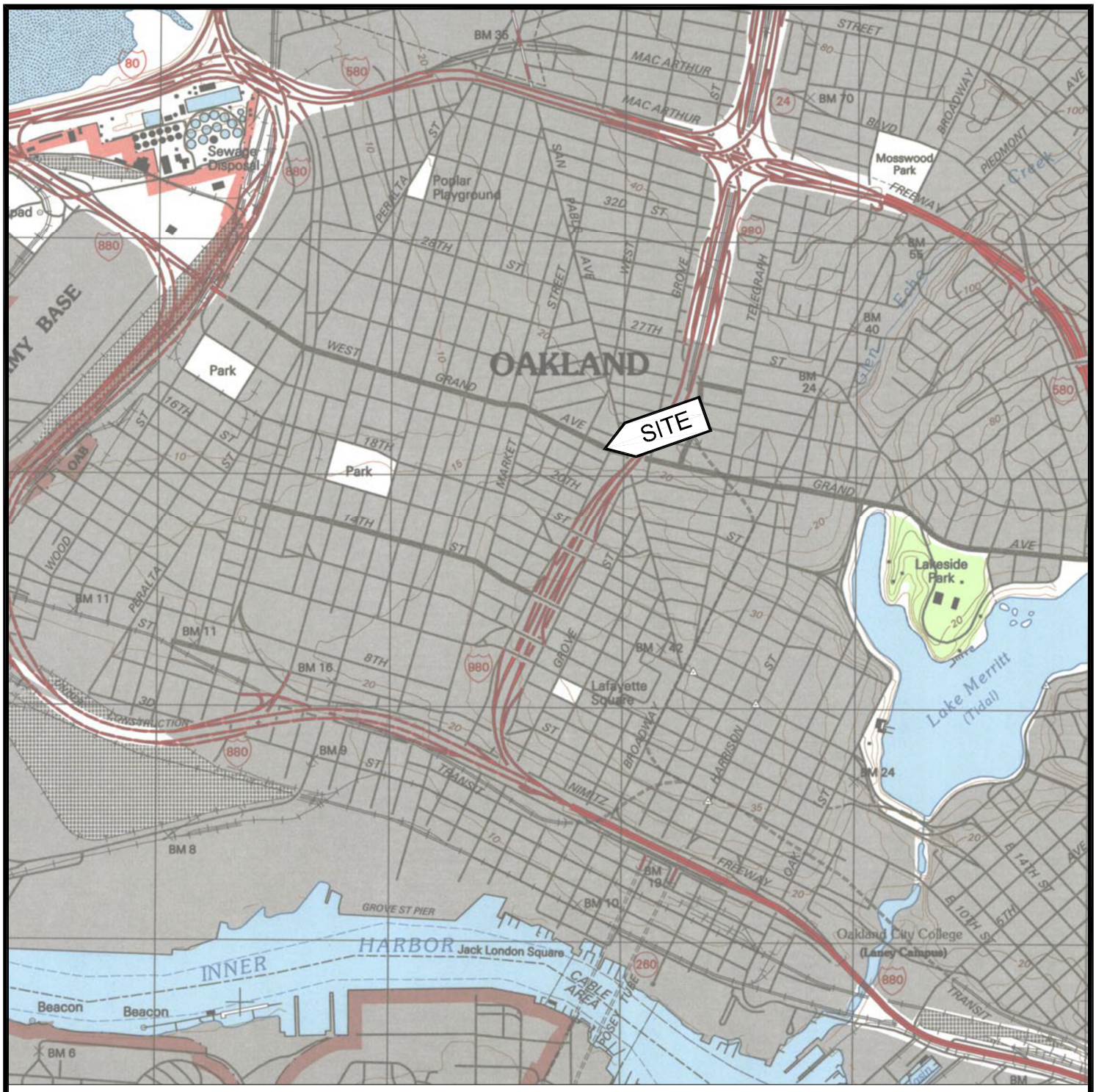
Detectable concentrations are in boldface type.

< = less than the laboratory reporting limit shown.

-- = not analyzed.

SFBRWQCB = San Francisco Bay Regional Water Quality Control Board

DTSC = California Department of Toxic Substances Control



Scale: 0 2000 feet 4000 feet

Source: USGS 7 1/2–Minute Quadrangle, Oakland West, California 1993

N

PROJECT NO.	DRAWN BY	REPORT DATE		PLATE
15166	EC	August 2017	Site Vicinity Map 760 22nd Street and 2201 Brush Street Oakland, California	1

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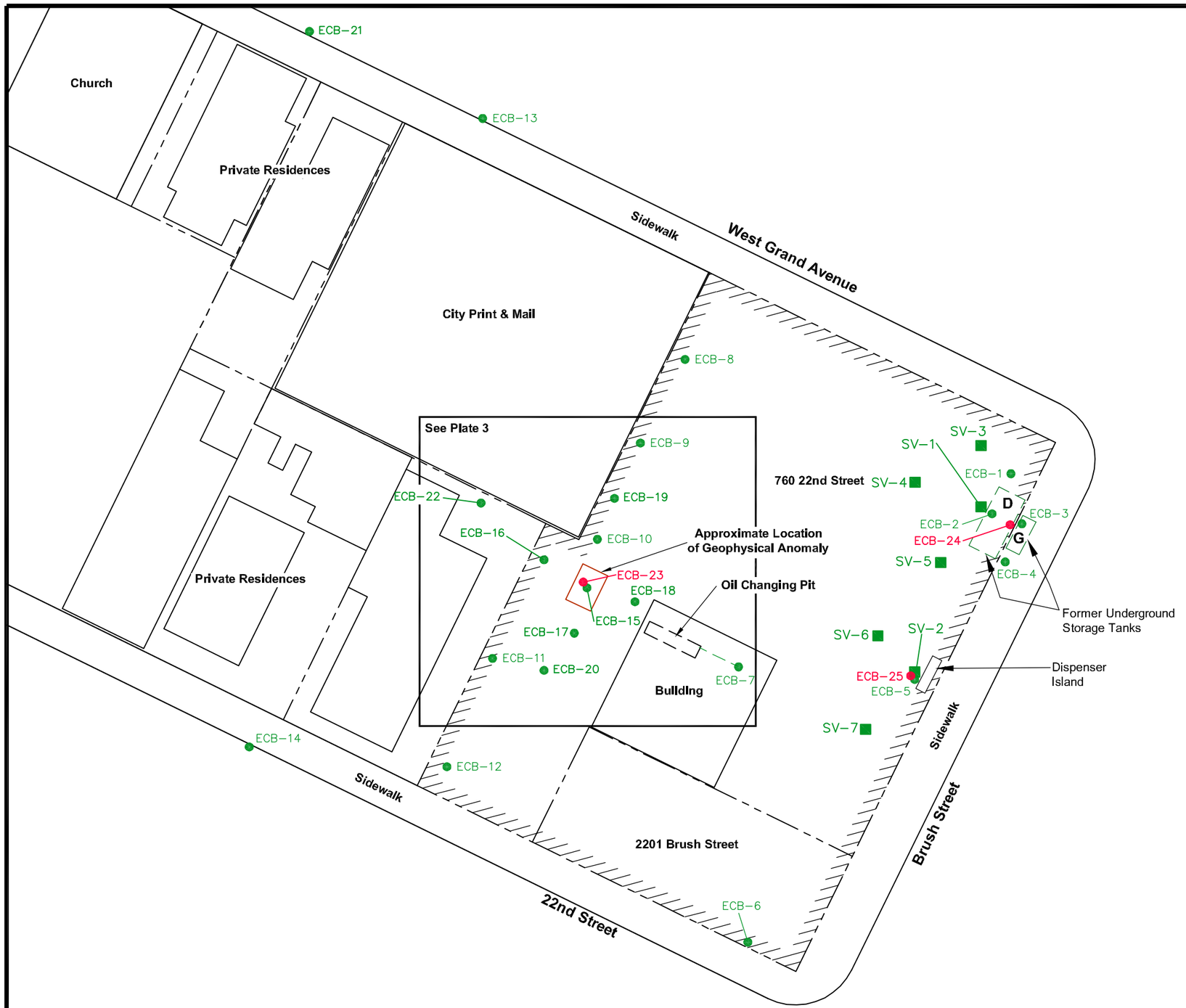
San Francisco, California 94104
1–800–595–7616



EXPLANATION

- SITE BOUNDARY
- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (ESSEL 2015, 2016)
- SOIL BORING LOCATION (ESSEL 2017)
- SOIL VAPOR WELL LOCATION (ESSEL 2015, 2016)
- D DIESEL
- G GASOLINE

NOTE: UNDERGROUND STORAGE TANK LOCATIONS FROM HAGEMAN–SCHANK, INC. (1987)

N

Approximate Scale

0 30 60

feet

PROJECT NO.	DRAWN BY	REPORT DATE		PLATE
15166	EC	August 2017	Site Plan and Boring Locations	2

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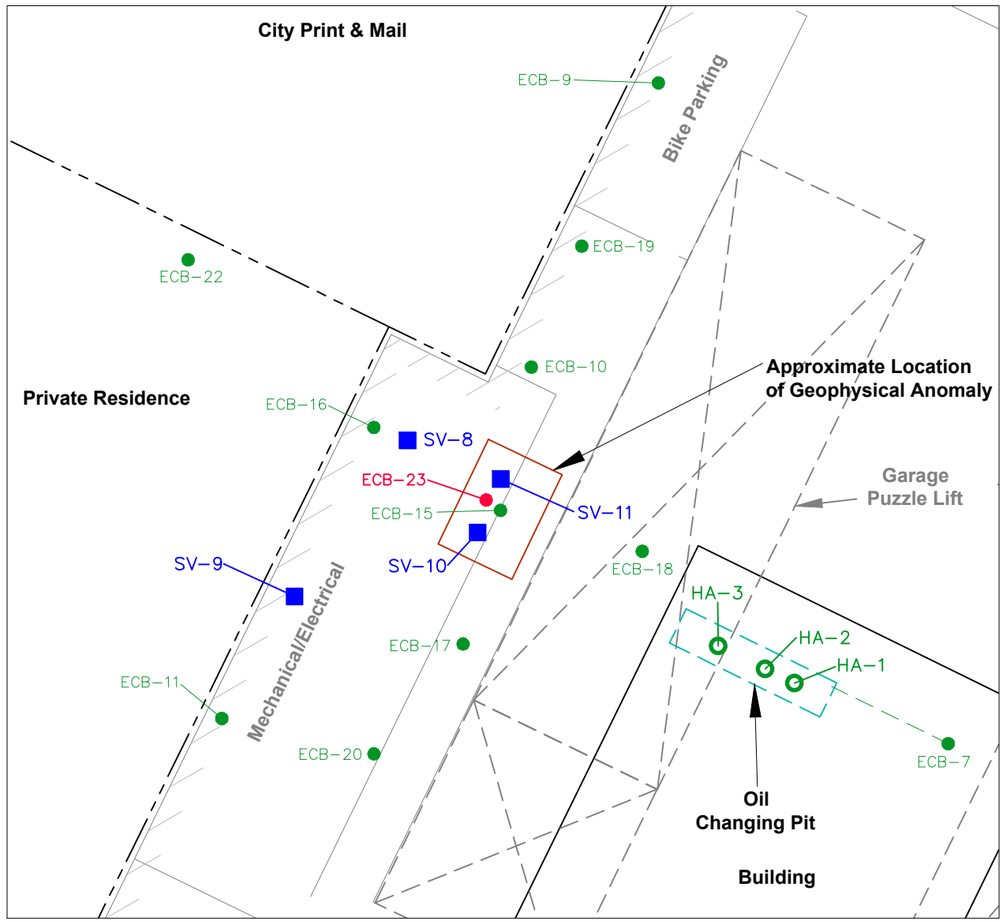
San Francisco, California 94104
1–800–595–7616

760 22nd Street and
2201 Brush Street
Oakland, California



EXPLANATION

- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (ESSEL 2015, 2016)
- SOIL BORING LOCATION (ESSEL 2017)
- SOIL VAPOR PROBE LOCATION (ESSEL, 2017)
- HAND AUGER LOCATION (ESSEL, 2016)

NOTE: FUTURE BUILDING FEATURES ARE IN HALF TONE

N

Approximate Scale
0 14 28
feet

PROJECT NO.	DRAWN BY	REPORT DATE
15166	EC	August 2017

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San Francisco, California 94104
1–800–595–7616

Soil Vapor Probe Locations
Geophysical Anomaly Area
760 22nd Street and
2201 Brush Street
Oakland, California

PLATE 3

APPENDIX A

DRILLING PERMIT

Alameda County Public Works Agency - Water Resources Well Permit

Public Works Agency
Alameda County

399 Elmhurst Street
Hayward, CA 94544-1395
Telephone: (510)670-6633 Fax:(510)782-1939

Application Approved on: 07/21/2017 By jamesy

Permit Numbers: W2017-0603
Permits Valid from 07/28/2017 to 07/28/2017

Application Id:	1500332965630	**City of Project Site:**	Oakland
Site Location:	760 22nd Street		
Project Start Date:	07/28/2017	**Completion Date:**	07/28/2017
Assigned Inspector:	Contact Eneyew Amberber at (510) 670-5759 or eneyew@acpwa.org		
Applicant:	Essel Environmental Consulting - Rodger Witham 44448 Martingale Court, Fremont, CA 94539	**Phone:**	510-366-8054
Property Owner:	E. B.A.L.D.C. 1825 San Pablo Avenue, Suite 200, Oakland, CA 94612	**Phone:**	510-287-5383
Client:	E. B.A.L.D.C. 1825 San Pablo Avenue, Suite 200, Oakland, CA 94612	**Phone:**	510-287-5383
Contact:	Rodger Witham	**Phone:** **Cell:**	510-366-8054 510-366-8054

	Total Due:	$265.00
Receipt Number: WR2017-0346	**Total Amount Paid:**	$265.00
Payer Name : Rodger C. Witham	Paid By: VISA	**PAID IN FULL**

Works Requesting Permits:

Borehole(s) for Investigation-Environmental/Monitorinig Study - 4 Boreholes
Driller: Penecore Drilling - Lic #: 9006899 - Method: DP **Work Total: $265.00**

Specifications

Permit Number	Issued Dt	Expire Dt	# Boreholes	Hole Diam	Max Depth
W2017-0603	07/21/2017	10/26/2017	4	2.50 in.	20.00 ft

Specific Work Permit Conditions

1. Backfill bore hole by tremie with cement grout or cement grout/sand mixture. Upper two-three feet replaced in kind or with compacted cuttings. All cuttings remaining or unused shall be containerized and hauled off site. The containers shall be clearly labeled to the ownership of the container and labeled hazardous or non-hazardous.

2. Boreholes shall not be left open for a period of more than 24 hours. All boreholes left open more than 24 hours will need approval from Alameda County Public Works Agency, Water Resources Section. All boreholes shall be backfilled according to permit destruction requirements and all concrete material and asphalt material shall be to Caltrans Spec or County/City Codes. No borehole(s) shall be left in a manner to act as a conduit at any time.

3. Permittee shall assume entire responsibility for all activities and uses under this permit and shall indemnify, defend and save the Alameda County Public Works Agency, its officers, agents, and employees free and harmless from any and all expense, cost, liability in connection with or resulting from the exercise of this Permit including, but not limited to, properly damage, personal injury and wrongful death.

4. Applicant shall contact assigned inspector listed on the top of the permit at least five (5) working days prior to starting, once the permit has been approved. Confirm the scheduled date(s) at least 24 hours prior to drilling.

5. Copy of approved drilling permit must be on site at all times. Failure to present or show proof of the approved permit application on site shall result in a fine of $500.00.

6. Electronic Reporting Regulations (Chapter 30, Division 3 of Title 23 & Division 3 of Title 27, CCR) require electronic submission of any report or data required by a regulatory agency from a cleanup site. Submission dates are set by a Regional Water Board or by a regulatory agency. Once a report/data is successfully uploaded, as required, you have met the reporting requirement (i.e. the compliance measure for electronic submittals is the actual upload itself). The upload date should be on or prior to the regulatory due date.

7. NOTE:
Under California laws, the owner/operator are responsible for reporting the contamination to the governmental regulatory agencies under Section 25295(a). The owner/operator is liable for civil penalties under Section 25299(a)(4) and criminal penalties under Section 25299(d) for failure to report a leak. The owner/operator is liable for civil penalties under Section 25299(b)(4) for knowing failure to ensure compliance with the law by the operator. These penalty provisions do not apply to a potential buyer.

8. Prior to any drilling activities onto any public right-of-ways, it shall be the applicants responsibilities to contact and coordinate a Underground Service Alert (USA), obtain encroachment permit(s), excavation permit(s) or any other permits required for that City or to the County and follow all City or County Ordinances. It shall also be the applicants responsibilities to provide to the Cities or to Alameda County a Traffic Safety Plan for any lane closures or detours planned. No work shall begin until all the permits and requirements have been approved or obtained.

9. Permit is valid only for the purpose specified herein. No changes in construction procedures, as described on this permit application. Boreholes shall not be converted to monitoring wells, without a permit application process.

APPENDIX B

CHAIN-OF-CUSTODY FORM
AND
LABORATORY ANALYTICAL REPORT
FOR GROUND-WATER SAMPLES

McCampbell Analytical, Inc.

"When Quality Counts"

Analytical Report

WorkOrder: 1707B67

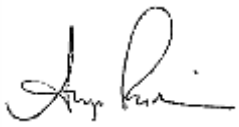
Report Created for: Essel Environmental Consulting

351 California Street, Ste. 615
San Francisco, CA 94104

Project Contact: Nik Lahiri
Project P.O.:
Project Name: 15166; EBALDC

Project Received: 07/28/2017

Analytical Report reviewed & approved for release on 08/04/2017 by:



Angela Rydelius,
Laboratory Manager

McCampbell Analytical, Inc.
"When Quality Counts"

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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Glossary of Terms & Qualifier Definitions

Client: Essel Environmental Consulting
Project: 15166; EBALDC
WorkOrder: 1707B67

Glossary Abbreviation

%D	Serial Dilution Percent Difference
95% Interval	95% Confident Interval
DF	Dilution Factor
DI WET	(DISTLC) Waste Extraction Test using DI water
DISS	Dissolved (direct analysis of 0.45 µm filtered and acidified water sample)
DLT	Dilution Test (Serial Dilution)
DUP	Duplicate
EDL	Estimated Detection Limit
ERS	External reference sample. Second source calibration verification.
ITEF	International Toxicity Equivalence Factor
LCS	Laboratory Control Sample
MB	Method Blank
MB % Rec	% Recovery of Surrogate in Method Blank, if applicable
MDL	Method Detection Limit
ML	Minimum Level of Quantitation
MS	Matrix Spike
MSD	Matrix Spike Duplicate
N/A	Not Applicable
ND	Not detected at or above the indicated MDL or RL
NR	Data Not Reported due to matrix interference or insufficient sample amount.
PDS	Post Digestion Spike
PDSD	Post Digestion Spike Duplicate
PF	Prep Factor
RD	Relative Difference
RL	Reporting Limit (The RL is the lowest calibration standard in a multipoint calibration.)
RPD	Relative Percent Deviation
RRT	Relative Retention Time
SPK Val	Spike Value
SPKRef Val	Spike Reference Value
SPLP	Synthetic Precipitation Leachate Procedure
ST	Sorbent Tube
TCLP	Toxicity Characteristic Leachate Procedure
TEQ	Toxicity Equivalents
WET (STLC)	Waste Extraction Test (Soluble Threshold Limit Concentration)

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Glossary of Terms & Qualifier Definitions

Client: Essel Environmental Consulting
Project: 15166; EBALDC
WorkOrder: 1707B67

Analytical Qualifiers

S	Surrogate spike recovery outside accepted recovery limits
a3	Sample diluted due to high organic content.
b1	Aqueous sample that contains greater than ~1 vol. % sediment
b6	Lighter than water immiscible sheen/product is present
c2	Surrogate recovery outside of the control limits due to matrix interference.
c4	Surrogate recovery outside of the control limits due to coelution with another peak(s) / cluttered chromatogram.
d1	Weakly modified or unmodified gasoline is significant
d7	Strongly aged gasoline or diesel range compounds are significant in the TPH(g) chromatogram
d9	No recognizable pattern
d17	Reporting limit for MTBE raised due to co-elution with non-target peaks.
e2	Diesel range compounds are significant; no recognizable pattern
e3	Aged diesel is significant
e7	Oil range compounds are significant
e8/e11	Pattern resembles kerosene/kerosene range/jet fuel range; and/or Pattern resembles stoddard solvent/mineral spirit
e11/e4	Pattern resembles stoddard solvent/mineral spirit; and/or Gasoline range compounds are significant.

Quality Control Qualifiers

F1	MS/MSD recovery and/or RPD is out of acceptance criteria; LCS validates the prep batch.
F2	LCS/LCSD recovery and/or RPD is out of acceptance criteria.

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB23	**1707B67-001B**	**Water**	**07/28/2017 11:53**	**GC38**	**143164**

Analytes	Result	RL	DF	Date Analyzed
Acetone	**15**	10	1	08/04/2017 05:36
tert-Amyl methyl ether (TAME)	ND	0.50	1	08/04/2017 05:36
Benzene	ND	0.50	1	08/04/2017 05:36
Bromobenzene	ND	0.50	1	08/04/2017 05:36
Bromochloromethane	ND	0.50	1	08/04/2017 05:36
Bromodichloromethane	ND	0.50	1	08/04/2017 05:36
Bromoform	ND	0.50	1	08/04/2017 05:36
Bromomethane	**0.99**	0.50	1	08/04/2017 05:36
2-Butanone (MEK)	**3.3**	2.0	1	08/04/2017 05:36
t-Butyl alcohol (TBA)	ND	2.0	1	08/04/2017 05:36
n-Butyl benzene	**4.3**	0.50	1	08/04/2017 05:36
sec-Butyl benzene	**3.6**	0.50	1	08/04/2017 05:36
tert-Butyl benzene	ND	0.50	1	08/04/2017 05:36
Carbon Disulfide	ND	0.50	1	08/04/2017 05:36
Carbon Tetrachloride	ND	0.50	1	08/04/2017 05:36
Chlorobenzene	ND	0.50	1	08/04/2017 05:36
Chloroethane	ND	0.50	1	08/04/2017 05:36
Chloroform	ND	0.50	1	08/04/2017 05:36
Chloromethane	ND	0.50	1	08/04/2017 05:36
2-Chlorotoluene	ND	0.50	1	08/04/2017 05:36
4-Chlorotoluene	ND	0.50	1	08/04/2017 05:36
Dibromochloromethane	ND	0.50	1	08/04/2017 05:36
1,2-Dibromo-3-chloropropane	ND	0.20	1	08/04/2017 05:36
1,2-Dibromoethane (EDB)	ND	0.50	1	08/04/2017 05:36
Dibromomethane	ND	0.50	1	08/04/2017 05:36
1,2-Dichlorobenzene	ND	0.50	1	08/04/2017 05:36
1,3-Dichlorobenzene	ND	0.50	1	08/04/2017 05:36
1,4-Dichlorobenzene	ND	0.50	1	08/04/2017 05:36
Dichlorodifluoromethane	ND	0.50	1	08/04/2017 05:36
1,1-Dichloroethane	ND	0.50	1	08/04/2017 05:36
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	08/04/2017 05:36
1,1-Dichloroethene	ND	0.50	1	08/04/2017 05:36
cis-1,2-Dichloroethene	ND	0.50	1	08/04/2017 05:36
trans-1,2-Dichloroethene	ND	0.50	1	08/04/2017 05:36
1,2-Dichloropropane	ND	0.50	1	08/04/2017 05:36
1,3-Dichloropropane	ND	0.50	1	08/04/2017 05:36
2,2-Dichloropropane	ND	0.50	1	08/04/2017 05:36

(Cont.)

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB23	**1707B67-001B**	**Water**	**07/28/2017 11:53**	**GC38**	**143164**

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	08/04/2017 05:36
cis-1,3-Dichloropropene	ND	0.50	1	08/04/2017 05:36
trans-1,3-Dichloropropene	ND	0.50	1	08/04/2017 05:36
Diisopropyl ether (DIPE)	ND	0.50	1	08/04/2017 05:36
Ethylbenzene	**0.58**	0.50	1	08/04/2017 05:36
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	08/04/2017 05:36
Freon 113	ND	0.50	1	08/04/2017 05:36
Hexachlorobutadiene	ND	0.50	1	08/04/2017 05:36
Hexachloroethane	ND	0.50	1	08/04/2017 05:36
2-Hexanone	ND	0.50	1	08/04/2017 05:36
Isopropylbenzene	**5.8**	0.50	1	08/04/2017 05:36
4-Isopropyl toluene	**4.1**	0.50	1	08/04/2017 05:36
Methyl-t-butyl ether (MTBE)	ND	0.50	1	08/04/2017 05:36
Methylene chloride	ND	0.50	1	08/04/2017 05:36
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	08/04/2017 05:36
Naphthalene	**16**	0.50	1	08/04/2017 05:36
n-Propyl benzene	**6.6**	0.50	1	08/04/2017 05:36
Styrene	ND	0.50	1	08/04/2017 05:36
1,1,1,2-Tetrachloroethane	ND	0.50	1	08/04/2017 05:36
1,1,2,2-Tetrachloroethane	ND	0.50	1	08/04/2017 05:36
Tetrachloroethene	ND	0.50	1	08/04/2017 05:36
Toluene	**3.0**	0.50	1	08/04/2017 05:36
1,2,3-Trichlorobenzene	ND	0.50	1	08/04/2017 05:36
1,2,4-Trichlorobenzene	ND	0.50	1	08/04/2017 05:36
1,1,1-Trichloroethane	ND	0.50	1	08/04/2017 05:36
1,1,2-Trichloroethane	ND	0.50	1	08/04/2017 05:36
Trichloroethene	ND	0.50	1	08/04/2017 05:36
Trichlorofluoromethane	ND	0.50	1	08/04/2017 05:36
1,2,3-Trichloropropane	ND	0.50	1	08/04/2017 05:36
1,2,4-Trimethylbenzene	**33**	0.50	1	08/04/2017 05:36
1,3,5-Trimethylbenzene	**4.0**	0.50	1	08/04/2017 05:36
Vinyl Chloride	ND	0.50	1	08/04/2017 05:36
Xylenes, Total	**5.1**	0.50	1	08/04/2017 05:36

(Cont.)

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB23	**1707B67-001B**	**Water**	**07/28/2017 11:53**	**GC38**	**143164**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	118	70-130		08/04/2017 05:36
Toluene-d8	101	70-130		08/04/2017 05:36
4-BFB	81	70-130		08/04/2017 05:36

Analyst(s): HK Analytical Comments: b1

(Cont.)

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http://www.mccampbell.com / E-mail: main@mccampbell.com

Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB24	**1707B67-002B**	**Water**	**07/28/2017 11:34**	**GC38**	**143181**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	10	1	08/04/2017 10:26
tert-Amyl methyl ether (TAME)	ND	0.50	1	08/04/2017 10:26
Benzene	ND	0.50	1	08/04/2017 10:26
Bromobenzene	ND	0.50	1	08/04/2017 10:26
Bromochloromethane	ND	0.50	1	08/04/2017 10:26
Bromodichloromethane	ND	0.50	1	08/04/2017 10:26
Bromoform	ND	0.50	1	08/04/2017 10:26
Bromomethane	ND	0.50	1	08/04/2017 10:26
2-Butanone (MEK)	ND	2.0	1	08/04/2017 10:26
t-Butyl alcohol (TBA)	ND	2.0	1	08/04/2017 10:26
n-Butyl benzene	**0.67**	0.50	1	08/04/2017 10:26
sec-Butyl benzene	**1.1**	0.50	1	08/04/2017 10:26
tert-Butyl benzene	ND	0.50	1	08/04/2017 10:26
Carbon Disulfide	ND	0.50	1	08/04/2017 10:26
Carbon Tetrachloride	ND	0.50	1	08/04/2017 10:26
Chlorobenzene	ND	0.50	1	08/04/2017 10:26
Chloroethane	ND	0.50	1	08/04/2017 10:26
Chloroform	ND	0.50	1	08/04/2017 10:26
Chloromethane	ND	0.50	1	08/04/2017 10:26
2-Chlorotoluene	ND	0.50	1	08/04/2017 10:26
4-Chlorotoluene	ND	0.50	1	08/04/2017 10:26
Dibromochloromethane	ND	0.50	1	08/04/2017 10:26
1,2-Dibromo-3-chloropropane	ND	0.20	1	08/04/2017 10:26
1,2-Dibromoethane (EDB)	ND	0.50	1	08/04/2017 10:26
Dibromomethane	ND	0.50	1	08/04/2017 10:26
1,2-Dichlorobenzene	ND	0.50	1	08/04/2017 10:26
1,3-Dichlorobenzene	ND	0.50	1	08/04/2017 10:26
1,4-Dichlorobenzene	ND	0.50	1	08/04/2017 10:26
Dichlorodifluoromethane	ND	0.50	1	08/04/2017 10:26
1,1-Dichloroethane	ND	0.50	1	08/04/2017 10:26
1,2-Dichloroethane (1,2-DCA)	ND	0.50	1	08/04/2017 10:26
1,1-Dichloroethene	ND	0.50	1	08/04/2017 10:26
cis-1,2-Dichloroethene	ND	0.50	1	08/04/2017 10:26
trans-1,2-Dichloroethene	ND	0.50	1	08/04/2017 10:26
1,2-Dichloropropane	ND	0.50	1	08/04/2017 10:26
1,3-Dichloropropane	ND	0.50	1	08/04/2017 10:26
2,2-Dichloropropane	ND	0.50	1	08/04/2017 10:26

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB24	**1707B67-002B**	**Water**	**07/28/2017 11:34**	**GC38**	**143181**

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	0.50	1	08/04/2017 10:26
cis-1,3-Dichloropropene	ND	0.50	1	08/04/2017 10:26
trans-1,3-Dichloropropene	ND	0.50	1	08/04/2017 10:26
Diisopropyl ether (DIPE)	ND	0.50	1	08/04/2017 10:26
Ethylbenzene	ND	0.50	1	08/04/2017 10:26
Ethyl tert-butyl ether (ETBE)	ND	0.50	1	08/04/2017 10:26
Freon 113	ND	0.50	1	08/04/2017 10:26
Hexachlorobutadiene	ND	0.50	1	08/04/2017 10:26
Hexachloroethane	ND	0.50	1	08/04/2017 10:26
2-Hexanone	ND	0.50	1	08/04/2017 10:26
Isopropylbenzene	ND	0.50	1	08/04/2017 10:26
4-Isopropyl toluene	ND	0.50	1	08/04/2017 10:26
Methyl-t-butyl ether (MTBE)	ND	0.50	1	08/04/2017 10:26
Methylene chloride	ND	0.50	1	08/04/2017 10:26
4-Methyl-2-pentanone (MIBK)	ND	0.50	1	08/04/2017 10:26
Naphthalene	ND	0.50	1	08/04/2017 10:26
n-Propyl benzene	ND	0.50	1	08/04/2017 10:26
Styrene	ND	0.50	1	08/04/2017 10:26
1,1,1,2-Tetrachloroethane	ND	0.50	1	08/04/2017 10:26
1,1,2,2-Tetrachloroethane	ND	0.50	1	08/04/2017 10:26
Tetrachloroethene	ND	0.50	1	08/04/2017 10:26
Toluene	ND	0.50	1	08/04/2017 10:26
1,2,3-Trichlorobenzene	ND	0.50	1	08/04/2017 10:26
1,2,4-Trichlorobenzene	ND	0.50	1	08/04/2017 10:26
1,1,1-Trichloroethane	ND	0.50	1	08/04/2017 10:26
1,1,2-Trichloroethane	ND	0.50	1	08/04/2017 10:26
Trichloroethene	ND	0.50	1	08/04/2017 10:26
Trichlorofluoromethane	ND	0.50	1	08/04/2017 10:26
1,2,3-Trichloropropane	ND	0.50	1	08/04/2017 10:26
1,2,4-Trimethylbenzene	ND	0.50	1	08/04/2017 10:26
1,3,5-Trimethylbenzene	ND	0.50	1	08/04/2017 10:26
Vinyl Chloride	ND	0.50	1	08/04/2017 10:26
Xylenes, Total	ND	0.50	1	08/04/2017 10:26

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB24	**1707B67-002B**	**Water**	**07/28/2017 11:34**	**GC38**	**143181**

Analytes	Result	RL	DF	Date Analyzed
Surrogates	REC (%)	Limits		
Dibromofluoromethane	116	70-130		08/04/2017 10:26
Toluene-d8	101	70-130		08/04/2017 10:26
4-BFB	97	70-130		08/04/2017 10:26

Analyst(s): HK

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Angela Rydelius, Lab Manager

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB25	**1707B67-003B**	**Water**	**07/28/2017 11:27**	**GC38**	**143181**

Analytes	Result	RL	DF	Date Analyzed
Acetone	ND	20	2	08/04/2017 16:14
tert-Amyl methyl ether (TAME)	ND	1.0	2	08/04/2017 16:14
Benzene	ND	1.0	2	08/04/2017 16:14
Bromobenzene	ND	1.0	2	08/04/2017 16:14
Bromochloromethane	ND	1.0	2	08/04/2017 16:14
Bromodichloromethane	ND	1.0	2	08/04/2017 16:14
Bromoform	ND	1.0	2	08/04/2017 16:14
Bromomethane	ND	1.0	2	08/04/2017 16:14
2-Butanone (MEK)	ND	4.0	2	08/04/2017 16:14
t-Butyl alcohol (TBA)	ND	4.0	2	08/04/2017 16:14
n-Butyl benzene	**11**	1.0	2	08/04/2017 16:14
sec-Butyl benzene	**6.2**	1.0	2	08/04/2017 16:14
tert-Butyl benzene	ND	1.0	2	08/04/2017 16:14
Carbon Disulfide	ND	1.0	2	08/04/2017 16:14
Carbon Tetrachloride	ND	1.0	2	08/04/2017 16:14
Chlorobenzene	ND	1.0	2	08/04/2017 16:14
Chloroethane	ND	1.0	2	08/04/2017 16:14
Chloroform	ND	1.0	2	08/04/2017 16:14
Chloromethane	ND	1.0	2	08/04/2017 16:14
2-Chlorotoluene	ND	1.0	2	08/04/2017 16:14
4-Chlorotoluene	ND	1.0	2	08/04/2017 16:14
Dibromochloromethane	ND	1.0	2	08/04/2017 16:14
1,2-Dibromo-3-chloropropane	ND	0.40	2	08/04/2017 16:14
1,2-Dibromoethane (EDB)	ND	1.0	2	08/04/2017 16:14
Dibromomethane	ND	1.0	2	08/04/2017 16:14
1,2-Dichlorobenzene	ND	1.0	2	08/04/2017 16:14
1,3-Dichlorobenzene	ND	1.0	2	08/04/2017 16:14
1,4-Dichlorobenzene	ND	1.0	2	08/04/2017 16:14
Dichlorodifluoromethane	ND	1.0	2	08/04/2017 16:14
1,1-Dichloroethane	ND	1.0	2	08/04/2017 16:14
1,2-Dichloroethane (1,2-DCA)	ND	1.0	2	08/04/2017 16:14
1,1-Dichloroethene	ND	1.0	2	08/04/2017 16:14
cis-1,2-Dichloroethene	ND	1.0	2	08/04/2017 16:14
trans-1,2-Dichloroethene	ND	1.0	2	08/04/2017 16:14
1,2-Dichloropropane	ND	1.0	2	08/04/2017 16:14
1,3-Dichloropropane	ND	1.0	2	08/04/2017 16:14
2,2-Dichloropropane	ND	1.0	2	08/04/2017 16:14

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB25	**1707B67-003B**	**Water**	**07/28/2017 11:27**	**GC38**	**143181**

Analytes	Result	RL	DF	Date Analyzed
1,1-Dichloropropene	ND	1.0	2	08/04/2017 16:14
cis-1,3-Dichloropropene	ND	1.0	2	08/04/2017 16:14
trans-1,3-Dichloropropene	ND	1.0	2	08/04/2017 16:14
Diisopropyl ether (DIPE)	ND	1.0	2	08/04/2017 16:14
Ethylbenzene	ND	1.0	2	08/04/2017 16:14
Ethyl tert-butyl ether (ETBE)	ND	1.0	2	08/04/2017 16:14
Freon 113	ND	1.0	2	08/04/2017 16:14
Hexachlorobutadiene	ND	1.0	2	08/04/2017 16:14
Hexachloroethane	ND	1.0	2	08/04/2017 16:14
2-Hexanone	ND	1.0	2	08/04/2017 16:14
Isopropylbenzene	**8.7**	1.0	2	08/04/2017 16:14
4-Isopropyl toluene	ND	1.0	2	08/04/2017 16:14
Methyl-t-butyl ether (MTBE)	ND	1.0	2	08/04/2017 16:14
Methylene chloride	ND	1.0	2	08/04/2017 16:14
4-Methyl-2-pentanone (MIBK)	ND	1.0	2	08/04/2017 16:14
Naphthalene	ND	1.0	2	08/04/2017 16:14
n-Propyl benzene	**27**	1.0	2	08/04/2017 16:14
Styrene	ND	1.0	2	08/04/2017 16:14
1,1,1,2-Tetrachloroethane	ND	1.0	2	08/04/2017 16:14
1,1,2,2-Tetrachloroethane	ND	1.0	2	08/04/2017 16:14
Tetrachloroethene	ND	1.0	2	08/04/2017 16:14
Toluene	ND	1.0	2	08/04/2017 16:14
1,2,3-Trichlorobenzene	ND	1.0	2	08/04/2017 16:14
1,2,4-Trichlorobenzene	ND	1.0	2	08/04/2017 16:14
1,1,1-Trichloroethane	ND	1.0	2	08/04/2017 16:14
1,1,2-Trichloroethane	ND	1.0	2	08/04/2017 16:14
Trichloroethene	ND	1.0	2	08/04/2017 16:14
Trichlorofluoromethane	ND	1.0	2	08/04/2017 16:14
1,2,3-Trichloropropane	ND	1.0	2	08/04/2017 16:14
1,2,4-Trimethylbenzene	ND	1.0	2	08/04/2017 16:14
1,3,5-Trimethylbenzene	ND	1.0	2	08/04/2017 16:14
Vinyl Chloride	ND	1.0	2	08/04/2017 16:14
Xylenes, Total	ND	1.0	2	08/04/2017 16:14

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/4/17	**Analytical Method:**	SW8260B
Project:	15166; EBALDC	**Unit:**	µg/L

Volatile Organics

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB25	**1707B67-003B**	**Water**	**07/28/2017 11:27**	**GC38**	**143181**

Analytes	Result		RL	DF	Date Analyzed
Surrogates	REC (%)	Qualifiers	Limits		
Dibromofluoromethane	117		70-130		08/04/2017 16:14
Toluene-d8	100		70-130		08/04/2017 16:14
4-BFB	209	S	70-130		08/04/2017 16:14

Analyst(s): JEM Analytical Comments: c2

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW3510C
Date Prepared:	8/1/17	**Analytical Method:**	SW8270C-SIM
Project:	15166; EBALDC	**Unit:**	µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) using SIM Mode

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB23	**1707B67-001C**	**Water**	**07/28/2017 11:53**	**GC35**	**142971**

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.50	1	08/03/2017 17:34
Acenaphthylene	ND	0.50	1	08/03/2017 17:34
Anthracene	ND	0.50	1	08/03/2017 17:34
Benzo (a) anthracene	ND	0.50	1	08/03/2017 17:34
Benzo (a) pyrene	ND	0.50	1	08/03/2017 17:34
Benzo (b) fluoranthene	ND	0.50	1	08/03/2017 17:34
Benzo (g,h,i) perylene	ND	0.50	1	08/03/2017 17:34
Benzo (k) fluoranthene	ND	0.50	1	08/03/2017 17:34
Chrysene	ND	0.50	1	08/03/2017 17:34
Dibenzo (a,h) anthracene	ND	0.50	1	08/03/2017 17:34
Fluoranthene	ND	0.50	1	08/03/2017 17:34
Fluorene	ND	0.50	1	08/03/2017 17:34
Indeno (1,2,3-cd) pyrene	ND	0.50	1	08/03/2017 17:34
1-Methylnaphthalene	**5.1**	0.50	1	08/03/2017 17:34
2-Methylnaphthalene	**2.7**	0.50	1	08/03/2017 17:34
Naphthalene	**7.5**	0.50	1	08/03/2017 17:34
Phenanthrene	**0.71**	0.50	1	08/03/2017 17:34
Pyrene	ND	0.50	1	08/03/2017 17:34

Surrogates	REC (%)	Limits	
1-Fluoronaphthalene	112	30-130	08/03/2017 17:34
2-Fluorobiphenyl	84	30-130	08/03/2017 17:34

Analyst(s): REB Analytical Comments: b1

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NELAP 4033ORELAP

Angela Rydelius, Lab Manager

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW3510C
Date Prepared:	8/1/17	**Analytical Method:**	SW8270C-SIM
Project:	15166; EBALDC	**Unit:**	µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) using SIM Mode

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB24	**1707B67-002C**	**Water**	**07/28/2017 11:34**	**GC35**	**142971**

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	**4.9**	0.50	1	08/03/2017 17:59
Acenaphthylene	ND	0.50	1	08/03/2017 17:59
Anthracene	**1.1**	0.50	1	08/03/2017 17:59
Benzo (a) anthracene	ND	0.50	1	08/03/2017 17:59
Benzo (a) pyrene	ND	0.50	1	08/03/2017 17:59
Benzo (b) fluoranthene	ND	0.50	1	08/03/2017 17:59
Benzo (g,h,i) perylene	ND	0.50	1	08/03/2017 17:59
Benzo (k) fluoranthene	ND	0.50	1	08/03/2017 17:59
Chrysene	ND	0.50	1	08/03/2017 17:59
Dibenzo (a,h) anthracene	ND	0.50	1	08/03/2017 17:59
Fluoranthene	ND	0.50	1	08/03/2017 17:59
Fluorene	ND	0.50	1	08/03/2017 17:59
Indeno (1,2,3-cd) pyrene	ND	0.50	1	08/03/2017 17:59
1-Methylnaphthalene	ND	0.50	1	08/03/2017 17:59
2-Methylnaphthalene	ND	0.50	1	08/03/2017 17:59
Naphthalene	**2.6**	0.50	1	08/03/2017 17:59
Phenanthrene	**10**	0.50	1	08/03/2017 17:59
Pyrene	ND	0.50	1	08/03/2017 17:59

Surrogates	REC (%)	Limits	
1-Fluoronaphthalene	101	30-130	08/03/2017 17:59
2-Fluorobiphenyl	61	30-130	08/03/2017 17:59

Analyst(s): REB

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW3510C
Date Prepared:	8/1/17	**Analytical Method:**	SW8270C-SIM
Project:	15166; EBALDC	**Unit:**	µg/L

Polynuclear Aromatic Hydrocarbons (PAHs / PNAs) using SIM Mode

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB25	**1707B67-003C**	**Water**	**07/28/2017 11:27**	**GC35**	**142971**

Analytes	Result	RL	DF	Date Analyzed
Acenaphthene	ND	0.50	1	08/03/2017 18:25
Acenaphthylene	ND	0.50	1	08/03/2017 18:25
Anthracene	ND	0.50	1	08/03/2017 18:25
Benzo (a) anthracene	ND	0.50	1	08/03/2017 18:25
Benzo (a) pyrene	ND	0.50	1	08/03/2017 18:25
Benzo (b) fluoranthene	ND	0.50	1	08/03/2017 18:25
Benzo (g,h,i) perylene	ND	0.50	1	08/03/2017 18:25
Benzo (k) fluoranthene	ND	0.50	1	08/03/2017 18:25
Chrysene	ND	0.50	1	08/03/2017 18:25
Dibenzo (a,h) anthracene	ND	0.50	1	08/03/2017 18:25
Fluoranthene	ND	0.50	1	08/03/2017 18:25
Fluorene	ND	0.50	1	08/03/2017 18:25
Indeno (1,2,3-cd) pyrene	ND	0.50	1	08/03/2017 18:25
1-Methylnaphthalene	**9.3**	0.50	1	08/03/2017 18:25
2-Methylnaphthalene	ND	0.50	1	08/03/2017 18:25
Naphthalene	**0.78**	0.50	1	08/03/2017 18:25
Phenanthrene	**0.51**	0.50	1	08/03/2017 18:25
Pyrene	ND	0.50	1	08/03/2017 18:25

Surrogates	REC (%)	Limits	
1-Fluoronaphthalene	111	30-130	08/03/2017 18:25
2-Fluorobiphenyl	85	30-130	08/03/2017 18:25

Analyst(s): REB

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/3/17-8/4/17	**Analytical Method:**	SW8021B/8015Bm
Project:	15166; EBALDC	**Unit:**	µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB23	**1707B67-001A**	**Water**	**07/28/2017 11:53**	**GC3**	**143100**

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	**480**	50	1	08/03/2017 05:41
MTBE	**---**	5.0	1	08/03/2017 05:41
Benzene	**---**	0.50	1	08/03/2017 05:41
Toluene	**---**	0.50	1	08/03/2017 05:41
Ethylbenzene	**---**	0.50	1	08/03/2017 05:41
Xylenes	**---**	1.5	1	08/03/2017 05:41

Surrogates	REC (%)	Limits	
aaa-TFT	106	89-115	08/03/2017 05:41

Analyst(s): IA Analytical Comments: d1,b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB24	**1707B67-002A**	**Water**	**07/28/2017 11:34**	**GC3**	**143100**

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	**350**	50	1	08/04/2017 06:44
MTBE	**---**	5.0	1	08/04/2017 06:44
Benzene	**---**	0.50	1	08/04/2017 06:44
Toluene	**---**	0.50	1	08/04/2017 06:44
Ethylbenzene	**---**	0.50	1	08/04/2017 06:44
Xylenes	**---**	1.5	1	08/04/2017 06:44

Surrogates	REC (%)	Qualifiers	Limits	
aaa-TFT	121	S	89-115	08/04/2017 06:44

Analyst(s): IA Analytical Comments: d7,d9,c4

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NELAP 4033ORELAP

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW5030B
Date Prepared:	8/3/17-8/4/17	**Analytical Method:**	SW8021B/8015Bm
Project:	15166; EBALDC	**Unit:**	µg/L

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB25	**1707B67-003A**	**Water**	**07/28/2017 11:27**	**GC3**	**143100**

Analytes	Result	RL	DF	Date Analyzed
TPH(g) (C6-C12)	**1200**	50	1	08/03/2017 06:12
MTBE	**---**	15	1	08/03/2017 06:12
Benzene	**---**	0.50	1	08/03/2017 06:12
Toluene	**---**	0.50	1	08/03/2017 06:12
Ethylbenzene	**---**	0.50	1	08/03/2017 06:12
Xylenes	**---**	1.5	1	08/03/2017 06:12

Surrogates	REC (%)	Qualifiers	Limits	
aaa-TFT	194	S	89-115	08/03/2017 06:12

Analyst(s): IA Analytical Comments: d1,d17,c4

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Analytical Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Received:	7/28/17 13:08	**Extraction Method:**	SW3510C/3630C
Date Prepared:	7/28/17	**Analytical Method:**	SW8015B
Project:	15166; EBALDC	**Unit:**	µg/L

Total Extractable Petroleum Hydrocarbons w/ Silica Gel Clean-Up

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB23	**1707B67-001A**	**Water**	**07/28/2017 11:53**	**GC11A**	**142816**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**3100**	100	1	08/03/2017 22:01
TPH-Motor Oil (C18-C36)	**15,000**	500	1	08/03/2017 22:01

Surrogates	REC (%)	Limits	
C9	100	66-138	08/03/2017 22:01

Analyst(s): TK Analytical Comments: e7,e2,e11/e4,b1

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB24	**1707B67-002A**	**Water**	**07/28/2017 11:34**	**GC39A**	**142816**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**6600**	100	1	08/03/2017 23:10
TPH-Motor Oil (C18-C36)	**1700**	500	1	08/03/2017 23:10

Surrogates	REC (%)	Limits	
C9	104	66-138	08/03/2017 23:10

Analyst(s): TK Analytical Comments: e3,e8/e11,b6

Client ID	Lab ID	Matrix	Date Collected	Instrument	Batch ID
W-ECB25	**1707B67-003A**	**Water**	**07/28/2017 11:27**	**GC11A**	**142816**

Analytes	Result	RL	DF	Date Analyzed
TPH-Diesel (C10-C23)	**710**	100	1	08/03/2017 20:43
TPH-Motor Oil (C18-C36)	ND	500	1	08/03/2017 20:43

Surrogates	REC (%)	Limits	
C9	102	66-138	08/03/2017 20:43

Analyst(s): TK Analytical Comments: e11/e4,a3

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/3/17	**BatchID:**	143164
Date Analyzed:	8/3/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143164 1708144-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	189	10	200	-	95	46-155
tert-Amyl methyl ether (TAME)	ND	7.99	0.50	10	-	80	54-140
Benzene	ND	9.25	0.50	10	-	93	47-158
Bromobenzene	ND	8.46	0.50	10	-	85	50-155
Bromochloromethane	ND	8.91	0.50	10	-	89	48-160
Bromodichloromethane	ND	8.57	0.50	10	-	86	60-156
Bromoform	ND	8.14	0.50	10	-	81	43-149
Bromomethane	ND	12.4	0.50	10	-	124	61-159
2-Butanone (MEK)	ND	36.5	2.0	40	-	91	61-124
t-Butyl alcohol (TBA)	ND	30.0	2.0	40	-	75	42-140
n-Butyl benzene	ND	9.66	0.50	10	-	97	74-138
sec-Butyl benzene	ND	10.3	0.50	10	-	103	72-142
tert-Butyl benzene	ND	9.34	0.50	10	-	93	74-140
Carbon Disulfide	ND	8.98	0.50	10	-	90	64-127
Carbon Tetrachloride	ND	8.85	0.50	10	-	89	61-158
Chlorobenzene	ND	8.85	0.50	10	-	88	43-157
Chloroethane	ND	10.4	0.50	10	-	104	50-127
Chloroform	ND	8.81	0.50	10	-	88	56-154
Chloromethane	ND	11.7	0.50	10	-	117	41-132
2-Chlorotoluene	ND	8.93	0.50	10	-	89	50-155
4-Chlorotoluene	ND	8.64	0.50	10	-	86	53-153
Dibromochloromethane	ND	7.70	0.50	10	-	77	49-156
1,2-Dibromo-3-chloropropane	ND	2.98	0.20	4	-	75	46-149
1,2-Dibromoethane (EDB)	ND	8.43	0.50	10	-	84	44-155
Dibromomethane	ND	8.64	0.50	10	-	86	50-157
1,2-Dichlorobenzene	ND	8.95	0.50	10	-	89	48-156
1,3-Dichlorobenzene	ND	9.15	0.50	10	-	91	49-159
1,4-Dichlorobenzene	ND	9.10	0.50	10	-	91	51-151
Dichlorodifluoromethane	ND	6.56	0.50	10	-	66	61-117
1,1-Dichloroethane	ND	9.75	0.50	10	-	97	53-153
1,2-Dichloroethane (1,2-DCA)	ND	8.95	0.50	10	-	90	66-125
1,1-Dichloroethene	ND	9.38	0.50	10	-	94	47-149
cis-1,2-Dichloroethene	ND	8.23	0.50	10	-	82	54-155
trans-1,2-Dichloroethene	ND	10.7	0.50	10	-	107	46-151
1,2-Dichloropropane	ND	9.08	0.50	10	-	91	54-153
1,3-Dichloropropane	ND	8.26	0.50	10	-	83	49-150
2,2-Dichloropropane	ND	8.87	0.50	10	-	89	74-147

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/3/17	**BatchID:**	143164
Date Analyzed:	8/3/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143164 1708144-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	9.71	0.50	10	-	97	54-150
cis-1,3-Dichloropropene	ND	8.13	0.50	10	-	81	55-159
trans-1,3-Dichloropropene	ND	8.34	0.50	10	-	83	74-131
Diisopropyl ether (DIPE)	ND	9.07	0.50	10	-	91	57-136
Ethylbenzene	ND	8.98	0.50	10	-	90	60-152
Ethyl tert-butyl ether (ETBE)	ND	8.92	0.50	10	-	89	55-137
Freon 113	ND	9.45	0.50	10	-	95	47-138
Hexachlorobutadiene	ND	8.37	0.50	10	-	84	66-160
Hexachloroethane	ND	8.50	0.50	10	-	85	75-130
2-Hexanone	ND	8.46	0.50	10	-	85	70-115
Isopropylbenzene	ND	8.70	0.50	10	-	87	59-156
4-Isopropyl toluene	ND	9.85	0.50	10	-	98	75-138
Methyl-t-butyl ether (MTBE)	ND	8.42	0.50	10	-	84	53-139
Methylene chloride	ND	8.55	0.50	10	-	86	66-127
4-Methyl-2-pentanone (MIBK)	ND	7.68	0.50	10	-	77	42-153
Naphthalene	ND	8.39	0.50	10	-	84	66-127
n-Propyl benzene	ND	9.72	0.50	10	-	97	54-155
Styrene	ND	9.15	0.50	10	-	91	51-152
1,1,1,2-Tetrachloroethane	ND	8.47	0.50	10	-	85	58-159
1,1,2,2-Tetrachloroethane	ND	8.19	0.50	10	-	82	51-150
Tetrachloroethene	ND	8.64	0.50	10	-	86	55-145
Toluene	ND	8.66	0.50	10	-	87	52-137
1,2,3-Trichlorobenzene	ND	8.64	0.50	10	-	86	70-136
1,2,4-Trichlorobenzene	ND	8.73	0.50	10	-	87	74-137
1,1,1-Trichloroethane	ND	9.08	0.50	10	-	91	57-156
1,1,2-Trichloroethane	ND	8.53	0.50	10	-	85	51-150
Trichloroethene	ND	9.07	0.50	10	-	91	43-157
Trichlorofluoromethane	ND	9.80	0.50	10	-	98	50-147
1,2,3-Trichloropropane	ND	8.81	0.50	10	-	88	41-152
1,2,4-Trimethylbenzene	ND	9.76	0.50	10	-	98	57-157
1,3,5-Trimethylbenzene	ND	9.34	0.50	10	-	93	56-159
Vinyl Chloride	ND	11.8	0.50	10	-	118	42-137
Xylenes, Total	ND	28.0	0.50	30	-	93	70-130

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/3/17	**BatchID:**	143164
Date Analyzed:	8/3/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143164 1708144-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	28.23	28.9		25	113	116	70-130
Toluene-d8	26.05	26.0		25	104	104	70-130
4-BFB	2.068	2.16		2.5	83	86	70-130

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/3/17	**BatchID:**	143164
Date Analyzed:	8/3/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143164 1708144-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Acetone	232	238	200	ND	113	116	66-158	2.50	20
tert-Amyl methyl ether (TAME)	9.36	10.4	10	ND	94	104	69-139	10.7	20
Benzene	9.57	10.1	10	ND	96	101	69-141	5.59	20
Bromobenzene	9.17	9.74	10	ND	92	97	70-127	6.01	20
Bromochloromethane	10.0	10.7	10	ND	100	107	72-142	6.40	20
Bromodichloromethane	9.34	9.90	10	ND	93	99	75-141	5.81	20
Bromoform	9.76	10.3	10	ND	98	103	72-126	5.78	20
Bromomethane	11.1	11.6	10	ND	111	116	50-160	4.39	20
2-Butanone (MEK)	46.4	48.4	40	ND	116	121	69-154	4.22	20
t-Butyl alcohol (TBA)	38.2	40.4	40	ND	95	101	41-152	5.71	20
n-Butyl benzene	9.88	10.5	10	ND	99	105	70-134	6.22	20
sec-Butyl benzene	9.83	10.4	10	ND	98	104	73-131	5.30	20
tert-Butyl benzene	9.32	9.87	10	ND	93	99	71-125	5.83	20
Carbon Disulfide	8.46	9.00	10	ND	85	90	63-158	6.15	20
Carbon Tetrachloride	8.98	9.58	10	ND	90	96	72-143	6.39	20
Chlorobenzene	9.29	9.87	10	ND	93	99	77-120	5.97	20
Chloroethane	9.35	9.71	10	ND	94	97	54-131	3.75	20
Chloroform	9.32	9.82	10	ND	93	98	75-139	5.26	20
Chloromethane	8.36	8.59	10	ND	84	86	40-130	2.71	20
2-Chlorotoluene	9.19	9.78	10	ND	92	98	70-122	6.23	20
4-Chlorotoluene	8.94	9.62	10	ND	89	96	71-123	7.32	20
Dibromochloromethane	8.94	9.48	10	ND	89	95	78-132	5.90	20
1,2-Dibromo-3-chloropropane	3.74	3.88	4	ND	93	97	59-143	3.79	20
1,2-Dibromoethane (EDB)	9.79	10.2	10	ND	98	102	76-135	4.48	20
Dibromomethane	9.94	10.4	10	ND	99	104	78-135	4.35	20
1,2-Dichlorobenzene	9.70	10.3	10	ND	97	103	68-133	5.79	20
1,3-Dichlorobenzene	9.72	10.3	10	ND	97	103	78-122	5.53	20
1,4-Dichlorobenzene	9.61	10.2	10	ND	96	102	80-117	5.97	20
Dichlorodifluoromethane	7.17	7.28	10	ND	72	73	38-125	1.53	20
1,1-Dichloroethane	10.0	10.6	10	ND	100	106	65-152	5.25	20
1,2-Dichloroethane (1,2-DCA)	10.0	10.6	10	ND	100	106	73-139	5.53	20
1,1-Dichloroethene	9.14	9.62	10	ND	91	96	59-140	5.15	20
cis-1,2-Dichloroethene	9.80	10.4	10	ND	96	102	50-154	5.83	20
trans-1,2-Dichloroethene	9.38	9.90	10	ND	94	99	69-136	5.30	20
1,2-Dichloropropane	9.87	10.4	10	ND	99	104	78-132	5.58	20
1,3-Dichloropropane	9.68	10.2	10	ND	97	102	77-131	4.78	20
2,2-Dichloropropane	9.03	9.52	10	ND	90	95	61-160	5.28	20

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/3/17	**BatchID:**	143164
Date Analyzed:	8/3/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143164 1708144-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
1,1-Dichloropropene	9.28	9.78	10	ND	93	98	70-137	5.16	20
cis-1,3-Dichloropropene	8.84	9.32	10	ND	88	93	78-135	5.26	20
trans-1,3-Dichloropropene	9.33	9.85	10	ND	93	99	78-131	5.49	20
Diisopropyl ether (DIPE)	9.98	10.6	10	ND	100	106	72-140	5.81	20
Ethylbenzene	9.23	9.68	10	ND	92	97	73-128	4.81	20
Ethyl tert-butyl ether (ETBE)	10.1	10.7	10	ND	101	107	71-140	5.74	20
Freon 113	9.14	9.63	10	ND	91	96	60-136	5.24	20
Hexachlorobutadiene	8.34	8.85	10	ND	83	89	56-132	5.93	20
Hexachloroethane	8.41	9.09	10	ND	84	91	61-129	7.77	20
2-Hexanone	10.6	11.1	10	ND	107	111	57-149	3.82	20
Isopropylbenzene	9.08	9.65	10	ND	91	97	69-130	6.10	20
4-Isopropyl toluene	9.54	10.2	10	ND	95	102	75-124	6.96	20
Methyl-t-butyl ether (MTBE)	9.84	10.4	10	ND	98	104	73-139	5.92	20
Methylene chloride	9.00	9.52	10	ND	90	95	74-128	5.62	20
4-Methyl-2-pentanone (MIBK)	9.68	10.0	10	ND	97	100	61-145	3.49	20
Naphthalene	9.58	10.1	10	ND	96	101	54-148	5.26	20
n-Propyl benzene	9.46	10.1	10	ND	95	101	71-121	6.84	20
Styrene	9.58	10.0	10	ND	96	100	56-140	4.45	20
1,1,1,2-Tetrachloroethane	9.16	9.70	10	ND	92	97	74-127	5.81	20
1,1,2,2-Tetrachloroethane	9.80	10.2	10	ND	98	102	63-142	4.36	20
Tetrachloroethene	8.83	9.32	10	ND	88	93	71-125	5.38	20
Toluene	8.88	9.35	10	ND	88	93	71-128	5.07	20
1,2,3-Trichlorobenzene	9.28	9.93	10	ND	93	99	59-135	6.75	20
1,2,4-Trichlorobenzene	9.32	10.0	10	ND	93	100	60-132	7.10	20
1,1,1-Trichloroethane	9.19	9.76	10	ND	92	98	75-138	5.99	20
1,1,2-Trichloroethane	9.82	10.3	10	ND	98	103	78-129	4.66	20
Trichloroethene	9.10	9.63	10	ND	91	96	64-132	5.70	20
Trichlorofluoromethane	9.11	9.55	10	ND	91	96	53-159	4.74	20
1,2,3-Trichloropropane	10.5	11.0	10	ND	105	110	68-130	4.69	20
1,2,4-Trimethylbenzene	9.67	10.4	10	ND	97	104	76-124	6.88	20
1,3,5-Trimethylbenzene	9.40	10.0	10	ND	94	100	77-124	6.30	20
Vinyl Chloride	9.02	9.24	10	ND	90	92	43-142	2.39	20
Xylenes, Total	28.7	30.3	30	ND	96	101	70-130	5.38	20

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/3/17	**BatchID:**	143164
Date Analyzed:	8/3/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143164 1708144-001AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Surrogate Recovery									
Dibromofluoromethane	29.6	29.8	25		118	119	73-131	0.896	20
Toluene-d8	25.6	25.4	25		102	101	72-117	0.761	20
4-BFB	2.18	2.23	2.5		87	89	74-116	2.24	20

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/4/17	**BatchID:**	143181
Date Analyzed:	8/4/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143181 1708074-005AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Acetone	ND	181	10	200	-	91	46-155
tert-Amyl methyl ether (TAME)	ND	7.96	0.50	10	-	80	54-140
Benzene	ND	8.92	0.50	10	-	89	47-158
Bromobenzene	ND	8.58	0.50	10	-	86	50-155
Bromochloromethane	ND	9.04	0.50	10	-	90	48-160
Bromodichloromethane	ND	8.39	0.50	10	-	84	60-156
Bromoform	ND	8.18	0.50	10	-	82	43-149
Bromomethane	ND	10.8	0.50	10	-	108	61-159
2-Butanone (MEK)	ND	36.9	2.0	40	-	92	61-124
t-Butyl alcohol (TBA)	ND	30.2	2.0	40	-	75	42-140
n-Butyl benzene	ND	9.77	0.50	10	-	98	74-138
sec-Butyl benzene	ND	9.76	0.50	10	-	98	72-142
tert-Butyl benzene	ND	9.27	0.50	10	-	93	74-140
Carbon Disulfide	ND	8.17	0.50	10	-	82	64-127
Carbon Tetrachloride	ND	8.08	0.50	10	-	81	61-158
Chlorobenzene	ND	8.86	0.50	10	-	89	43-157
Chloroethane	ND	8.89	0.50	10	-	89	50-127
Chloroform	ND	8.60	0.50	10	-	86	56-154
Chloromethane	ND	8.27	0.50	10	-	83	41-132
2-Chlorotoluene	ND	8.90	0.50	10	-	89	50-155
4-Chlorotoluene	ND	8.74	0.50	10	-	87	53-153
Dibromochloromethane	ND	7.75	0.50	10	-	77	49-156
1,2-Dibromo-3-chloropropane	ND	3.04	0.20	4	-	76	46-149
1,2-Dibromoethane (EDB)	ND	8.38	0.50	10	-	84	44-155
Dibromomethane	ND	8.45	0.50	10	-	84	50-157
1,2-Dichlorobenzene	ND	9.08	0.50	10	-	91	48-156
1,3-Dichlorobenzene	ND	9.29	0.50	10	-	93	49-159
1,4-Dichlorobenzene	ND	9.10	0.50	10	-	91	51-151
Dichlorodifluoromethane	ND	6.38	0.50	10	-	64	61-117
1,1-Dichloroethane	ND	9.27	0.50	10	-	93	53-153
1,2-Dichloroethane (1,2-DCA)	ND	8.85	0.50	10	-	88	66-125
1,1-Dichloroethene	ND	8.56	0.50	10	-	86	47-149
cis-1,2-Dichloroethene	ND	8.90	0.50	10	-	89	54-155
trans-1,2-Dichloroethene	ND	8.76	0.50	10	-	88	46-151
1,2-Dichloropropane	ND	8.90	0.50	10	-	89	54-153
1,3-Dichloropropane	ND	8.43	0.50	10	-	84	49-150
2,2-Dichloropropane	ND	8.63	0.50	10	-	86	74-147

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/4/17	**BatchID:**	143181
Date Analyzed:	8/4/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143181 1708074-005AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
1,1-Dichloropropene	ND	8.80	0.50	10	-	88	54-150
cis-1,3-Dichloropropene	ND	8.15	0.50	10	-	81	55-159
trans-1,3-Dichloropropene	ND	8.35	0.50	10	-	83	74-131
Diisopropyl ether (DIPE)	ND	8.76	0.50	10	-	88	57-136
Ethylbenzene	ND	8.94	0.50	10	-	89	60-152
Ethyl tert-butyl ether (ETBE)	ND	8.76	0.50	10	-	88	55-137
Freon 113	ND	8.58	0.50	10	-	86	47-138
Hexachlorobutadiene	ND	8.28	0.50	10	-	83	66-160
Hexachloroethane	ND	8.11	0.50	10	-	81	75-130
2-Hexanone	ND	8.20	0.50	10	-	82	70-115
Isopropylbenzene	ND	8.90	0.50	10	-	89	59-156
4-Isopropyl toluene	ND	9.59	0.50	10	-	96	75-138
Methyl-t-butyl ether (MTBE)	ND	8.20	0.50	10	-	82	53-139
Methylene chloride	ND	8.16	0.50	10	-	82	66-127
4-Methyl-2-pentanone (MIBK)	ND	7.55	0.50	10	-	76	42-153
Naphthalene	ND	8.54	0.50	10	-	85	66-127
n-Propyl benzene	ND	9.38	0.50	10	-	94	54-155
Styrene	ND	9.05	0.50	10	-	90	51-152
1,1,1,2-Tetrachloroethane	ND	8.48	0.50	10	-	85	58-159
1,1,2,2-Tetrachloroethane	ND	8.20	0.50	10	-	82	51-150
Tetrachloroethene	ND	8.52	0.50	10	-	85	55-145
Toluene	ND	8.45	0.50	10	-	84	52-137
1,2,3-Trichlorobenzene	ND	8.64	0.50	10	-	86	70-136
1,2,4-Trichlorobenzene	ND	8.83	0.50	10	-	88	74-137
1,1,1-Trichloroethane	ND	8.79	0.50	10	-	88	57-156
1,1,2-Trichloroethane	ND	8.37	0.50	10	-	84	51-150
Trichloroethene	ND	8.54	0.50	10	-	85	43-157
Trichlorofluoromethane	ND	8.56	0.50	10	-	86	50-147
1,2,3-Trichloropropane	ND	8.74	0.50	10	-	87	41-152
1,2,4-Trimethylbenzene	ND	9.55	0.50	10	-	95	57-157
1,3,5-Trimethylbenzene	ND	9.29	0.50	10	-	93	56-159
Vinyl Chloride	ND	8.89	0.50	10	-	89	42-137
Xylenes, Total	ND	27.6	0.50	15	-	184, F2	70-130

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/4/17	**BatchID:**	143181
Date Analyzed:	8/4/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143181 1708074-005AMS/MSD

QC Summary Report for SW8260B

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
Surrogate Recovery							
Dibromofluoromethane	28.33	29.1		25	113	116	70-130
Toluene-d8	25.79	25.9		25	103	104	70-130
4-BFB	2.061	2.20		2.5	82	88	70-130

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/4/17	**BatchID:**	143181
Date Analyzed:	8/4/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143181 1708074-005AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Acetone	227	228	200	ND	112	112	66-158	0	20
tert-Amyl methyl ether (TAME)	8.98	9.36	10	ND	90	94	69-139	4.09	20
Benzene	9.61	9.90	10	ND	96	99	69-141	2.92	20
Bromobenzene	9.17	9.47	10	ND	92	95	70-127	3.24	20
Bromochloromethane	10.1	10.4	10	ND	101	104	72-142	3.03	20
Bromodichloromethane	9.14	9.52	10	ND	91	95	75-141	4.12	20
Bromoform	9.43	9.85	10	ND	94	98	72-126	4.35	20
Bromomethane	11.0	11.1	10	ND	110	111	50-160	0.419	20
2-Butanone (MEK)	45.8	46.1	40	ND	111	112	69-154	0.689	20
t-Butyl alcohol (TBA)	38.5	38.9	40	ND	96	97	41-152	1.12	20
n-Butyl benzene	10.6	10.7	10	ND	105	107	70-134	1.85	20
sec-Butyl benzene	10.4	10.6	10	ND	104	106	73-131	1.81	20
tert-Butyl benzene	9.80	10.0	10	ND	98	100	71-125	2.30	20
Carbon Disulfide	8.88	9.02	10	ND	89	90	63-158	1.64	20
Carbon Tetrachloride	8.78	8.92	10	ND	88	89	72-143	1.58	20
Chlorobenzene	9.44	9.74	10	ND	94	97	77-120	3.04	20
Chloroethane	9.42	9.50	10	ND	94	95	54-131	0.833	20
Chloroform	9.30	9.60	10	ND	93	96	75-139	3.19	20
Chloromethane	8.62	8.37	10	ND	86	84	40-130	2.89	20
2-Chlorotoluene	9.48	9.65	10	ND	95	97	70-122	1.77	20
4-Chlorotoluene	9.27	9.44	10	ND	93	94	71-123	1.75	20
Dibromochloromethane	8.70	9.06	10	ND	87	91	78-132	4.00	20
1,2-Dibromo-3-chloropropane	3.66	3.75	4	ND	92	94	59-143	2.21	20
1,2-Dibromoethane (EDB)	9.61	9.87	10	ND	96	99	76-135	2.69	20
Dibromomethane	9.69	9.99	10	ND	97	100	78-135	3.01	20
1,2-Dichlorobenzene	9.79	10.0	10	ND	98	100	68-133	2.17	20
1,3-Dichlorobenzene	9.96	10.1	10	ND	100	101	78-122	1.44	20
1,4-Dichlorobenzene	9.82	10.0	10	ND	98	100	80-117	2.29	20
Dichlorodifluoromethane	7.03	6.74	10	ND	70	67	38-125	4.16	20
1,1-Dichloroethane	10.1	10.4	10	ND	100	103	65-152	3.05	20
1,2-Dichloroethane (1,2-DCA)	9.93	10.2	10	ND	99	102	73-139	2.57	20
1,1-Dichloroethene	9.30	9.52	10	ND	93	95	59-140	2.31	20
cis-1,2-Dichloroethene	9.63	9.96	10	ND	96	100	50-154	3.44	20
trans-1,2-Dichloroethene	9.43	9.74	10	ND	94	97	69-136	3.26	20
1,2-Dichloropropane	9.70	10.0	10	ND	97	100	78-132	3.43	20
1,3-Dichloropropane	9.53	9.85	10	ND	95	99	77-131	3.30	20
2,2-Dichloropropane	9.33	9.39	10	ND	93	94	61-160	0.615	20

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/4/17	**BatchID:**	143181
Date Analyzed:	8/4/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143181 1708074-005AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
1,1-Dichloropropene	9.41	9.64	10	ND	94	96	70-137	2.46	20
cis-1,3-Dichloropropene	8.90	9.21	10	ND	89	92	78-135	3.39	20
trans-1,3-Dichloropropene	9.23	9.62	10	ND	92	96	78-131	4.18	20
Diisopropyl ether (DIPE)	9.70	10.0	10	ND	97	100	72-140	3.41	20
Ethylbenzene	9.48	9.69	10	ND	95	97	73-128	2.26	20
Ethyl tert-butyl ether (ETBE)	9.76	10.2	10	ND	98	102	71-140	4.15	20
Freon 113	9.22	9.48	10	ND	92	95	60-136	2.84	20
Hexachlorobutadiene	8.72	8.73	10	ND	87	87	56-132	0	20
Hexachloroethane	8.46	8.75	10	ND	85	88	61-129	3.42	20
2-Hexanone	10.2	10.5	10	ND	102	105	57-149	2.85	20
Isopropylbenzene	9.38	9.65	10	ND	94	96	69-130	2.75	20
4-Isopropyl toluene	10.2	10.4	10	ND	102	104	75-124	1.64	20
Methyl-t-butyl ether (MTBE)	9.43	9.79	10	ND	94	98	73-139	3.72	20
Methylene chloride	9.10	9.28	10	ND	91	93	74-128	1.96	20
4-Methyl-2-pentanone (MIBK)	9.16	9.46	10	ND	92	95	61-145	3.30	20
Naphthalene	9.92	9.95	10	ND	99	100	54-148	0.301	20
n-Propyl benzene	9.92	10.1	10	ND	99	101	71-121	2.14	20
Styrene	9.79	9.93	10	ND	98	99	56-140	1.36	20
1,1,1,2-Tetrachloroethane	9.11	9.44	10	ND	91	94	74-127	3.60	20
1,1,2,2-Tetrachloroethane	9.54	9.87	10	ND	95	99	63-142	3.37	20
Tetrachloroethene	9.01	9.36	10	ND	90	94	71-125	3.81	20
Toluene	9.02	9.30	10	ND	90	92	71-128	2.99	20
1,2,3-Trichlorobenzene	9.67	9.76	10	ND	97	98	59-135	0.994	20
1,2,4-Trichlorobenzene	9.65	9.70	10	ND	97	97	60-132	0	20
1,1,1-Trichloroethane	9.39	9.61	10	ND	94	96	75-138	2.32	20
1,1,2-Trichloroethane	9.52	9.91	10	ND	95	99	78-129	3.98	20
Trichloroethene	9.19	9.48	10	ND	92	95	64-132	3.18	20
Trichlorofluoromethane	9.19	9.39	10	ND	92	94	53-159	2.16	20
1,2,3-Trichloropropane	10.3	10.6	10	ND	103	106	68-130	2.99	20
1,2,4-Trimethylbenzene	10.3	10.4	10	ND	103	105	76-124	1.60	20
1,3,5-Trimethylbenzene	9.89	10.0	10	ND	99	100	77-124	1.36	20
Vinyl Chloride	9.30	9.13	10	ND	93	91	43-142	1.80	20
Xylenes, Total	29.7	30.2	15	ND	198,F1	201,F1	70-130	1.85	20

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/4/17	**BatchID:**	143181
Date Analyzed:	8/4/17	**Extraction Method:**	SW5030B
Instrument:	GC38	**Analytical Method:**	SW8260B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143181 1708074-005AMS/MSD

QC Summary Report for SW8260B

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
Surrogate Recovery									
Dibromofluoromethane	29.3	29.5	25		117	118	73-131	0.431	20
Toluene-d8	25.8	25.8	25		103	103	72-117	0	20
4-BFB	2.19	2.19	2.5		87	87	74-116	0	20

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/1/17	**BatchID:**	142971
Date Analyzed:	8/3/17	**Extraction Method:**	SW3510C
Instrument:	GC35	**Analytical Method:**	SW8270C-SIM
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS/LCSD-142971

QC Summary Report for SW8270C

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
Acenaphthene	ND	0.50	-	-	-
Acenaphthylene	ND	0.50	-	-	-
Anthracene	ND	0.50	-	-	-
Benzo (a) anthracene	ND	0.50	-	-	-
Benzo (a) pyrene	ND	0.50	-	-	-
Benzo (b) fluoranthene	ND	0.50	-	-	-
Benzo (g,h,i) perylene	ND	0.50	-	-	-
Benzo (k) fluoranthene	ND	0.50	-	-	-
Chrysene	ND	0.50	-	-	-
Dibenzo (a,h) anthracene	ND	0.50	-	-	-
Fluoranthene	ND	0.50	-	-	-
Fluorene	ND	0.50	-	-	-
Indeno (1,2,3-cd) pyrene	ND	0.50	-	-	-
1-Methylnaphthalene	ND	0.50	-	-	-
2-Methylnaphthalene	ND	0.50	-	-	-
Naphthalene	ND	0.50	-	-	-
Phenanthrene	ND	0.50	-	-	-
Pyrene	ND	0.50	-	-	-
Surrogate Recovery					
1-Fluoronaphthalene	23.15		25	93	30-130
2-Fluorobiphenyl	24.14		25	97	30-130

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
Benzo (a) pyrene	11.8	12.8	10	119	128	12-152	8.05	25
Chrysene	7.47	7.94	10	75	79	28-116	6.08	25
1-Methylnaphthalene	8.55	8.94	10	85	89	48-125	4.45	25
2-Methylnaphthalene	9.36	9.36	10	94	94	41-124	0	25
Phenanthrene	8.45	8.80	10	85	88	36-123	4.04	25
Pyrene	9.19	9.77	10	92	98	29-118	6.06	25
Surrogate Recovery								
1-Fluoronaphthalene	22.9	23.4	25	91	94	45-129	2.39	25
2-Fluorobiphenyl	22.7	23.4	25	91	93	47-125	2.67	25

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	8/2/17	**BatchID:**	143100
Date Analyzed:	8/2/17	**Extraction Method:**	SW5030B
Instrument:	GC3	**Analytical Method:**	SW8021B/8015Bm
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS-143100 1707B93-001AMS/MSD

QC Summary Report for SW8021B/8015Bm

Analyte	MB Result	LCS Result	RL	SPK Val	MB SS %REC	LCS %REC	LCS Limits
TPH(btex)	ND	58.7	40	60	-	98	78-116
MTBE	ND	8.54	5.0	10	-	85	72-122
Benzene	ND	8.59	0.50	10	-	86	81-123
Toluene	ND	9.01	0.50	10	-	90	83-129
Ethylbenzene	ND	9.47	0.50	10	-	95	88-126
Xylenes	ND	29.5	1.5	30	-	98	87-131
Surrogate Recovery							
aaa-TFT	9.639	9.21		10	96	92	89-116

Analyte	MS Result	MSD Result	SPK Val	SPKRef Val	MS %REC	MSD %REC	MS/MSD Limits	RPD	RPD Limit
TPH(btex)	58.0	59.0	60	ND	97	98	63-133	1.64	20
MTBE	9.07	9.42	10	ND	91	94	69-122	3.70	20
Benzene	8.73	8.93	10	ND	87	89	84-125	2.24	20
Toluene	9.18	9.35	10	ND	92	94	87-131	1.90	20
Ethylbenzene	9.68	9.76	10	ND	97	98	92-126	0.718	20
Xylenes	30.1	30.3	30	ND	100	101	88-132	0.496	20
Surrogate Recovery									
aaa-TFT	9.41	9.43	10		94	94	90-117	0	20

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Quality Control Report

Client:	Essel Environmental Consulting	**WorkOrder:**	1707B67
Date Prepared:	7/28/17	**BatchID:**	142816
Date Analyzed:	7/29/17	**Extraction Method:**	SW3510C/3630C
Instrument:	GC9a	**Analytical Method:**	SW8015B
Matrix:	Water	**Unit:**	µg/L
Project:	15166; EBALDC	**Sample ID:**	MB/LCS/LCSD-142816

QC Report for SW8015B w/ Silica Gel Clean-Up

Analyte	MB Result	RL	SPK Val	MB SS %REC	MB SS Limits
TPH-Diesel (C10-C23)	ND	50	-	-	-
TPH-Motor Oil (C18-C36)	ND	250	-	-	-
Surrogate Recovery					
C9	661.1		625	106	79-111

Analyte	LCS Result	LCSD Result	SPK Val	LCS %REC	LCSD %REC	LCS/LCSD Limits	RPD	RPD Limit
TPH-Diesel (C10-C23)	1110	1140	1000	111	113	88-134	2.60	30
Surrogate Recovery								
C9	668	667	625	107	107	79-111	0	30

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CHAIN-OF-CUSTODY RECORD

WorkOrder: 1707B67 **ClientCode: ESL**

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Report to:
Nik Lahiri
Essel Environmental Consulting
351 California Street, Ste. 615
San Francisco, CA 94104
(707) 494-4883 FAX: 510-380-6610

Email: nlahiri@esseltek.com
cc/3rd Party: rodger@esseltek.com;
PO:
ProjectNo: 15166; EBALDC

Bill to:
Nik Lahiri
Essel Environmental Consulting
351 California Street, Ste. 615
San Francisco, CA 94104
tnnkbmax@sbcglobal.net; nlahiri@essel

Requested TAT: 5 days;

Date Received: **07/28/2017**
Date Logged: **07/28/2017**

Lab ID	Client ID	Matrix	Collection Date	Hold	Requested Tests (See legend below)											
					1	2	3	4	5	6	7	8	9	10	11	12
1707B67-001	W-ECB23	Water	7/28/2017 11:53	☐	B	C	A	A								
1707B67-002	W-ECB24	Water	7/28/2017 11:34	☐	B	C	A	A								
1707B67-003	W-ECB25	Water	7/28/2017 11:27	☐	B	C	A	A								

Test Legend:

1	8260B_W	2	8270_PNA_W	3	G-MBTEX_W	4	TPH(DMO)WSG_W
5		6		7		8	
9		10		11		12	

Prepared by: Agustina Venegas

The following SampIDs: 001A, 002A, 003A contain testgroup Multi RangeWSG_W.

Comments:

NOTE: Soil samples are discarded 60 days after results are reported unless other arrangements are made (Water samples are 30 days).
Hazardous samples will be returned to client or disposed of at client expense.

McCampbell Analytical, Inc.
"When Quality Counts"

1534 Willow Pass Road, Pittsburg, CA 94565-1701
Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

WORK ORDER SUMMARY

Client Name: ESSEL ENVIRONMENTAL CONSULTING **Project:** 15166; EBALDC **Work Order:** 1707B67
Client Contact: Nik Lahiri **QC Level:** LEVEL 2
Contact's Email: nlahiri@esseltek.com **Comments:** **Date Logged:** 7/28/2017

☐ WaterTrax ☐ WriteOn ☐ EDF ☐ Excel ☐ Fax ☐ Email ☐ HardCopy ☐ ThirdParty ☐ J-flag

Lab ID	Client ID	Matrix	Test Name	Containers /Composites	Bottle & Preservative	De-chlorinated	Collection Date & Time	TAT	Sediment Content	Hold	SubOut
1707B67-001A	W-ECB23	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	VOA w/ HCl	☐	7/28/2017 11:53	5 days	25%+	☐	
1707B67-001B	W-ECB23	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	7/28/2017 11:53	5 days	25%+	☐	
1707B67-001C	W-ECB23	Water	SW8270C (PAHs/PNAs)	2	1LA Narrow Mouth	☐	7/28/2017 11:53	5 days	25%+	☐	
1707B67-002A	W-ECB24	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	VOA w/ HCl	☐	7/28/2017 11:34	5 days		☐	
1707B67-002B	W-ECB24	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	7/28/2017 11:34	5 days		☐	
1707B67-002C	W-ECB24	Water	SW8270C (PAHs/PNAs)	2	1LA Narrow Mouth	☐	7/28/2017 11:34	5 days		☐	
1707B67-003A	W-ECB25	Water	Multi-Range TPH(g,d,mo) w/ S.G. Clean-Up	4	VOA w/ HCl	☐	7/28/2017 11:27	5 days		☐	
1707B67-003B	W-ECB25	Water	SW8260B (VOCs)	2	VOA w/ HCl	☐	7/28/2017 11:27	5 days		☐	
1707B67-003C	W-ECB25	Water	SW8270C (PAHs/PNAs)	2	1LA Narrow Mouth	☐	7/28/2017 11:27	5 days		☐	

NOTES: - STLC and TCLP extractions require 2 days to complete; therefore, all TATs begin after the extraction is completed (i.e., One-day TAT yields results in 3 days from sample submission).

- MAI assumes that all material present in the provided sampling container is considered part of the sample - MAI does not exclude any material from the sample prior to sample preparation unless requested in writing by the client.

McCAMPBELL ANALYTICAL, INC.

1534 WILLOW PASS ROAD
PITTSBURG, CA 94565-1701
Website: www.mccampbell.com Email: main@mccampbell.com
Telephone: (877) 252-9262 Fax: (925) 252-9269

1707B47

CHAIN OF CUSTODY RECORD

TURN AROUND TIME X

RUSH 24 HR 48 HR 72 HR 5 DAY

GeoTracker EDF **PDF** **Excel** **Write On (DW)**

Check if sample is effluent and "J" flag is required

Report To: Nik Lahiri/Rodger Witham	Bill To: Samhita Lahiri
Company: Essel Technology Services, Inc.	
351 California Street, Suite 615	rodger@esseltek.com
San Francisco, California 94104	E-Mail:nlahiri@esseltek.com
Tele: (925) 413-5511	Fax: ( )
Project #: 15166	Project Name: EBALDC
Project Location: West Grand Avenue and Brush Street, Oakland, California 94612	
Sampler Signature: Rodger C. Witham	

SAMPLE ID	LOCATION/ Field Point Name	SAMPLING Date	SAMPLING Time	# Containers	Type Containers	MATRIX Water	MATRIX Soil	MATRIX Air	MATRIX Sludge	MATRIX Other	METHOD PRESERVED ICE	METHOD PRESERVED HCL	METHOD PRESERVED HNO_3	METHOD PRESERVED Other	BTEX & TPH as Gas (602 / 8021 + 8015) / MTBE	TPHg, d, mo (8015) – w/SILICA GEL CLEANUP	Total Petroleum Oil & Grease (1664 / 5520 E/B&F)	Total Petroleum Hydrocarbons (418.1)	EPA 502.2 / 601 / 8010 / 8021 (HVOCs)	MTBE / BTEX ONLY (EPA 602 / 8021)	EPA 505/ 608 / 8081 (Cl Pesticides)	EPA 608 / 8082 PCB's ONLY; Aroclors / Congeners	EPA 507 / 8141 (NP Pesticides)	EPA 515 / 8151 (Acidic Cl Herbicides)	EPA 524.2 / 624 / 8260B (VOCs)	EPA 525.2 / 625 / 8270 (SVOCs)	EPA 8270 SIM / 8310 (PAHs / PNAs)	CAM 17 Metals (200.7 / 200.8 / 6010 / 6020)	LUFT 5 Metals (200.7 / 200.8 / 6010 / 6020)	Lead (200.7 / 200.8 / 6010 / 6020)	Other: Filter sample for DISSOLVED metals analysis	Other: Cyanide	Other: pH	Comments
+25 W-ECB23	ECB-23	7/28/17	11:53 a.m.	8	G	X					X	X				X									X		X								
+20 W-ECB24	ECB-24	7/28/17	11:34 a.m.		G	X					X	X				X									X		X								
+25 W-ECB25	ECB-25	7/28/17	11:27 a.m.		G	X					X	X				X									X		X								

**MAI clients MUST disclose any dangerous chemicals known to be present in their submitted samples in concentrations that may cause immediate harm or serious future health endangerment as a result of brief, gloved, open air, sample handling by MAI staff. Non-disclosure incurs an immediate $250 surcharge and the client is subject to full legal liability for harm suffered. Thank you for your understanding and for allowing us to work safely.

Relinquished By:	Date:	Time:	Received By:
Rodger C. Witham	7/28/17	12:30 pm	
Relinquished By:	Date:	Time:	Received By:
	7/28/17	1:08 pm	
Relinquished By:	Date:	Time:	Received By:

ICE/t° 4.7° wet

GOOD CONDITION_____
HEAD SPACE ABSENT_____
DECHLORINATED IN LAB_____
APPROPRIATE CONTAINERS_____
PRESERVED IN LAB_____

COMMENTS:

VOAS O&G METALS OTHER
PRESERVATION_____ pH<2_____

McCampbell Analytical, Inc.
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Toll Free Telephone: (877) 252-9262 / Fax: (925) 252-9269
http://www.mccampbell.com / E-mail: main@mccampbell.com

Sample Receipt Checklist

Client Name:	**Essel Environmental Consulting**	Date and Time Received	**7/28/2017 13:08**
Project Name:	**15166; EBALDC**	Date Logged:	**7/28/2017**
		Received by:	Jena Alfaro
WorkOrder №:	**1707B67** Matrix: Water	Logged by:	Agustina Venegas
Carrier:	Client Drop-In		

Chain of Custody (COC) Information

Chain of custody present?	Yes ☑	No ☐
Chain of custody signed when relinquished and received?	Yes ☑	No ☐
Chain of custody agrees with sample labels?	Yes ☑	No ☐
Sample IDs noted by Client on COC?	Yes ☑	No ☐
Date and Time of collection noted by Client on COC?	Yes ☑	No ☐
Sampler's name noted on COC?	Yes ☑	No ☐

Sample Receipt Information

Custody seals intact on shipping container/cooler?	Yes ☐	No ☐	NA ☑
Shipping container/cooler in good condition?	Yes ☑	No ☐	
Samples in proper containers/bottles?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	

Sample Preservation and Hold Time (HT) Information

All samples received within holding time?	Yes ☑	No ☐	NA ☐
Sample/Temp Blank temperature	Temp: 4.7°C		NA ☐
Water - VOA vials have zero headspace / no bubbles?	Yes ☐	No ☑	NA ☐
Sample labels checked for correct preservation?	Yes ☑	No ☐	
pH acceptable upon receipt (Metal: <2; 522: <4; 218.7: >8)?	Yes ☐	No ☐	NA ☑
Samples Received on Ice?	Yes ☑	No ☐	
	(Ice Type: WET ICE)		

UCMR Samples:

Total Chlorine tested and acceptable upon receipt for EPA 522?	Yes ☐	No ☐	NA ☑
Free Chlorine tested and acceptable upon receipt for EPA 218.7, 300.1, 537, 539?	Yes ☐	No ☐	NA ☑

Comments:

APPENDIX C

CHAIN-OF-CUSTODY FORMS
AND
LABORATORY ANALYTICAL REPORTS
FOR SOIL-VAPOR SAMPLES

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8/5/2017
Mr. Rodger Witham
Essel Environmental Consultants
44448 Martingale Ct.

Fremont CA 94539

Project Name: West Grand & Brush
Project #: 15166
Workorder #: 1708039

Dear Mr. Rodger Witham

The following report includes the data for the above referenced project for sample(s) received on 8/2/2017 at Air Toxics Ltd.

The data and associated QC analyzed by Modified TO-17 VI are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Rachel Selenis at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Rachel Selenis

Project Manager

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WORK ORDER #: 1708039

Work Order Summary

CLIENT:	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539	**BILL TO:**	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539
PHONE:	415-767-6375	**P.O. #**	15166
FAX:		**PROJECT #**	15166 West Grand & Brush
DATE RECEIVED:	08/02/2017	**CONTACT:**	Rachel Selenis
DATE COMPLETED:	08/05/2017		

FRACTION #	NAME	TEST
01A	SV-8	Modified TO-17 VI
02A	SV-9	Modified TO-17 VI
03A	SV-10	Modified TO-17 VI
04A	SV-11	Modified TO-17 VI
05A	Lab Blank	Modified TO-17 VI
06A	CCV	Modified TO-17 VI
07A	LCS	Modified TO-17 VI
07AA	LCSD	Modified TO-17 VI

CERTIFIED BY: Heidi Hayes DATE: 08/05/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified EPA Method TO-17 (VI Tubes)
Essel Environmental Consultants
Workorder# 1708039

Four TO-17 VI Tube samples were received on August 02, 2017. The laboratory performed the analysis via modified EPA Method TO-17 using GC/MS in the full scan mode. TO-17 'VI' sorbent tubes are thermally desorbed onto a secondary trap. The trap is thermally desorbed to elute the components into the GC/MS system for compound separation and detection.

A modification that may be applied to EPA Method TO-17 at the client's discretion is the requirement to transport sorbent tubes at 4 deg C. Laboratory studies demonstrate a high level of stability for VOCs on the TO-17 'VI' tube at room temperature for periods of up to 14 days. Tubes can be shipped to and from the field site at ambient conditions as long as the 14-day sample hold time is upheld. Trip blanks and field surrogate spikes are used as additional control measures to monitor recovery and background contribution during tube transport.

Since the TO-17 VI application significantly extends the scope of target compounds addressed in EPA Method TO-15 and TO-17, the laboratory has implemented several method modifications outlined in the table below. Specific project requirements may over-ride the laboratory modifications.

Requirement	***TO-17***	***ATL Modifications***
Distributed Volume Pairs	Collection of distributed volume pairs required for monitoring ambient air to insure high quality.	If site is well-characterized or performance previously verified, single tube sampling may be appropriate. Distributed pairs may be impractical for soil gas collection due to configuration and volume constraints.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

A sampling volume of 0.06 L was used to convert ng to ug/m3 for the associated Lab Blank.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in blank (subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates

as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-17

Client Sample ID: SV-8

Lab ID#: 1708039-01A

No Detections Were Found.

Client Sample ID: SV-9

Lab ID#: 1708039-02A

No Detections Were Found.

Client Sample ID: SV-10

Lab ID#: 1708039-03A

No Detections Were Found.

Client Sample ID: SV-11

Lab ID#: 1708039-04A

No Detections Were Found.

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Client Sample ID: SV-8
Lab ID#: 1708039-01A
EPA METHOD TO-17

File Name:	**6080422**	**Date of Extraction: NA**	**Date of Collection: 8/2/17 9:54:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 8/4/17 11:21 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	17	Not Detected	Not Detected

Air Sample Volume(L): 0.0600
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	94	50-150

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Client Sample ID: SV-9
Lab ID#: 1708039-02A
EPA METHOD TO-17

File Name:	**6080423**	**Date of Extraction: NA**	**Date of Collection: 8/2/17 9:36:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 8/5/17 12:01 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	17	Not Detected	Not Detected

Air Sample Volume(L): 0.0600
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	103	50-150

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Client Sample ID: SV-10
Lab ID#: 1708039-03A
EPA METHOD TO-17

File Name:	**6080424**	**Date of Extraction: NA**	**Date of Collection: 8/2/17 10:05:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 8/5/17 12:41 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	17	Not Detected	Not Detected

Air Sample Volume(L): 0.0600
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	103	50-150

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Client Sample ID: SV-11

Lab ID#: 1708039-04A

EPA METHOD TO-17

File Name:	**6080425**	**Date of Extraction: NA**	**Date of Collection: 8/2/17 10:22:00 AM**
Dil. Factor:	**1.00**		**Date of Analysis: 8/5/17 01:22 AM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	17	Not Detected	Not Detected

Air Sample Volume(L): 0.0600
Container Type: TO-17 VI Tube

Surrogates	%Recovery	Method Limits
Naphthalene-d8	106	50-150

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Client Sample ID: Lab Blank

Lab ID#: 1708039-05A

EPA METHOD TO-17

File Name:	**6080419**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 8/4/17 09:21 PM**

Compound	Rpt. Limit (ng)	Rpt. Limit (ug/m3)	Amount (ng)	Amount (ug/m3)
Naphthalene	1.0	17	Not Detected	Not Detected

Air Sample Volume(L): 0.0600

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Naphthalene-d8	113	50-150

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Client Sample ID: CCV
Lab ID#: 1708039-06A
EPA METHOD TO-17

File Name:	**6080407a**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 8/4/17 11:51 AM**

Compound	%Recovery
Naphthalene	106

Air Sample Volume(L): 1.00
Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Naphthalene-d8	101	50-150

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Client Sample ID: LCS
Lab ID#: 1708039-07A
EPA METHOD TO-17

File Name:	**6080416**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 8/4/17 06:04 PM**

Compound	%Recovery	Method Limits
Naphthalene	103	70-130

Air Sample Volume(L): 1.00
Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Naphthalene-d8	98	50-150

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Client Sample ID: LCSD
Lab ID#: 1708039-07AA
EPA METHOD TO-17

File Name:	**6080417**	**Date of Extraction: NA**	**Date of Collection: NA**
Dil. Factor:	**1.00**		**Date of Analysis: 8/4/17 06:44 PM**

Compound	%Recovery	Method Limits
Naphthalene	103	70-130

Air Sample Volume(L): 1.00
Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Naphthalene-d8	99	50-150

TO-17 SAMPLE COLLECTION

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CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Eurofins assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Eurofins against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020

Project Manager: Rodger Wortham
Collected by: (Print and Sign) Rodger Wortham Rodger C. Wortham
Company: Essel Env. Consulting Email: rodger@esselenv.com
Address: 351 California St City: San Francisco State: CA Zip: 94104
Phone: 510-366-8054 Fax:

Project Info:
P.O. #: 15166
Project #: 15166
Project Name: West Grand & Brush

Turn Around Time:
☐ Normal
☒ Rush
24-hr or ASAP (Specify)

Reporting Units:
☐ ppmv
☐ ppbv
☒ µg/m3
☐ mg/m3

Lab I.D.	Field Sample I.D. (Location)	Engraved or Stamped Tube #	Date of Collection (mm/dd/yy)	Start Time (hr:min)	Date of Retrieval (mm/dd/yy)	End Time (hr:min)	Pre-Test Flow Rate	Post-Test Flow Rate	Volume	Indoor Air	Outdoor Air	Soil Vapor	Other ( )
01A	SV-8	G0145578	08/02/2017	9:54 a.m.					60ml	☐	☐	☒	☐
02A	SV-9	G0137188	08/02/2017	9:36 a.m.					60 ml	☐	☐	☒	☐
03A	SV-10	G0143671	08/02/2017	10:05 a.m.					60 ml	☐	☐	☒	☐
04A	SV-11	G0147267	08/02/2017	10:22 a.m.					60 ml	☐	☐	☒	☐
										☐	☐	☐	☐
										☐	☐	☐	☐
										☐	☐	☐	☐
										☐	☐	☐	☐
										☐	☐	☐	☐
										☐	☐	☐	☐

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Rodger C. Wortham	8/2/17 2:30 p.m.		8/2/17 2:30pm
	8/2/17 2:44 pm	FAIR	08/02/17 1444
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Notes: Analyze for naphthalene using TO-17

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	HD		2.2°C	Good	Yes No (None)	1708039

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8/3/2017
Mr. Rodger Witham
Essel Environmental Consultants
44448 Martingale Ct.

Fremont CA 94539

Project Name: West Grand & Brush
Project #: 15166
Workorder #: 1708038

Dear Mr. Rodger Witham

The following report includes the data for the above referenced project for sample(s) received on 8/2/2017 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Rachel Selenis at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Rachel Selenis

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1708038

Work Order Summary

CLIENT:	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539	**BILL TO:**	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539
PHONE:	415-767-6375	**P.O. #**	15166
FAX:		**PROJECT #**	15166 West Grand & Brush
DATE RECEIVED:	08/02/2017	**CONTACT:**	Rachel Selenis
DATE COMPLETED:	08/03/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-8	Modified ASTM D-1946	15.3 "Hg	14.7 psi
02A	SV-9	Modified ASTM D-1946	1 "Hg	14.5 psi
03A	SV-10	Modified ASTM D-1946	3.9 "Hg	14 psi
04A	SV-11	Modified ASTM D-1946	2.8 "Hg	15 psi
05A	Lab Blank	Modified ASTM D-1946	NA	NA
06A	LCS	Modified ASTM D-1946	NA	NA
06AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 08/03/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified ASTM D-1946
Essel Environmental Consultants
Workorder# 1708038

Four 1 Liter Summa Canister samples were received on August 02, 2017. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

Sample SV-8 was received with significant vacuum remaining in the canister. The residual canister vacuum resulted in elevated reporting limits.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-8

Lab ID#: 1708038-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.41	11
Nitrogen	0.41	88
Methane	0.00041	0.16
Carbon Dioxide	0.041	0.77

Client Sample ID: SV-9

Lab ID#: 1708038-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.21	20
Nitrogen	0.21	80
Methane	0.00021	0.00022
Carbon Dioxide	0.021	0.049

Client Sample ID: SV-10

Lab ID#: 1708038-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.22	20
Nitrogen	0.22	80
Methane	0.00022	0.00090
Carbon Dioxide	0.022	0.050

Client Sample ID: SV-11

Lab ID#: 1708038-04A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.22	20
Nitrogen	0.22	80
Methane	0.00022	0.010
Carbon Dioxide	0.022	0.13

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Client Sample ID: SV-8

Lab ID#: 1708038-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10080209**	**Date of Collection: 8/2/17 12:02:00 PM**	
Dil. Factor:	**4.08**	**Date of Analysis: 8/2/17 07:57 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.41	11
Nitrogen	0.41	88
Methane	0.00041	0.16
Carbon Dioxide	0.041	0.77

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-9

Lab ID#: 1708038-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10080210**	**Date of Collection: 8/2/17 11:14:00 AM**	
Dil. Factor:	**2.06**	**Date of Analysis: 8/2/17 08:36 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.21	20
Nitrogen	0.21	80
Methane	0.00021	0.00022
Carbon Dioxide	0.021	0.049

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-10

Lab ID#: 1708038-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10080211**	**Date of Collection: 8/2/17 12:23:00 PM**	
Dil. Factor:	**2.24**	**Date of Analysis: 8/2/17 09:04 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.22	20
Nitrogen	0.22	80
Methane	0.00022	0.00090
Carbon Dioxide	0.022	0.050

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-11

Lab ID#: 1708038-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10080212**	**Date of Collection: 8/2/17 12:47:00 PM**	
Dil. Factor:	**2.23**	**Date of Analysis: 8/2/17 09:29 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.22	20
Nitrogen	0.22	80
Methane	0.00022	0.010
Carbon Dioxide	0.022	0.13

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1708038-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10080204**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/17 05:26 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.10	Not Detected
Nitrogen	0.10	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1708038-06A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10080202**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/2/17 04:35 PM**	

Compound	%Recovery	Method Limits
Oxygen	98	85-115
Nitrogen	88	85-115
Methane	101	85-115
Carbon Dioxide	99	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1708038-06AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10080227**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/3/17 01:25 PM**	

Compound	%Recovery	Method Limits
Oxygen	101	85-115
Nitrogen	88	85-115
Methane	100	85-115
Carbon Dioxide	100	85-115

Container Type: NA - Not Applicable

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Rodger Witham
Collected by: (Print and Sign) Rodger Witham Rodger C. Witham
Company Essel Environmental Consulting Email rodger@esseltek.com
Address 351 California Street City San Francisco State CA Zip 94104
Phone 510-366-8054 Fax

Project Info:
P.O. # 15166
Project # 15166
Project Name West Grand & Brush

Turn Around Time:
❑ Normal
☒ Rush 24-HR or
ASA Specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-8	N2647	8/2/17	12:02 p.m.	Methane N_2, O_2, CO_2 ASTM D-1946				
02A	SV-9	A7029	8/2/17	11:14 a.m.	Methane N_2, O_2, CO_2 ASTM D-1946				
03A	SV-10	01025	8/2/17	12:23 p.m.	Methane, N_2, O_2, CO_2 ASTM D-1946				
04A	SV-11	N2660	8/2/17	12:47 p.m.	methane, N_2, O_2, CO_2 ASTM D-1946				

Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
Rodger C. Witham 8/2/17 2:30 p.m.	8/2/17 2:30 pm
8/2/17 3:44 p.m.	EAL 080217 1444
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FED		22	Good	Yes No (None)	1708038

Form 1293 rev.11

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8/17/2017

Mr. Rodger Witham
Essel Environmental Consultants
44448 Martingale Ct.

Fremont CA 94539

Project Name: West Grand & Brush
Project #: 15166
Workorder #: 1708282B

Dear Mr. Rodger Witham

The following report includes the data for the above referenced project for sample(s) received on 8/16/2017 at Air Toxics Ltd.

The data and associated QC analyzed by Modified ASTM D-1946 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Rachel Selenis at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Rachel Selenis

Project Manager

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WORK ORDER #: 1708282B

Work Order Summary

CLIENT:	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539	**BILL TO:**	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539
PHONE:	415-767-6375	**P.O. #**	15166
FAX:		**PROJECT #**	15166 West Grand & Brush
DATE RECEIVED:	08/16/2017	**CONTACT:**	Rachel Selenis
DATE COMPLETED:	08/17/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-9	Modified ASTM D-1946	1.0 "Hg	14.8 psi
02A	SV-10	Modified ASTM D-1946	3.7 "Hg	15.3 psi
03A	SV-11	Modified ASTM D-1946	2.8 "Hg	15.1 psi
04A	Lab Blank	Modified ASTM D-1946	NA	NA
05A	LCS	Modified ASTM D-1946	NA	NA
05AA	LCSD	Modified ASTM D-1946	NA	NA

CERTIFIED BY: Heidi Hayes DATE: 08/17/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
Modified ASTM D-1946
Essel Environmental Consultants
Workorder# 1708282B

Three 1 Liter Summa Canister samples were received on August 16, 2017. The laboratory performed analysis via Modified ASTM Method D-1946 for Methane and fixed gases in air using GC/FID or GC/TCD. The method involves direct injection of 1.0 mL of sample.

On the analytical column employed for this analysis, Oxygen coelutes with Argon. The corresponding peak is quantitated as Oxygen.

Since Nitrogen is used to pressurize samples, the reported Nitrogen values are calculated by adding all the sample components and subtracting from 100%.

Method modifications taken to run these samples are summarized in the table below. Specific project requirements may over-ride the ATL modifications.

Requirement	***ASTM D-1946***	***ATL Modifications***
Calibration	A single point calibration is performed using a reference standard closely matching the composition of the unknown.	A minimum of 5-point calibration curve is performed. Quantitation is based on average Response Factor.
Reference Standard	The composition of any reference standard must be known to within 0.01 mol % for any component.	The standards used by ATL are blended to a >/= 95% accuracy.
Sample Injection Volume	Components whose concentrations are in excess of 5 % should not be analyzed by using sample volumes greater than 0.5 mL.	The sample container is connected directly to a fixed volume sample loop of 1.0 mL on the GC. Linear range is defined by the calibration curve. Bags are loaded by vacuum.
Normalization	Normalize the mole percent values by multiplying each value by 100 and dividing by the sum of the original values. The sum of the original values should not differ from 100% by more than 1.0%.	Results are not normalized. The sum of the reported values can differ from 100% by as much as 15%, either due to analytical variability or an unusual sample matrix.
Precision	Precision requirements established at each concentration level.	Duplicates should agree within 25% RPD for detections > 5 X's the RL.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Seven qualifiers may have been used on the data analysis sheets and indicate as follows:
B - Compound present in laboratory blank greater than reporting limit.
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the detection limit.
M - Reported value may be biased due to apparent matrix interferences.
File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

Client Sample ID: SV-9

Lab ID#: 1708282B-01A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.21	6.8
Nitrogen	0.21	89
Carbon Dioxide	0.021	4.4

Client Sample ID: SV-10

Lab ID#: 1708282B-02A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	20
Nitrogen	0.23	80
Methane	0.00023	0.0099
Carbon Dioxide	0.023	0.15

Client Sample ID: SV-11

Lab ID#: 1708282B-03A

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.22	20
Nitrogen	0.22	80
Methane	0.00022	0.0092
Carbon Dioxide	0.022	0.22

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Client Sample ID: SV-9

Lab ID#: 1708282B-01A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081610**	**Date of Collection: 8/15/17 9:48:00 AM**	
Dil. Factor:	**2.08**	**Date of Analysis: 8/16/17 12:50 PM**	

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.21	6.8
Nitrogen	0.21	89
Methane	0.00021	Not Detected
Carbon Dioxide	0.021	4.4

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-10

Lab ID#: 1708282B-02A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081611**	**Date of Collection: 8/15/17 9:08:00 AM**	
Dil. Factor:	**2.32**	**Date of Analysis: 8/16/17 01:14 PM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.23	20
Nitrogen	0.23	80
Methane	0.00023	0.0099
Carbon Dioxide	0.023	0.15

Container Type: 1 Liter Summa Canister

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Client Sample ID: SV-11

Lab ID#: 1708282B-03A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081612**	**Date of Collection:**	**8/15/17 8:27:00 AM**
Dil. Factor:	**2.24**	**Date of Analysis:**	**8/16/17 01:42 PM**

Compound	**Rpt. Limit (%)**	**Amount (%)**
Oxygen	0.22	20
Nitrogen	0.22	80
Methane	0.00022	0.0092
Carbon Dioxide	0.022	0.22

Container Type: 1 Liter Summa Canister

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Client Sample ID: Lab Blank

Lab ID#: 1708282B-04A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/16/17 10:17 AM**	

Compound	Rpt. Limit (%)	Amount (%)
Oxygen	0.10	Not Detected
Nitrogen	0.10	Not Detected
Methane	0.00010	Not Detected
Carbon Dioxide	0.010	Not Detected

Container Type: NA - Not Applicable

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Client Sample ID: LCS

Lab ID#: 1708282B-05A

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/16/17 09:29 AM**	

Compound	%Recovery	Method Limits
Oxygen	109	85-115
Nitrogen	88	85-115
Methane	100	85-115
Carbon Dioxide	98	85-115

Container Type: NA - Not Applicable

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Client Sample ID: LCSD

Lab ID#: 1708282B-05AA

NATURAL GAS ANALYSIS BY MODIFIED ASTM D-1946

File Name:	**10081613**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/16/17 02:10 PM**	

Compound	%Recovery	Method Limits
Oxygen	102	85-115
Nitrogen	88	85-115
Methane	100	85-115
Carbon Dioxide	99	85-115

Container Type: NA - Not Applicable

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Rodger Witham

Collected by: (Print and Sign) Rodger Witham Rodger C. Witham

Company Essel Environmental Email rodger@esseltek.com

Address 351 California St. City San Francisco State CA Zip 94104

Phone _____ Fax _____

Project Info:
P.O. # 15166
Project # 15166
Project Name West Grand #Brush

Turn Around Time:
☐ Normal
☒ Rush 3-day specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-9	N0233	8/15/17	9:48a.m.	Methane, O_2, N_2, CO_2 D-1946				
					2-propanol TO-15				
02A	SV-10	01031	8/15/17	9:08a.m.	Methane, O_2, N_2, CO_2 D-1946				
					2-propanol TO-15				
03A	SV-11	N3093	8/15/17	8:27a.m.	Methane, O_2, N_2, CO_2 D-1946				
					2-propanol TO-15				

Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
Rodger C. Witham 8/15/17 11:50a.m.	08/16/17 1010
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		NA	Good	Yes No None	1708282

Form 1293 rev.11

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8/17/2017

Mr. Rodger Witham
Essel Environmental Consultants
44448 Martingale Ct.

Fremont CA 94539

Project Name: West Grand & Brush
Project #: 15166
Workorder #: 1708282A

Dear Mr. Rodger Witham

The following report includes the data for the above referenced project for sample(s) received on 8/16/2017 at Air Toxics Ltd.

The data and associated QC analyzed by TO-15 are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free to contact the Project Manager: Rachel Selenis at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Rachel Selenis

Project Manager

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WORK ORDER #: 1708282A

Work Order Summary

CLIENT:	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539	**BILL TO:**	Mr. Rodger Witham Essel Environmental Consultants 44448 Martingale Ct. Fremont, CA 94539
PHONE:	415-767-6375	**P.O. #**	15166
FAX:		**PROJECT #**	15166 West Grand & Brush
DATE RECEIVED:	08/16/2017	**CONTACT:**	Rachel Selenis
DATE COMPLETED:	08/17/2017		

FRACTION #	NAME	TEST	RECEIPT VAC./PRES.	FINAL PRESSURE
01A	SV-9	TO-15	1.0 "Hg	14.8 psi
02A	SV-10	TO-15	3.7 "Hg	15.3 psi
03A	SV-11	TO-15	2.8 "Hg	15.1 psi
04A	Lab Blank	TO-15	NA	NA
04B	Lab Blank	TO-15	NA	NA
05A	CCV	TO-15	NA	NA
05B	CCV	TO-15	NA	NA
06A	LCS	TO-15	NA	NA
06AA	LCSD	TO-15	NA	NA
06B	LCS	TO-15	NA	NA
06BB	LCSD	TO-15	NA	NA

CERTIFIED BY:  DATE: 08/17/17

Technical Director

Certification numbers: AZ Licensure AZ0775, NJ NELAP - CA016, NY NELAP - 11291,
TX NELAP - T104704434-16-11, UT NELAP CA0093332016-7, VA NELAP - 8113, WA NELAP - C935
Name of Accreditation Body: NELAP/ORELAP (Oregon Environmental Laboratory Accreditation Program)
Accreditation number: CA300005, Effective date: 10/18/2016, Expiration date: 10/17/2017.
Eurofins Air Toxics Inc.. certifies that the test results contained in this report meet all requirements of the NELAC standards

LABORATORY NARRATIVE
EPA Method TO-15
Essel Environmental Consultants
Workorder# 1708282A

Three 1 Liter Summa Canister samples were received on August 16, 2017. The laboratory performed analysis via EPA Method TO-15 using GC/MS in the full scan mode.

This workorder was independently validated prior to submittal using 'USEPA National Functional Guidelines' as generally applied to the analysis of volatile organic compounds in air. A rules-based, logic driven, independent validation engine was employed to assess completeness, evaluate pass/fail of relevant project quality control requirements and verification of all quantified amounts.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

There were no analytical discrepancies.

Definition of Data Qualifying Flags

Eight qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).

J - Estimated value.

E - Exceeds instrument calibration range.

S - Saturated peak.

Q - Exceeds quality control limits.

U - Compound analyzed for but not detected above the reporting limit, LOD, or MDL value. See data page for project specific U-flag definition.

UJ- Non-detected compound associated with low bias in the CCV

N - The identification is based on presumptive evidence.

File extensions may have been used on the data analysis sheets and indicates as follows:

a-File was requantified

b-File was quantified by a second column and detector

r1-File was requantified for the purpose of reissue

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Summary of Detected Compounds
EPA METHOD TO-15 GC/MS FULL SCAN

Client Sample ID: SV-9

Lab ID#: 1708282A-01A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.2	10	10	26

Client Sample ID: SV-10

Lab ID#: 1708282A-02A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	93	13000	230	33000

Client Sample ID: SV-11

Lab ID#: 1708282A-03A

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	90	20000	220	50000

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Client Sample ID: SV-9

Lab ID#: 1708282A-01A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17081615**	**Date of Collection: 8/15/17 9:48:00 AM**	
Dil. Factor:	**2.08**	**Date of Analysis: 8/16/17 09:41 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	4.2	10	10	26

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	98	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	86	70-130

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Client Sample ID: SV-10

Lab ID#: 1708282A-02A

EPA METHOD TO-15 GC/MS

File Name:	**14081706**	**Date of Collection: 8/15/17 9:08:00 AM**	
Dil. Factor:	**4.64**	**Date of Analysis: 8/17/17 10:10 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	93	13000	230	33000

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	105	70-130
Toluene-d8	94	70-130
4-Bromofluorobenzene	105	70-130

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Client Sample ID: SV-11

Lab ID#: 1708282A-03A

EPA METHOD TO-15 GC/MS

File Name:	**14081707**	**Date of Collection:**	**8/15/17 8:27:00 AM**
Dil. Factor:	**4.48**	**Date of Analysis:**	**8/17/17 10:35 AM**

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	90	20000	220	50000

Container Type: 1 Liter Summa Canister

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	100	70-130
4-Bromofluorobenzene	104	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1708282A-04A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17081605**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/16/17 01:09 PM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	2.0	Not Detected	4.9	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	97	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	84	70-130

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Client Sample ID: Lab Blank

Lab ID#: 1708282A-04B

EPA METHOD TO-15 GC/MS

File Name:	**14081705**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/17 09:35 AM**	

Compound	Rpt. Limit (ppbv)	Amount (ppbv)	Rpt. Limit (ug/m3)	Amount (ug/m3)
2-Propanol	20	Not Detected	49	Not Detected

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	101	70-130

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Client Sample ID: CCV

Lab ID#: 1708282A-05A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17081602**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/16/17 10:40 AM**	

Compound	%Recovery
2-Propanol	87

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	104	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	93	70-130

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Client Sample ID: CCV

Lab ID#: 1708282A-05B

EPA METHOD TO-15 GC/MS

File Name:	**14081702**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/17 07:51 AM**	

Compound	%Recovery
2-Propanol	106

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	106	70-130
Toluene-d8	96	70-130
4-Bromofluorobenzene	108	70-130

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Client Sample ID: LCS

Lab ID#: 1708282A-06A

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17081603**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/16/17 11:07 AM**	

Compound	%Recovery	Method Limits
2-Propanol	98	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	102	70-130
Toluene-d8	102	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: LCSD

Lab ID#: 1708282A-06AA

EPA METHOD TO-15 GC/MS FULL SCAN

File Name:	**17081604**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/16/17 11:34 AM**	

Compound	%Recovery	Method Limits
2-Propanol	99	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	101	70-130
Toluene-d8	103	70-130
4-Bromofluorobenzene	92	70-130

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Client Sample ID: LCS

Lab ID#: 1708282A-06B

EPA METHOD TO-15 GC/MS

File Name:	**14081703**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/17 08:38 AM**	

Compound	%Recovery	Method Limits
2-Propanol	121	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	109	70-130
Toluene-d8	90	70-130
4-Bromofluorobenzene	107	70-130

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Client Sample ID: LCSD

Lab ID#: 1708282A-06BB

EPA METHOD TO-15 GC/MS

File Name:	**14081704**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 8/17/17 09:06 AM**	

Compound	%Recovery	Method Limits
2-Propanol	106	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
1,2-Dichloroethane-d4	113	70-130
Toluene-d8	98	70-130
4-Bromofluorobenzene	106	70-130

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Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630-4719
(916) 985-1000 FAX (916) 985-1020

Project Manager Rodger Witham

Collected by: (Print and Sign) Rodger Witham Rodger C. Witham

Company Essel Environmental Email rodger@esseltek.com

Address 351 California St. City San Francisco State CA Zip 94104

Phone _____ Fax _____

Project Info:
P.O. # 15166
Project # 15166
Project Name West Grand #Brush

Turn Around Time:
☐ Normal
☒ Rush 3-day specify

Lab Use Only
Pressurized by:
Date:
Pressurization Gas: N_2 He

Lab I.D.	Field Sample I.D. (Location)	Can #	Date of Collection	Time of Collection	Analyses Requested	Canister Pressure/Vacuum Initial	Final	Receipt	Final (psi)
01A	SV-9	N0233	8/15/17	9:48a.m.	Methane, O_2, N_2, CO_2 D-1946				
					2-propanol TO-15				
02A	SV-10	01031	8/15/17	9:08a.m.	Methane, O_2, N_2, CO_2 D-1946				
					2-propanol TO-15				
03A	SV-11	N3093	8/15/17	8:27a.m.	Methane, O_2, N_2, CO_2 D-1946				
					2-propanol TO-15				

Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
Rodger C. Witham 8/15/17 11:50a.m.	08/16/17 1010
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time
Relinquished by: (signature) Date/Time	Received by: (signature) Date/Time

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		NA	Good	Yes No None	1708282

Form 1293 rev.11

APPENDIX D

CONCEPTUAL SITE MODEL

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Conceptual □ite Model

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
Geology and Hydrogeology	Regional	The Site is located on the East Bay Plain, which consists of a series of alluvial fans and dune sands that were deposited on a westward sloping bedrock surface. This bedrock is presumed to consist of rocks of the Jurassic- to Cretaceous-age Franciscan complex. The alluvial fan and dune sand deposits that overlie the Franciscan complex rocks are Pleistocene to Holocene in age and, from oldest to youngest, include the Santa Clara, Alameda, and Temescal Formations. The early Pleistocene-age Santa Clara Formation contains semi-consolidated units of conglomerate, sandstone, siltstone, and claystone. The Alameda Formation, of Pleistocene to Holocene age, comprises lower unnamed units and several upper members that include the Yerba Buena mud (black, organic-rich clay); a sequence of alluvial fan and eolian deposits (sand, gravel, silt) referred to as the San Antonio/Merritt/Posey member, and the Young Bay mud (black, organic-rich clay). The Temescal Formation is late Pleistocene to early Holocene in age and is an alluvial fan deposit consisting of silt and clay. The total thickness of these Pleistocene to Holocene sediments in the general area is reported to range from 450 to 500 feet (see Radbruch, 1957; California Regional Water Quality Control Board, San Francisco Bay Region [RWQCB], 1999; Graymer, 2000). The RWQCB considers regional shallow ground-water-bearing units to be those that are above the Yerba Buena mud (i.e., San Antonio, Merritt, and Posey members of the Alameda Formation; Temescal Formation) and deeper regional ground water to be below the Yerba Buena mud (i.e., lower unnamed units of the Alameda Formation; Santa Clara Formation). The direction of ground-water flow in the area of the Site varies, but is generally westward to northwestward, consistent with the surface topographic slope.	None.	NA

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
Geology and Hydrogeology	Site	Graymer (2000) and Radbruch (1957), respectively, show the site is located at or near the surface contact between the Merritt sand member of the Alameda Formation and the Temescal Formation. The Merritt sand is a fine-grained, very well sorted, Aeolian sand that is silty and clayey in areas and contains lenses of sandy clay and clay. The Temescal Formation is an alluvial fan deposit and consists of interfingering lenses of sandy gravel, clayey gravel, gravelly sand, and clayey sand that grade upward at shallower depths to sandy clay and silty clay. The Merritt sand and Temescal formation are late Pleistocene to Holocene in age. Unconsolidated sediments encountered during Essel's three subsurface investigations (2015; 2016a; 2016b) include near-surface silt or fill underlain by alternating and interbedded units of clay, silt, sand, and occasionally gravel to the maximum depth explored of 20.8 feet below the ground surface. Coarse-grained sand and gravel clasts contained within the silty clay are consistent with the Temescal Formation as described by Radbruch (1957) and the very fine- to fine-grained sand (well sorted, poorly graded), silty sand, and clayey sand appears consistent with Radbruch's description of the Merritt sand. Units encountered in borings at the site are described as follows: • Fill - brownish-black to dusky yellowish-brown clay, silt, silty fine-grained sand, and fine- to coarse-grained sand observed in some borings from the base of the concrete to depths ranging from a few inches to approximately 4 feet below the ground surface. • Fill - at the locations of the former underground storage tanks (USTs), bluish-gray-discolored silty clay and silt underlain by layers of fine-grained sand and fine- to coarse-grained sand with gravel that showed no discoloration, were encountered to 13 feet below the ground surface in borings ECB-2 and	None.	NA

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		B-SV1 (diesel UST location), and 10½ feet below the ground surface in boring ECB-3 (gasoline UST location). Bluish-gray-discolored silty clay directly underlies the sand backfill in the three borings indicating the bottoms of the former diesel and gasoline USTs were at approximate depths of 12 and 10½ feet below grade, respectively. • Silt and silty clay - outside the former UST excavation, a near-surface silt unit, up to 4 feet thick, and underlying relatively thick silty clay were encountered in borings to depths generally of 8 to 10 feet below grade. This silt/clay unit appears to be laterally extensive beneath much of the site in the 1- to 10-foot-depth interval; however, was observed to extend as deep as 17 feet below grade in east-central boring ECB-5, advanced next to the former fuel dispenser. The silt/clay unit is inferred to be of similar thickness to the south of the fuel dispenser area (southeastern portion of the site); however, interbeds of silt and sand are present between 10 and 17 feet below grade at the southeastern corner of the property in boring ECB-6. • Silt/sand/gravel - units of silt, more predominant units of clayey sand, silty sand, sand (some units containing gravel), and occasional units of clayey gravel, with subordinate interbeds of clay, are present beneath the silty clay (base at 8 to 10 feet below grade) to depths ranging from 17½ to at least 20 feet below the ground surface. The silt/sand/gravel zone also appears to be laterally continuous beneath the site, but is thinner (2 to 3 feet thick) beneath the eastern portion of the property and becomes notably thicker (more than 10 feet) along the western side of the site and off-site beneath the adjacent residential property (boring ECB-22). • Silty clay - encountered beneath the silt/sand/gravel zone in many but not all borings advanced to 20 feet below the ground surface. This unit appears to be laterally continuous beneath much of the site, except along the western edge.		

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		The sediments were observed to be various shades of yellowish-brown (pale to dark) with varying degrees of reddish-brown and yellowish-orange oxidation staining. A zone of medium bluish-gray discolored sediments (with associated petroleum odor) was observed between 5 and 17 feet below grade in borings (ECB-1 through ECB-5) advanced near the former USTs and fuel dispenser. Bluish-gray discolored soil was observed in borings ECB-9, ECB-10, and ECB-15 through ECB-19 in the west-central geophysical anomaly area from as shallow as 3 feet to as deep as 17 feet below the ground surface. At both these locations, the discoloration occurs above and below the ground-water surface. Gray, discolored appearing soil was observed in off-site western boring ECB-14 (22nd Street) at depths of 17½ to 18½ feet below grade (below the ground-water surface). PES (2005) reported depth to first ground water in borings drilled at the site in 2005 to be 12 to 13 feet below the ground surface. Depth to ground water was measured in the temporary wells installed in borings ECB-1 through ECB-22 during Essel's 2015 and 2016 subsurface investigations. In September 2015, the ground-water surface ranged from 12.41 feet below grade in off-site western boring ECB-14 to 20.19 feet below the ground surface in slant boring ECB-7, located in the central portion of the site. Depth to water in most temporary wells averaged approximately 14¼ feet below grade in September 2015. The greater depths to first ground water measured in some borings likely do not represent static water levels. In February 2016, depth to ground water varied from 12.8 to 13.25 feet below the ground surface in temporary wells placed in borings ECB-15 through ECB-20 (west-central portion of the site). In June 2016, ground water was measured at approximately 13 feet below grade in off-site borings ECB-21 and ECB-22, located along West Grand Avenue and on the west-adjacent residential property, respectively. Depth to water in borings ECB-23 through ECB-25 was measured at approximately 13½ feet below grade in July 2017.		

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		Based on the orientation of TPHg, TPHd, TPHmo, and naphthalene plumes in the geophysical anomaly area, the direction of ground-water flow beneath the site is inferred to be between north-northwest and northwest.		
Surface Water Bodies		Lake Merritt is located approximately 3,900 feet east-southeast and Oakland Inner Harbor is located approximately 6,700 feet south of the site.	None.	NA
Nearby Wells		The State Water Resources Control Board's GeoTracker GAMA website provides the locations of ground-water-monitoring and ground-water-supply wells. The GAMA website shows that no ground-water-supply wells are located within ¼-mile (1,320 feet) of the site. Three groups of environmental monitoring wells, related to leaking underground storage tank properties, are located at distances of 600 feet south-southwest, 900 feet west-northwest, and 1,350 feet south of the site. Well records provided by the Alameda County Public Works Agency show the nearest water-supply wells are more than 2,000 feet north of the site. Records provided by the California Department of Water Resources do not indicate any water-supply wells are located within 2,000 feet of the Site.	None.	NA
Release Sources		The release sources include: • One 7,000-gallon diesel (UST) formerly located in the northeastern corner of the site; • A fuel dispenser island located in the east-central portion of the site; • One 2,000-gallon gasoline UST formerly located off-site beneath the sidewalk adjacent to the diesel UST; and • A presumed UST, possibly used for waste oil, formerly located near the west-central edge of the site. The gasoline and diesel USTs were removed in October 1986. No description of the conditions of the tanks or observations of the tank	None.	NA

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		excavation is available. The volume of the release is not known. No record exists with regard to the possible UST at the west-central edge of the site, but borings advanced in the area did not encounter a UST.		
Light Non-aqueous Phase Liquid (LNAPL)		An electronic oil-water interface probe was used to check the presence of LNAPL in on-site and off-site borings ECB-1 through ECB-22. No LNAPL was detected in any boring using the interface probe and no LNAPL was observed during grab ground-water sampling (through temporary wells) of the 22 borings. No LNAPL was observed in temporary wells installed in borings ECB-23 through ECB-25 in July 2017.	None.	NA
Source Removal Activities		Primary sources: The two USTs were removed in October 1986. Secondary sources: No free-phase petroleum product was found on the ground water in borings ECB-1 through ECB-25. Secondary source soil with elevated concentrations of TPHg, TPHd, and TPHmo is present in the 12- to 16-foot-depth interval (at and below the ground-water surface) in the areas of the former USTs and the geophysical anomaly. The vertical and lateral extent of this impacted soil has been delineated and is restricted to the vicinity of the former UST excavation and within an approximately 35 by 55 foot area around boring ECB-15 at the geophysical anomaly. Moderate concentrations of petroleum hydrocarbons are present in the depth interval of 8 to 15 feet below the ground surface in an estimated 15- by 15-foot square area near the former fuel dispenser. Based on depth to this impacted soil (greater than 10 feet below grade), the local impact to ground water, and the lack of health-risk indicator constituents (benzene, naphthalene, polynuclear aromatic hydrocarbons [PAHs]), secondary source soil at the former USTs, fuel dispenser, and geophysical anomaly areas is not considered to be of risk to human health or the environment.	None	NA
Contaminants		Historical records indicate diesel and gasoline USTs were present	None.	NA

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
of Potential Concern		at and adjacent to the site and that the present-day shop building was used for vehicle oil changes. Previous analyses (PES, 2005, 2011) of soil and ground-water samples were restricted to total petroleum hydrocarbons (TPH); benzene, toluene, ethylbenzene, total xylenes (BTEX); and methyl tertiary butyl ether (MTBE). Soil and ground-water samples from borings ECB-1 through ECB-22, soil samples from borings advanced for soil vapor wells SV-1 through SV-7, and soil samples from hand auger borings HA-1 through HA-3 were analyzed for the full range of petroleum hydrocarbons and VOCs. Selected soil and ground-water samples were also analyzed for PAHs (see Essel, 2015, 2016a, 2016b). In soil, relatively elevated concentrations of TPHg, TPHd, and TPHmo were found in nine of 95 soil samples. Trace to low concentrations of xylenes, naphthalene, five other petroleum-related volatile organic compounds (VOCs), and five PAHs were sporadically detected in soil samples from borings in the geophysical anomaly. Low concentrations of the carcinogenic PAHs were detected in one soil sample from off-site boring B-22. Of the compounds detected, concentrations of TPHg, TPHd, TPHmo, xylenes, naphthalene, 2-methylnaphthalene, and benzo (a) pyrene are greater than Tier 1 environmental screening levels (ESLs) of the San Francisco Bay Regional Water Quality Control Board. However, no concentration of the indicator petroleum constituents (benzene, ethylbenzene, naphthalene, carcinogenic PAHs) is greater than the direct contact or outdoor air criteria of the State Water Resources Control Board's Low-Threat UST Closure Policy. In ground water, concentrations of TPHg, TPHd, and TPHmo greater than current applicable Tier 1 ESLs were found in 13 of 26 ground-water samples collected from borings advanced in 2005, 2015, 2016, and 2017. The higher concentrations were detected		

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C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		primarily in borings where elevated levels of TPH were found in soil. The aromatic hydrocarbons BTEX were detected in five ground-water samples, the fuel oxygenate MTBE was detected in one sample, naphthalene was detected in three samples, the chlorinated hydrocarbons *cis*-1,2-dichloroethene and vinyl chloride were found in one sample; and the butyl benzenes, isopropylbenzene, n-propyl benzene, and the trimethylbenzenes were variously detected in seven water samples. Non-chlorinated hydrocarbon solvents acetone, methyl ethyl ketone (MEK), 2-hexanone, methyl isobutyl ketone (MIBK), and 4-isopropyl toluene; and the insecticide bromomethane were also detected in several ground-water samples. In addition to the total petroleum hydrocarbons, benzene, xylenes, naphthalene, 2-methylnaphthalene, phenanthrene, and vinyl chloride, were at a concentration greater than applicable screening levels or maximum contaminant levels for drinking water; however, these exceedances were in only four water samples that were associated with elevated TPH levels. In soil vapor, TPH-gasoline range, BTEX, MTBE, other fuel constituents and vinyl chloride were detected in soil-vapor samples from wells SV-1 and SV-4, located within and to the west of the former UST excavation. Benzene and vinyl chloride were found at levels greater than applicable vapor intrusion ESLs. In soil vapor wells SV-2, SV-3, SV-5, SV-6, and SV-7, petroleum hydrocarbon constituents were either not detected or were detected at low levels below applicable vapor intrusion ESLs. Chloroform was detected in wells SV-2 and SV-7 at concentrations greater than the applicable ESL. The chlorinated solvent tetrachloroethene was found during two sampling events in well SV-2 (below the vapor intrusion ESL), but was not detected in nearby vapor wells SV-6 or SV-7. Sampling of soil vapor wells SV-1 through SV-7 in February and March 2016 did not suggest a significant on-site source area or areas for the chlorinated solvents vinyl chloride or tetrachloroethene.		

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		Naphthalene was not detected in soil vapor samples collected from the former UST and dispenser areas in 2015 and 2015 and was not detected in soil vapor samples collected in the geophysical anomaly area in 2017. Methane has not been detected in vapor samples collected from SV-1 through SV-11 at concentrations greater than the 5,000 part-per-million action level cited in Department of Toxic Substances Control guidance. The results of analyses of soil, ground water, and soil vapor samples and the relevant criteria of the Low-Threat UST Closure Policy indicate that the contaminants of potential concern are TPHg, TPHd, and TPHmo.		
Petroleum Hydrocarbons in Soil		The results of subsurface investigations performed by PES in 2005 and 2011 found relatively localized concentrations of TPHg and TPHd in soil above the ground-water surface at levels greater than applicable environmental screening levels (ESLs). Essel's 2015 and 2016 investigations were performed to further delineate the extent of petroleum contaminants, particularly at and below the ground-water surface. <u>TPHg:</u> Detectable levels of TPHg were found in the two soil samples collected from the gasoline UST pit in 1986 and in three of 25 soil samples collected from borings advanced in 2005 and 2011. Soil collected at a depth of 8 feet below the ground surface in boring B-4, advanced next to the former fuel dispenser, was the only sample containing TPHg at a concentration (190 mg/kg) greater than the current applicable Tier 1 ESL. During the 2015 and 2016 subsurface investigations, elevated levels of TPHg were detected at and just below the ground-water surface (depth interval of 13 to 16 feet below grade) in borings advanced at and very near the location of the former gasoline UST and at the west-central	None. Extent of contaminants in soil has been delineated.	NA

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		edge of the site (geophysical anomaly area). Concentrations of 130 and 95 milligrams per kilogram (mg/kg) TPHg were detected at 8 and 14½ feet below grade in boring ECB-5, located next to the former fuel dispenser and earlier boring B-4. Low concentrations (2.1 to 44 mg/kg) of TPHg were detected in soil from five borings advanced in the former UST, former fuel dispenser, and geophysical anomaly areas. No TPHg was detected in 56 soil samples collected from borings advanced within and outside the three areas of impact or in the four borings advanced off-site. TPHd: Concentrations of 250 and 220 mg/kg TPHd were found in 1986 at the northern end of the on-site 7,000-gallon diesel UST at respective depths of 12 and 13 feet below the ground surface and 80 mg/kg TPHd was detected at 12 feet below grade beneath the southern end of the former UST. A concentration of 230 mg/kg TPHd, associated with the elevated TPHg, was also detected in the soil sample collected at the 8-foot depth in boring B-4, advanced next to the former fuel dispenser. This concentration dropped to 23 mg/kg at the 12-foot depth in boring B-4. In 2015 and 2016, elevated concentrations of TPHd (190 to 1,200 mg/kg) were found in borings ECB-3, ECB-4, ECB-10, ECB-15, ECB-16, and ECB-17 within the depth interval of 13 to 16 feet below the ground surface. These borings were advanced in the former UST area and the geophysical anomaly area. Either no TPHd was detected or low concentrations were found in other soil samples tested. TPHmo: TPHmo was not detected in soil samples during previous investigations, including two samples collected from boring B-5, advanced in the former oil changing building. In 2015 and 2016 elevated concentrations of 310 to 16,000 mg/kg TPHmo were detected within the 13- to 16-foot-depth interval in borings advanced in the former UST and geophysical anomaly areas. No TPHmo was detected in the two samples collected at 4½ and 9½		

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Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		feet below grade from slant boring ECB-7, advanced beneath the vehicle maintenance trench and none was detected in other soil samples tested. The vertical and lateral extents of the three TPH ranges in soil have been defined in the former UST, former fuel dispenser, and geophysical anomaly areas as follows. • Former USTs - an area approximately 35 feet by 30 feet is impacted around the former locations of the USTs, with elevated concentrations occurring between 12 and 16 feet below grade and the maximum depth of impact at approximately 17½ feet below the ground surface. • Former Fuel Dispenser – an estimated 15- by 15-square-foot area is impacted at the location of the existing concrete dispenser pedestal. Concentrations of TPH were detected at depths of 4 to 14½ feet below grade and no TPH was detected at 18 feet below grade. Relatively elevated concentrations are at 8 and 14½ feet below the ground surface. • Geophysical Anomaly Area – an estimated area approximately 55 feet by 35 feet encompassing borings ECB-10, ECB-15 through ECB-17, and ECB-19 is impacted with TPH. The TPH impact may extend approximately 10 feet west of the site beneath adjacent properties. Elevated concentrations of TPH and the maximum depth of impact are restricted to within the depth interval of approximately 12 to 16 feet below the ground surface. <u>Individual Constituents</u>: No BTEX, MTBE, naphthalene, other VOCs, or PAHs were detected in soil samples collected during the 2005, 2011, and 2015 investigations. In 2016, xylenes, naphthalene, and a few other petroleum-related VOCs and PAHs		

□a□le
Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		were detected in soil in the geophysical anomaly area, with detected concentrations primarily found in samples containing elevated TPH concentrations. Except for anomalous detections of the carcinogenic PAHs at the 12½-foot depth in off-site boring ECB-22, the lateral and vertical extent of individual constituents is essentially contained within the area of TPH impact in the geophysical anomaly area.		
Petroleum Hydrocarbons in Ground Water		PES sampled ground water from borings B-1, B-2, B-5, and B-6 in 2005 and concentrations of TPHd and TPHmo were greater than current applicable Tier 1 ESLs. No TPHg or BTEX was detected in water samples and trace MTBE (0.61 ug/L) was found in one grab ground-water sample. Both TPHd and TPHmo were present across the site and, possibly may have migrated off-site to the northwest. In 2015 and 2016, elevated levels of TPHg, TPHd, and TPHmo were detected in water samples collected from borings ECB-2 through ECB-5 (former USTs and fuel dispenser) and borings ECB-10, ECB-15 through ECB-17, and ECB-19 (geophysical anomaly area). No TPHg, TPHd, or TPHmo was found in water samples from central boring ECB-7, perimeter borings ECB-1, ECB-6, ECB-8, ECB-9, ECB-11, and ECB-12, or off-site boring ECB-13. Low concentrations of TPHd were detected in off-site borings ECB-14 and ECB-21, but these detections do not appear to be related to site releases, based on crossgradient location and distance from the site. The results suggest the elevated levels detected in the areas of the former USTs and fuel dispenser have not migrated to the western edge of the site. Elevated TPHg, TPHd, and TPHmo in ground water in the geophysical anomaly area are present a short distance (likely less than 50 feet) off-site to the northwest. Sporadic trace to low concentrations of petroleum fuel constituents and PAHs and minor concentrations of non-chlorinated solvents and chlorinated solvents were detected in	None. Extent of contaminants in ground water has been delineated.	NA

□a□le
Conceptual □ite Model □Continued□

C□M Element	C□M □u□□ Element	□escription	□ata Gap □tem □	Resolution
		water samples collected from on-site borings. None of these individual compounds were detected in water samples collected from the four off-site borings.		
Vapor Intrusion to Indoor Air		Detectable concentrations of TPH gasoline range, benzene, ethylbenzene, xylenes, MTBE and other petroleum fuel constituents were found in several soil vapor wells located near the former USTs and fuel dispenser. Naphthalene was not detected in any soil vapor sample in these two areas or in the geophysical anomaly area. Except for TPH gasoline range, benzene, vinyl chloride, and chloroform, none of the detected concentrations was greater than applicable Tier 1 ESLs for potential vapor intrusion risk. A focused human health risk assessment shows vapor intrusion health risk in the former UST and fuel dispenser areas is not present.	None. No vapor intrusion health risk appears to be present.	NA
Direct Contact and Outdoor Air		Soil samples collected within the 0- to 5-foot and 5- to 10-foot depth intervals have been analyzed for benzene. Benzene was not detected in soil samples collected within the two depth intervals. During the 2015 and 2016 investigations, soil samples collected within the above-described depth intervals in the former UST, fuel dispenser, geophysical anomaly area, and oil-changing pit were analyzed for benzene, naphthalene, and PAHs. Laboratory analytical results show no detectable concentrations of benzene, naphthalene, or any PAH analyte.	None.	NA
Risk Evaluation		The Source Group, Inc. performed a focused human health risk assessment for the former UST and fuel dispenser area to assess vapor intrusion risk from vinyl chloride and other VOCs found in soil vapor. The assessment did not find significant health risk from the contaminants present in soil vapor in this area.	None.	NA

APPENDIX E

FOCUSED HUMAN HEALTH RISK ASSESSMENT

APEX
Apex Companies, LLC
3478 Buskirk Avenue, Suite 100 • Pleasant Hill, CA 94523
P: (925) 944-2856 • F: (925) 944-2859

August 22, 2017

Mr. Nik Lahiri
Essel Environmental Engineering & Consulting
564 Market Street, Suite 160
San Francisco, CA 94104

Subject: Focused Human Health Risk Assessment for Groundwater Impacts to Indoor Air
760 22nd Street and 2201 Brush Street
Oakland, California

Dear Mr. Lahiri:

At your request, The Source Group, Inc. a division of Apex Companies, LLC. (Apex-SGI) has performed an evaluation of the groundwater data collected at the properties located at 760 22nd Street and 2201 Brush Street in Oakland, California (the Site; Attachment A). The two adjacent properties are bordered by West Grand Avenue to the north, Brush Street to the east, and 22nd Street to the south. The Site is surrounded by both residential and commercial/industrial land use. The proposed redevelopment of the Site includes a multi-story building with mixed use (i.e., offices, child-care facility, and residences). Preliminary architectural plans indicate that the proposed building and associated parking will cover the entire Site. Therefore, exposure via direct contact with soil or groundwater is not anticipated. This focused human health risk assessment (HHRA) was conducted to estimate potential adverse noncancer health effects and excess cancer risks associated with the chemicals of potential concern (COPCs) in groundwater volatilizing into indoor air. Although the proposed building will include office and child-care worker receptors, the estimated risks for these occupational receptors would be less than the estimated risks for a resident receptor. Consequently, this HHRA was conducted to estimate potential indoor air concentrations and associated human health risks from vapor intrusion of COPCs into future onsite residences. Although the preliminary architectural plans indicate that the residences will be located above the second floor, currently available vapor intrusion models do not allow for the evaluation of a multi-story building or elevator exposure scenarios. Therefore, this HHRA conservatively assumes that the future onsite resident receptor is located at ground surface.

GROUNDWATER SCREENING ASSESSMENT

Grab groundwater samples were collected during three separate Site investigations conducted in September 2015, February 2016, and July 2017. The focus of this HHRA, specifically evaluates groundwater data

collected northeast of the oil changing pit, near the former underground storage tanks (USTs), and near the former dispenser island. The groundwater data are summarized in the following bullets:

- Northeast of the Oil Changing Pit – boring ECB-15 (sampled February 16, 2016) and boring ECB-23 (sampled July 28, 2017);
- Former USTs – boring ECB-3 (sampled September 24, 2015) and boring ECB-24 (sampled July 28, 2017); and
- Former Dispenser Island – boring ECB-5 (sampled September 25, 2015) and boring ECB-25 (sampled July 28, 2017).

The grab groundwater samples were collected by Essel Environmental Engineering & Consulting (Essel) and analyzed for total petroleum hydrocarbons (TPH), volatile organic compounds (VOCs), and polynuclear aromatic hydrocarbons (PAHs). Table 1 summarizes the analytical data for the groundwater samples collected from the borings listed above. Attachment A includes a figure showing the boring locations.

The results from the groundwater investigations were compared with the San Francisco Bay Regional Water Quality Control Board Environmental (SFRWQCB) Screening Levels (ESLs; SFRWQCB, 2016) for groundwater vapor intrusion based on residential land use. U.S. Environmental Protection Agency (USEPA) and Department of Toxic Substances Control (DTSC) do not provide groundwater screening levels for the vapor intrusion exposure pathway. As presented in Table 1, ESLs were only available for 8 of the 23 analytes detected in groundwater. For those 8 analytes, all detected concentrations were below their respective ESL.

Since 15 analytes detected in groundwater did not have a ESL available, further evaluation of groundwater was conducted using the site-specific DTSC vapor intrusion screening model for groundwater (DTSC VI Model; DTSC, 2014). Using this model, all of the analytes detected in groundwater were included in the evaluation. The vapor intrusion modeling assessment is discussed in the following section.

VAPOR INTRUSION MODELING ASSESSMENT

The methods used to conduct this HHRA are consistent with CalEPA DTSC *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air* (Vapor Intrusion Guidance; DTSC, 2011). The DTSC modified version of the USEPA Johnson and Ettinger (1991; J/E) model (DTSC, 2014) was used to estimate potential indoor air concentrations and associated health risks from chemicals in groundwater volatilizing into indoor air. The DTSC VI Model simulates volatilization of chemicals from groundwater into soil vapor, migration of vapors to the ground surface, and mixing with indoor air for the future onsite resident receptor. A detailed description of the equations used in this model is provided in the *User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings* (USEPA, 2004). The following sections discuss the input parameters used in the DTSC VI Model.

Source Concentrations

Vapor emissions were modeled for the Site using source concentrations from groundwater (EPC_{gw}). As described in the previous section, the groundwater data collected in September 2015, February 2016, and

July 2017 from borings ECB-3, ECB-5, ECB-15, ECB-23, ECB-24, and ECB-25 were used in this HHRA (Table 1). Based on the assumption that portions of the building may be located over maximum concentrations in groundwater, it was assumed that hypothetical resident receptors reside over maximum detected concentrations. Therefore, the maximum detected concentration in groundwater for each COPC was selected as the groundwater EPC to be used in the DTSC VI Model to estimate indoor air EPCs. Groundwater EPCs (EPC_{gw}) and the resulting modeled soil gas EPCs (EPC_{sg}) and indoor air EPCs ($EPC_{indoor\ air}$ or $C_{building}$) are presented in Table 2.

To provide a conservative and complete characterization of potential risks associated with exposure at the Site, all detected analytes were retained at COPCs with the exception of TPH. Generally, the evaluation of TPH in a risk assessment includes the evaluation of its components most likely to reflect risk (i.e., benzene, toluene, ethylbenzene, xylenes [BTEX], methyl tertiary butyl ether [MTBE], and naphthalene). It is unlikely that other less toxic components of TPH will drive the overall risk at a site. TPH as a mixture is not evaluated further in this risk evaluation. BTEX and naphthalene were detected in one or more groundwater samples and were included in this HHRA. MTBE was not detected in groundwater.

Naphthalene was detected by both VOC and PAH laboratory analyses of groundwater samples from borings ECB-23 and ECB-15. Naphthalene via VOC analysis was detected at a maximum concentration of 16 micrograms per liter (µg/L) in boring ECB-23. Naphthalene via PAH analysis was detected at a maximum concentration of 36 µg/L in boring ECB-15. For this HHRA, the maximum detected concentration for naphthalene of 36 µg/L via the PAH analysis was used.

Site-Specific and Chemical-Specific Properties

In addition to the chemical concentrations measured in groundwater, site-specific soil physical properties were used as input parameters for the DTSC VI Model. In February 2016, four soil samples were collected and analyzed for physical soil property characterization. Two soil samples were collected near the former USTs at 6.3 feet below ground surface (bgs) and 9.7 feet bgs. Two soil samples were collected near the former dispenser island at 5.7 feet bgs and 9.9 feet bgs. Each soil sample was analyzed for particle size distribution, dry bulk density, and porosity by a California-certified laboratory. The soil characterization analytical report is provided in Attachment B.

The results from the February 2016 soil physical properties analyses were used to determine the appropriate U.S. Department of Agriculture (USDA) soil textural classification within the Site. For three out of four soil samples, the particle size distribution analysis indicated that Site soils most closely fit with the “silty clay loam” USDA soil textural classification. This classification is consistent with the soils observed during previous investigations, which were predominately silty clay. The soil classification for the remaining soil sample was “sand” at probe SV-5 at 9.7 feet bgs. Based on the other soil samples, this sand zone is not indicative of the predominant soil type within the vadose zone. As a result, silty clay loam was selected as the Vadose Zone Soil Type input parameter for the DTSC VI Model. The reported values for dry bulk density (1.63 gram per cubic centimeter [g/cm^3]), total porosity (0.383 cubic centimeter per cubic centimeter [cm^3/cm^3]), and water-filled porosity (0.300 cm^3/cm^3) were used as model input parameters, which represent

the more conservative values for the three "silty clay loam" samples. In accordance with DTSC (2014), default values of 24 degrees Celsius for average soil temperature and 15 centimeters (cm) for depth to the bottom of an enclosed space floor for slab-on-grade construction were used as model input parameters.

During 2015, 2016, and 2017 Site investigations, depth to groundwater ranged from approximately 13 to 14 feet bgs. For this HHRA, a depth of 13 feet bgs was used as the depth below grade to the water table, based on the shallowest depth to groundwater.

Default chemical properties supplied by the DTSC VI Model were used for the dimensionless Henry's Law constant, organic carbon-water partition coefficient (K_{oc}), and molecular diffusion coefficients in air and water, D_i and D_w, for each COPC. If a chemical was not included in the DTSC VI Model, the chemical was reviewed to assess whether an appropriate surrogate chemical could be identified. There were three COPCs not included in the DTSC VI Model. The following table summarizes these COPCs and their identified surrogates, based primarily on structural similarities.

COPC	Surrogate
4-Isopropyl toluene	Isopropylbenzene
Anthracene	Pyrene
Phenanthrene	Pyrene

The identified surrogates listed above were used to evaluate the compounds not included in the DTSC VI Model.

Table 3 summarizes the site-specific soil physical properties input into the DTSC VI Model for vapor migration from groundwater to indoor air.

Building Properties

The DTSC VI Model assumes default values for a single-family residence (DTSC, 2014) for all exposure scenarios. The building air exchange rate was 0.5 $hour^{-1}$ for residential exposure scenario.

Toxicity Assessment

Toxicity values are combined with exposure factors to estimate adverse noncancer health effects and excess cancer risks. Toxicity values include inhalation reference concentrations (RfCs) for noncarcinogenic effects and inhalation unit risk factors (URFs) for carcinogenic effects. Toxicity values supplied by the DTSC VI Model were used.

As discussed previously, there were three COPCs (4-isopropyl toluene, anthracene, and phenanthrene) not included in the DTSC VI Model. For these chemicals, surrogate chemicals were identified, based primarily on structural similarities. The toxicity values supplied by DTSC VI Model for each identified surrogate were used to evaluate the compounds.

Risk Characterization

The risk characterization process incorporates data from the exposure and toxicity assessments to estimate noncancer adverse health effects and excess cancer risks. To estimate noncancer effects, the chronic daily intake is divided by the RfC. The resulting value is referred to as a hazard quotient (HQ). Exposures to multiple chemicals were evaluated by summing the HQs for each COPC, resulting in a hazard index (HI). A HI less than or equal to 1 indicates that no adverse noncancer health effects are expected to occur (USEPA, 1989). Consistent with USEPA (1989) risk assessment guidelines, carcinogenic effects are typically evaluated by multiplying the URF by the chronic daily intake averaged over 70 years to estimate lifetime excess cancer risk. The resulting values are referred to as excess cancer risks. These potential excess cancer risks are compared to the California Environmental Protection Agency (CalEPA) risk management range of one-in-one-million (1×10^{-6}) to one-in-ten thousand (1×10^{-4}).

Consistent with USEPA (1989; 1991) guidelines, the following general equations were used to estimate excess cancer risks and noncancer adverse health effects (expressed as a HQ):

For carcinogens: $$Risk = \frac{C_{building} x EF x ED x ET x URF}{AT_c}$$

For noncarcinogens: $$HQ = \frac{C_{building} x EF x ED x ET}{RfC \; x \; AT_n}$$

Where:

$C_{building}$ = Chemical concentration in indoor air ($EPC_{indoor\ air}$; micrograms per cubic meter [µg/m^3]).
EF = Exposure frequency (days per year).
ED = Exposure duration (years).
ET = Exposure time (hours per day).
AT = Averaging time (hours).
For noncarcinogenic effects, *AT = ED x 365 days/year x 24 hours/day*.
For carcinogenic effects, *AT = 70 years x 365 days/year x 24 hours/day*.
URF = Inhalation unit risk factor for carcinogenic chemicals (µg/m^3)$^{-1}$.
RfC = Inhalation reference concentration for noncarcinogenic chemicals (µg/m^3).

The residential exposure parameters (EF, ED, ET, and AT) are summarized in Table 3. The toxicity values (URF and RfC) used in the above equations were obtained from DTSC VI Model. Table 2 summarizes the individual noncancer HIs and excess cancer risk estimates for each COPC detected in groundwater. The DTSC VI Model spreadsheets are presented in Attachment C.

SUMMARY AND CONCLUSIONS

This focused HHRA was conducted to estimate potential adverse noncancer health effects and excess cancer risks for hypothetical future onsite resident receptors potentially exposed to COPCs volatilizing from

groundwater into indoor air. The proposed redevelopment of the Site includes a multi-story building with mixed use (i.e., offices, child care facility, and residences). Although the proposed building will include office and child-care worker receptors, the estimated risk for these occupational receptors would be less than the estimated risks for a resident receptor. Currently available vapor intrusion models do not allow for evaluation of multi-story building or preferential pathway (i.e., elevator) exposure scenarios. Therefore, this HHRA conservatively assumes that the hypothetical future onsite resident receptors are located at ground surface.

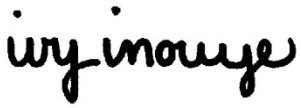
Based on the groundwater data collected in September 2015, February 2016, and July 2017 from borings ECB-3, ECB-5, ECB-15, ECB-23, ECB-24, and ECB-25, the HI estimate of 0.01 does not exceed the USEPA and CalEPA target level of one and the excess cancer risk estimate of 1×10^{-7} is below 1×10^{-6}, which is the most stringent end of CalEPA's risk management range of 1×10^{-6} to 1×10^{-4}. Generally, an excess cancer risk below 1×10^{-6} is acceptable for unrestricted or residential land use.

As mentioned previously, this HHRA assumes the future resident receptor resides over maximum detected COPC concentrations in groundwater beneath a single-story residence. Under proposed development plans, the future onsite resident receptor would be located on the third floor or higher floor of a multi-story building. Therefore, the results of this HHRA likely overestimate actual risk.

Based on this HHRA, the estimated cancer risk and noncancer hazard are below regulatory thresholds and COPCs in groundwater do not pose a human health risk to potential future onsite resident receptors at the Site.

Sincerely,

The Source Group, Inc.



Ivy Inouye
Senior Toxicologist

Table 1	Comparison of Organic Compound Concentrations in Groundwater Samples
Table 2	Exposure Point Concentrations for Chemicals of Potential Concern in Groundwater and Indoor Air, Risk Characterization for Hypothetical Future Onsite Resident Receptor
Table 3	Vapor Intrusion Model Parameters

Attachment A	Site Plan and Boring Locations
Attachment B	Soil Characterization Analytical Report
Attachment C	DTSC Vapor Intrusion Model Spreadsheets

APEX

References

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USEPA. 2004. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. Office of Emergency and Remedial Response. February.

TABLES

Table 1
Comparison of Organic Compound Concentrations in Groundwater Samples
760 22nd Street and 2201 Brush Street, Oakland, California

Boring	ECB-23	ECB-15	ECB-24	ECB-3	ECB-25	ECB-5	**Groundwater Vapor Intrusion ESL[1]**
Sample Number	W-ECB23	W-ECB15	W-ECB24	W-ECB3	W-ECB25	W-ECB5	
Date Sampled	7/28/17	2/16/16	7/28/17	9/24/15	7/28/17	9/25/15	
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
Analyte							
Petroleum Hydrocarbons							
TPH-gas	**480**	**120**	**350**	**710**	**1,200**	**430**	**No Value**
TPH-diesel	**3,100**	**3,400**	**6,600**	**24,000**	**710**	**100**	**No Value**
TPH-motor oil	**15,000**	**24,000**	**1,700**	**7,300**	<500	<250	**No Value**
VOCs							
Benzene	<0.50	**0.54**	<0.50	<0.50	<1.0	<0.50	**30**
Toluene	**3.0**	**1.3**	<0.50	<0.50	<1.0	<0.50	**100,000**
Ethylbenzene	**0.58**	<0.50	<0.50	<0.50	<1.0	<0.50	**370**
Xylenes	**5.1**	**4.6**	<0.50	<0.50	<1.0	**0.56**	**38,000**
Methyl tertiary butyl ether	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**15,000**
tert-Butyl alcohol	<2.0	<2.0	<2.0	<2.0	<4.0	<2.0	**No Value**
Naphthalene	**16**	**6.1**	<0.50	<0.50	<1.0	<0.50	**180**
Acetone	**15**	<10	<10	**18**	<20	**12**	**140,000,000**
Bromomethane	**0.99**	<0.50	<0.50	<0.50	<1.0	<0.50	**6,500**
2-Butanone (MEK)	**3.3**	<2.0	<2.0	<2.0	<4.0	**3.6**	**22,000,000**
n-Butyl benzene	**4.3**	**1.1**	**0.67**	**0.91**	**11**	**0.92**	**NA**
sec-Butyl benzene	**3.6**	**0.63**	**1.1**	**1.4**	**6.2**	**1.4**	**NA**
tert-Butyl benzene	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**NA**
2-Hexanone	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**NA**
Isopropylbenzene	**5.8**	**0.95**	<0.50	<0.50	**8.7**	**1.1**	**NA**
4-Isopropyl toluene	**4.1**	**1.9**	<0.50	<0.50	<1.0	<0.50	**NA**
4-Methyl-2-pentanone (MIBK)	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**11,000,000**
n-Propyl benzene	**6.6**	**1.3**	<0.50	**0.67**	**27**	**1.3**	**NA**
1,2,4-Trimethylbenzene	**33**	**19**	<0.50	<0.50	<1.0	**0.62**	**NA**
1,3,5-Trimethylbenzene	**4.0**	**2.2**	<0.50	<0.50	<1.0	<0.50	**NA**
cis-1,2-Dichloroethene	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**15,000**
Vinyl chloride	<0.50	<0.50	<0.50	<0.50	<1.0	<0.50	**2.0**
PAHs							
Acenaphthene	<0.50	<5.0	**4.9**	**1.9**	<0.50	<0.50	**No Value**
Anthracene	<0.50	<5.0	**1.1**	<0.50	<0.50	<0.50	**No Value**
1-Methylnaphthalene	**5.1**	**15**	<0.50	<0.50	**9.3**	<0.50	**NA**
2-Methylnaphthalene	**2.7**	**19**	<0.50	<0.50	<0.50	<0.50	**No Value**
Naphthalene	**7.5**	**36**	**2.6**	<0.50	**0.78**	<0.50	**180**
Phenanthrene	**0.71**	<5.0	**10**	**3.3**	**0.51**	<0.50	**No Value**

Notes:

Data provided by Essel Environmental Engineering & Consulting

Detectable concentrations are in bold font.

µg/L = microgram per liter

TPH = total petroleum hydrocarbons

VOCs = volatile organic compounds

PAHs - polynuclear aromatic hydrocarbons

ESL = Environmental Screening Level

< = less than the laboratory reporting limit shown.

No Value = compound listed in ESL table, but no value indicated

NA = not available, compound not listed in ESL table

[1] Represents SFRWQCB (2016) groundwater vapor intrusion human health risk screening levels, Deep Groundwater, Residential, Fine to Coarse Scenario.

References:

Regional Water Quality Control Board - San Francisco Bay (SFRWQCB). 2016. Environmental Screening Levels (ESLs). Interim Final 2016. Revision 3. February.

Table 2
Exposure Point Concentrations for Chemicals of Potential Concern in Groundwater and Indoor Air
Risk Charaterization for Hypothetical Future Onsite Resident Receptor
760 22nd Street and 2201 Brush Street
Oakland, California

Chemical of Potential Concern	Groundwater Concentration[1] EPC_{gw} (µg/L)	Soil Gas Concentration[2] EPC_{sg} (µg/m^3)	Soil Vapor to Indoor Air Attenuation Factor[2] (unitless)	Indoor Air Concentration[2] $EPC_{indoor\ air}$ $C_{building}$ (µg/m^3)	Cancer Risk[3,5] (unitless)	Noncancer Hazard[4] (unitless)
Volatile Organic Compounds (VOCs)						
Benzene	0.54	117	1.0E-05	1.23E-03	1.3E-08	3.9E-04
Toluene	3.0	776	9.0E-06	6.99E-03	NA	2.2E-05
Ethylbenzene	0.58	177	7.9E-06	1.39E-03	1.2E-09	1.3E-06
Xylenes	5.1	1,418	7.9E-06	1.12E-02	NA	1.1E-04
Acetone	18	25	1.0E-04	2.52E-03	NA	7.8E-08
Bromomethane	0.99	289	1.2E-05	3.36E-03	NA	6.4E-04
2-Butanone (MEK)	3.6	8.0	6.1E-05	4.88E-04	NA	9.4E-08
n-Butyl benzene	11	6,713	5.9E-06	3.99E-02	NA	2.2E-04
sec-Butyl benzene	6.2	2,442	6.0E-06	1.47E-02	NA	3.5E-05
Isopropylbenzene	8.7	3,823	6.9E-06	2.62E-02	NA	6.3E-05
(6) 4-Isopropyl toluene	4.1	1,802	6.9E-06	1.23E-02	NA	3.0E-05
n-Propyl benzene	27	10,911	6.9E-06	7.48E-02	NA	7.2E-05
1,2,4-Trimethylbenzene	33	7,809	7.1E-06	5.54E-02	NA	7.6E-03
1,3,5-Trimethylbenzene	4.0	1,348	6.9E-06	9.32E-03	NA	2.6E-04
Polycyclic Aromatic Hydrocarbons (PAHs)						
Acenaphthene	4.9	34	2.0E-05	6.62E-04	NA	3.0E-06
(7) Anthracene	1.1	0.48	1.8E-04	8.38E-05	NA	7.6E-07
1-Methylnaphthalene	15	291	1.1E-05	3.11E-03	NA	2.1E-04
2-Methylnaphthalene	19	368	1.1E-05	3.94E-03	NA	2.7E-04
Naphthalene	36	604	1.3E-05	7.71E-03	9.3E-08	2.5E-03
(7) Phenanthrene	10	4.3	1.8E-04	7.61E-04	NA	7.0E-06
				Total	**1 E-07**	**1 E-02**

Notes:

bgs = below ground surface.
MDC = maximum detected concentration.
EPC = exposure point concentration.
µg/L = microgram per liter
µg/m^3 = micrograms per cubic meter.
NA = not available or not applicable.

[1] Value represents the maximum detected concentration in groundwater from data collected in September 2015, February 2016, and July 2017 (see Table 1).

[2] EPCs in groundwater (EPC_{gw}) were coupled with vapor intrusion model to estimate attenuation factors and EPCs in soil gas (EPC_{sg}) and EPCs in indoor air ($EPC_{indoor\ air}$ or $C_{building}$).

[3] As estimated by DTSC (2014), using the following equation.

$$Excess\ Cancer\ Risk = \frac{C_{building} \times EF \times ED \times ET \times URF}{AT_c}$$

[4] As estimated by DTSC (2014), using the following equation.

$$Hazard\ Quotient = \frac{C_{building} \times EF \times ED \times ET}{RfC \times AT_n}$$

[5] "NA" indicates inhalation unit risk factor was not available; therefore, a cancer risk was not estimated.

[6] DTSC vapor intrusion model did not include 4-isopropyl toluene; therefore, the DTSC model for isopropylbenzene (cumene) was used as a surrogate.

[7] DTSC vapor intrusion model did not include anthracene and phenanthrene; therefore, the DTSC model for pyrene was used as a surrogate.

References:

DTSC. 2014. DTSC Vapor Intrusion Screening Model - Groundwater. California Environmental Protection Agency (CalEPA). Last Modified December.

Table 3
Vapor Intrusion Model Parameters
760 22nd Street and 2201 Brush Street
Oakland, California

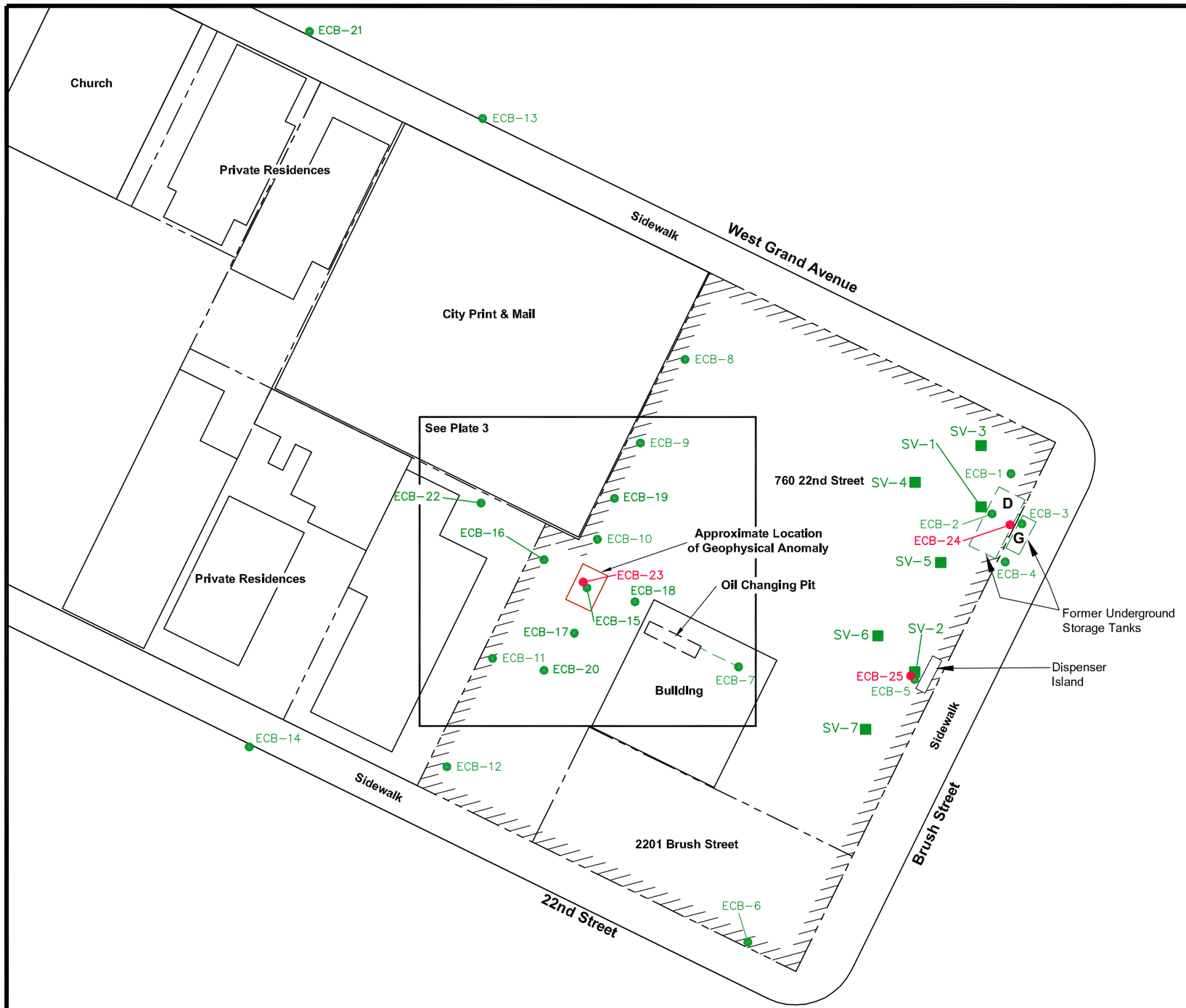
Vapor Intrusion Model Parameters	Symbol	Assumed Value	Source
Soil Physical Properties			
Depth Below Grade to Bottom of Enclosed Space Floor	L_F	15 cm	DTSC, 2014
Depth Below Grade to Water Table	L_{WT}	396 cm	Site-specific
SCS Soil Type Directly Above Water Table	- -	Silty Clay Loam (SiCL)	Site-specific
Average Soil/Groundwater Temperature	T_s	24°C	DTSC, 2014
Average Vapor Flow Rate into Building	Q_{soil}	5 L/min	DTSC, 2014
Vadose Zone SCS Soil Type	- -	Silty Clay Loam (SiCL)	Site-specific
Vadose Zone Soil Dry Bulk Density	ρ_b	1.63 g/cm^3	Site-specific
Vadose Zone Soil Total Porosity	n	0.383 cm^3/cm^3	Site-specific
Vadose Zone Soil Water-filled Porosity	θ_w	0.300 cm^3/cm^3	Site-specific
Resident Receptor Exposure Parameters			
Averaging Time for Carcinogens	AT_c	70 years	DTSC, 2014
Averaging Time for Noncarcinogens	AT_n	26 years	DTSC, 2014
Exposure Duration	ED	26 years	DTSC, 2014
Exposure Frequency	EF	350 days/year	DTSC, 2014
Exposure Time	ET	24 hours/day	DTSC, 2014
Air Exchange Rate	ACH	0.5 hour^{-1}	DTSC, 2014

Notes:
cm = centimeter.
°C = degrees Celsius.
cm^3/cm^3 = cubic centimeter per cubic centimeter.
g/cm^3 = gram per cubic centimeter.
L/min = liter per minute.

References:
DTSC. 2014. DTSC Vapor Intrusion Screening Model - Groundwater. California Environmental Protection Agency. Last Modified December.

ATTACHMENT A

SITE PLAN AND BORING LOCATIONS



EXPLANATION

- SITE BOUNDARY
- APPROXIMATE PROPERTY BOUNDARY
- SOIL BORING LOCATION (ESSEL 2015, 2016)
- SOIL BORING LOCATION (ESSEL 2017)
- SOIL VAPOR WELL LOCATION (ESSEL 2015, 2016)
- D DIESEL
- G GASOLINE

NOTE: UNDERGROUND STORAGE TANK LOCATIONS FROM HAGEMAN–SCHANK, INC. (1987)

N

Approximate Scale

0 30 60

feet

PROJECT NO.	DRAWN BY	REPORT DATE		PLATE
15166	EC	August 2017	Site Plan and Boring Locations	2

Essel Environmental Consulting
351 California Street, Suite 615
San Francisco, California 94104
1–800–595–7616

760 22nd Street and
2201 Brush Street
Oakland, California

ATTACHMENT B
SOIL CHARACTERIZATION ANALYTICAL REPORT

8100 Secura Way • Santa Fe Springs, CA 90670
Telephone (562) 347-2500 • Fax (562) 907-3610

February 26, 2016

Rodger Witham
Essel Environmental Consulting
351 California St, Suite 615
San Francisco, CA 94104

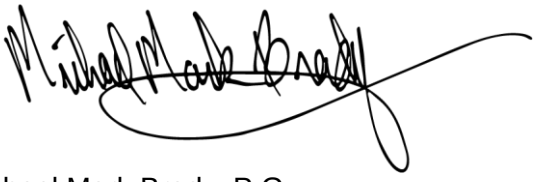
Re: PTS File No: 46112
Physical Properties Data
EBALDC West Grand & Brush; 15166

Dear Mr. Witham:

Please find enclosed report for Physical Properties analyses conducted upon samples received from your EBALDC West Grand & Brush; 15166 project. All analyses were performed by applicable ASTM, EPA, or API methodologies. The samples are currently in storage and will be retained for thirty days past completion of testing at no charge. Please note that the samples will be disposed of at that time. You may contact me regarding storage, disposal, or return of the samples.

PTS Laboratories appreciates the opportunity to be of service. If you have any questions or require additional information, please give me a call at (562) 347-2502.

Sincerely,
PTS Laboratories, Inc.



Michael Mark Brady, P.G.
Laboratory Director

Encl.

Project Name: **EBALDC West Grand & Brush** **PTS File No: 46112**
Project Number: **15166** **Client: Essel Environmental Consultin**

TEST PROGRAM - 20160219

CORE ID	Depth ft.	Core Recovery ft.	CAL-EPA DTSC Vapor Intrusion						Comments
		Plugs:	Various						
Date Received: 20160218									
S-5 1/2 - BSV1	**5.5-6.5**	**1.00**	**X**						
S-9-BSV5	**9-10**	**0.90**	**X**						
S-5-BSV2	**5-6**	**0.90**	**X**						
S-9-BSV2	**9-10**	**1.10**	**X**						
TOTALS:	**4 cores**	**3.90**	**4**						**4**

Laboratory Test Program Notes
Contaminant identification:
Standard TAT for basic analysis is 10 business days.
CAL-EPA DTSC Vapor Intrusion: Bulk & grain density, total porosity, moisture content, volumetric air & moisture, TOC/foc, and grain size distribution.
5 Day Rush TAT results by COB 2/25/16 requested per H. Mendoza / Essel Environmental Consulting 20160219

PTS Laboratories

PTS File No: 46112
Client: Essel Environmental Consulting
Report Date: 02/26/16

PHYSICAL PROPERTIES DATA - CAL-EPA DTSC Vapor Intrusion Package

Project Name: EBALDC West Grand & Brush
Project No: 15166

			METHODS:	API RP40/ASTM D2216		API RP 40		API RP 40		
				MOISTURE CONTENT,		DENSITY		POROSITY, (2)		
SAMPLE ID.	DEPTH, ft.	SAMPLE ORIENTATION (1)	ANALYSIS DATE	% weight	cm^3/cm^3	DRY BULK, g/cm^3	GRAIN, g/cm^3	TOTAL, cm^3/cm^3	AIR-FILLED, cm^3/cm^3	WATER-FILLED, cm^3/cm^3
S-5 1/2 - BSV1	6.3	V	20160220	18.5	0.302	1.63	2.64	0.382	0.080	0.302
S-9-BSV5	9.7	V	20160220	9.3	0.143	1.54	2.66	0.423	0.281	0.143
S-5-BSV2	5.7	V	20160220	18.4	0.300	1.63	2.64	0.383	0.083	0.300
S-9-BSV2	9.9	V	20160220	18.9	0.318	1.68	2.65	0.365	0.047	0.318

(1) Sample Orientation: H = horizontal; V = vertical; R = remold

(2) Total Porosity = all interconnected pore channels; Air Filled = pore channels not occupied by pore fluids.

Vb = Bulk Volume, cc; Pv = Pore Volume, cc; ND = Not Detected

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422/D4464M)

PROJECT NAME: EBALDC West Grand & Brush
PROJECT NO: 15166

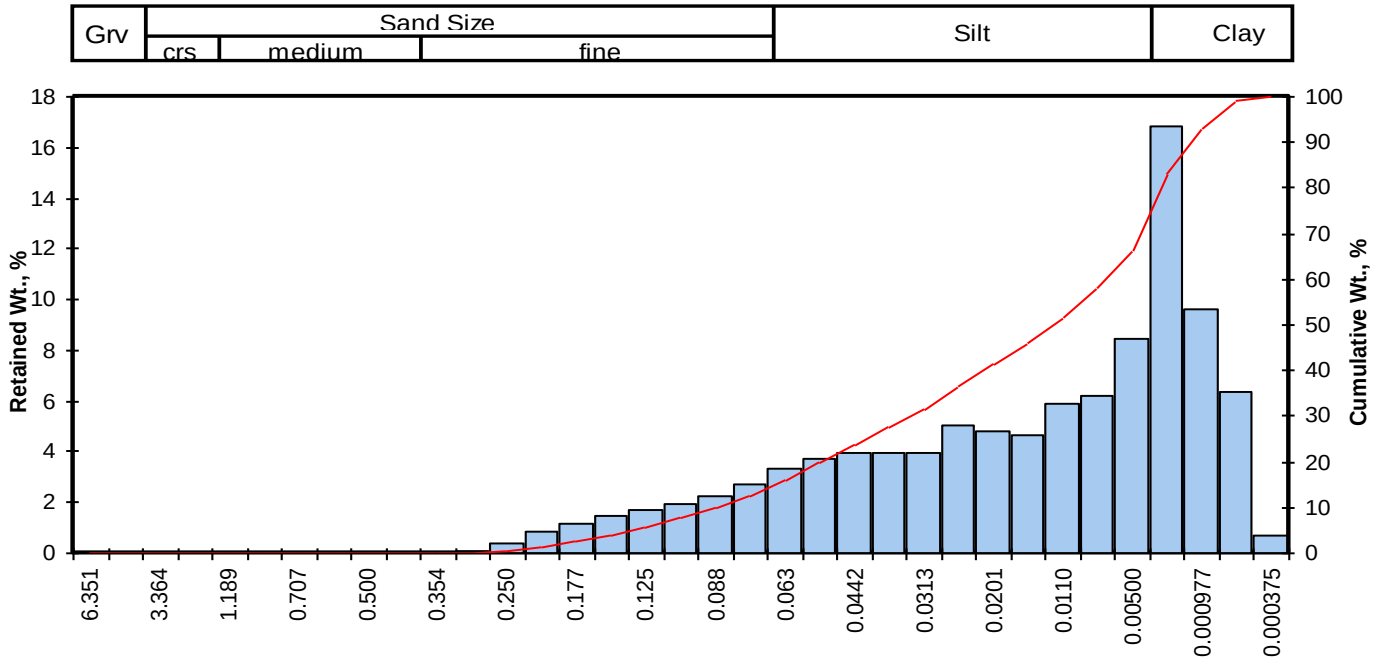
Sample ID	Depth, ft.	Mean Grain Size Description (1)	Median Grain Size mm	Particle Size Distribution, wt. percent						Silt & Clay
				Gravel	Sand Size			Silt	Clay	
					Coarse	Medium	Fine			
S-5 1/2 - BSV1	6.15	Silt	0.012	0.00	0.00	0.00	12.61	53.85	33.54	87.39
S-5-BSV2	5.55	Silt	0.017	0.00	0.00	0.00	12.68	57.76	29.56	87.32
S-9-BSV2	9.75	Silt	0.018	0.00	0.00	0.00	12.91	59.42	27.67	87.09

(1) Based on Mean from Trask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Essel Environmental Consulting	**PTS File No:**	46112
Project:	EBALDC West Grand & Brush	**Sample ID:**	S-5 1/2 - BSV1
Project No:	15166	**Depth, ft:**	6.15



Opening		Phi of	U.S.	Sample Weight,	Increment Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.00	0.00	0.00
0.0166	0.420	1.25	40	0.00	0.00	0.00
0.0139	0.354	1.50	45	0.00	0.00	0.00
0.0117	0.297	1.75	50	0.06	0.06	0.06
0.0098	0.250	2.00	60	0.38	0.38	0.44
0.0083	0.210	2.25	70	0.88	0.88	1.32
0.0070	0.177	2.50	80	1.20	1.20	2.52
0.0059	0.149	2.75	100	1.44	1.44	3.96
0.0049	0.125	3.00	120	1.71	1.71	5.67
0.0041	0.105	3.25	140	1.96	1.96	7.63
0.0035	0.088	3.50	170	2.25	2.25	9.88
0.0029	0.074	3.75	200	2.73	2.73	12.61
0.0025	0.063	4.00	230	3.32	3.32	15.93
0.0021	0.053	4.25	270	3.75	3.75	19.68
0.00174	0.0442	4.50	325	3.92	3.92	23.60
0.00146	0.0372	4.75	400	3.92	3.92	27.52
0.00123	0.0313	5.00	450	3.95	3.95	31.47
0.000986	0.0250	5.32	500	5.06	5.06	36.53
0.000790	0.0201	5.64	635	4.78	4.78	41.31
0.000615	0.0156	6.00		4.63	4.63	45.94
0.000435	0.0110	6.50		5.89	5.89	51.83
0.000308	0.00781	7.00		6.20	6.20	58.03
0.000197	0.00500	7.65		8.43	8.43	66.46
0.000077	0.00195	9.00		16.80	16.80	83.26
0.000038	0.000977	10.00		9.63	9.63	92.89
0.000019	0.000488	11.00		6.39	6.39	99.28
0.000015	0.000375	11.38		0.72	0.72	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	2.90	0.0053	0.134
10	3.51	0.0035	0.088
16	4.00	0.0025	0.062
25	4.59	0.0016	0.042
40	5.55	0.0008	0.021
50	6.34	0.0005	0.012
60	7.15	0.0003	0.007
75	8.33	0.0001	0.003
84	9.08	0.0001	0.002
90	9.70	0.0000	0.001
95	10.33	0.0000	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	6.34	6.34	6.34
Median, in.	0.0005	0.0005	0.0005
Median, mm	0.012	0.012	0.012
Mean, phi	5.49	6.54	6.48
Mean, in.	0.0009	0.0004	0.0004
Mean, mm	0.022	0.011	0.011
Sorting	3.661	2.536	2.393
Skewness	0.922	0.077	0.075
Kurtosis	0.222	0.464	0.813

Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

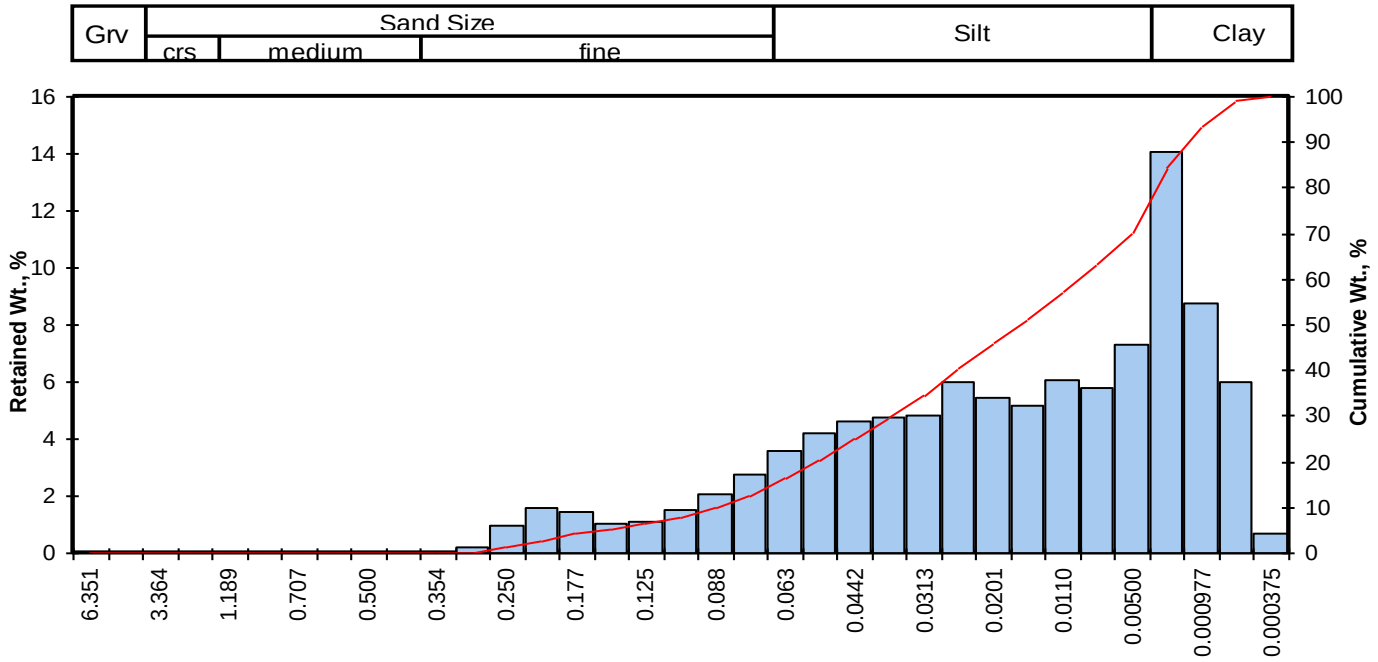
Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.00
Fine Sand	200	12.61
Silt	>0.005 mm	53.85
Clay	<0.005 mm	33.54
	Total	**100**

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client: Essel Environmental Consulting
Project: EBALDC West Grand & Brush
Project No: 15166

PTS File No: 46112
Sample ID: S-5-BSV2
Depth, ft: 5.55



Opening		Phi of	U.S.	Sample Weight,	Increment Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.00	0.00	0.00
0.0166	0.420	1.25	40	0.00	0.00	0.00
0.0139	0.354	1.50	45	0.00	0.00	0.00
0.0117	0.297	1.75	50	0.20	0.20	0.20
0.0098	0.250	2.00	60	0.94	0.94	1.14
0.0083	0.210	2.25	70	1.60	1.60	2.74
0.0070	0.177	2.50	80	1.42	1.42	4.16
0.0059	0.149	2.75	100	1.02	1.02	5.18
0.0049	0.125	3.00	120	1.12	1.12	6.30
0.0041	0.105	3.25	140	1.54	1.54	7.84
0.0035	0.088	3.50	170	2.07	2.07	9.91
0.0029	0.074	3.75	200	2.77	2.77	12.68
0.0025	0.063	4.00	230	3.57	3.57	16.25
0.0021	0.053	4.25	270	4.21	4.21	20.46
0.00174	0.0442	4.50	325	4.62	4.62	25.08
0.00146	0.0372	4.75	400	4.77	4.77	29.85
0.00123	0.0313	5.00	450	4.82	4.82	34.67
0.000986	0.0250	5.32	500	6.02	6.02	40.69
0.000790	0.0201	5.64	635	5.47	5.47	46.16
0.000615	0.0156	6.00		5.14	5.14	51.30
0.000435	0.0110	6.50		6.09	6.09	57.39
0.000308	0.00781	7.00		5.78	5.78	63.16
0.000197	0.00500	7.65		7.28	7.28	70.44
0.000077	0.00195	9.00		14.10	14.10	84.54
0.000038	0.000977	10.00		8.78	8.78	93.32
0.000019	0.000488	11.00		6.01	6.01	99.33
0.000015	0.000375	11.38		0.67	0.67	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than

Weight percent	Phi Value	Particle Size Inches	Particle Size Millimeters
5	2.71	0.0060	0.153
10	3.51	0.0035	0.088
16	3.98	0.0025	0.063
25	4.50	0.0017	0.044
40	5.28	0.0010	0.026
50	5.91	0.0007	0.017
60	6.73	0.0004	0.009
75	8.08	0.0001	0.004
84	8.95	0.0001	0.002
90	9.62	0.0000	0.001
95	10.28	0.0000	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	5.91	5.91	5.91
Median, in.	0.0007	0.0007	0.0007
Median, mm	0.017	0.017	0.017
Mean, phi	5.38	6.47	6.28
Mean, in.	0.0009	0.0004	0.0005
Mean, mm	0.024	0.011	0.013
Sorting	3.467	2.483	2.389
Skewness	0.768	0.224	0.189
Kurtosis	0.235	0.525	0.865

Grain Size Description (ASTM-USCS Scale)	Silt (based on Mean from Trask)

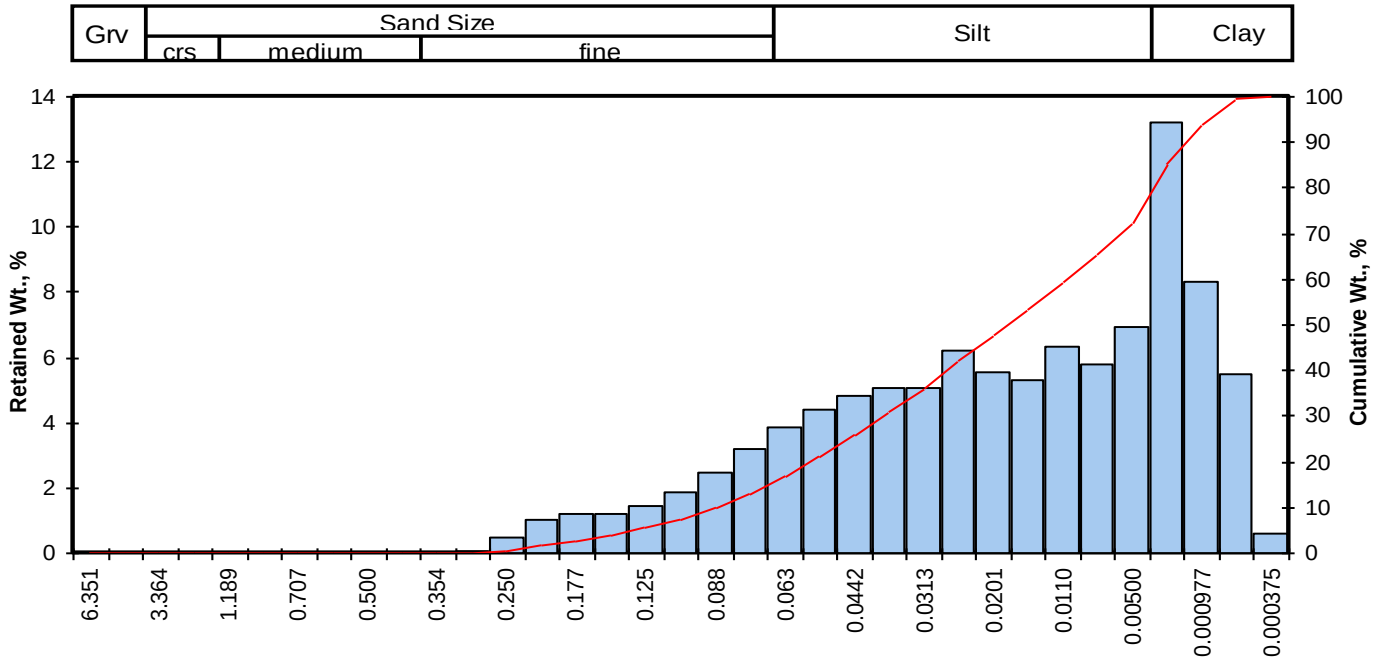
Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.00
Fine Sand	200	12.68
Silt	>0.005 mm	57.76
Clay	<0.005 mm	29.56
	Total	**100**

Phone: (562) 907-3607
Fax: (562) 907-3610

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D4464M

Client:	Essel Environmental Consulting	**PTS File No:**	46112
Project:	EBALDC West Grand & Brush	**Sample ID:**	S-9-BSV2
Project No:	15166	**Depth, ft:**	9.75



Opening		Phi of	U.S.	Sample Weight,	Increment Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.2500	6.351	-2.67	1/4	0.00	0.00	0.00
0.1873	4.757	-2.25	4	0.00	0.00	0.00
0.1324	3.364	-1.75	6	0.00	0.00	0.00
0.0787	2.000	-1.00	10	0.00	0.00	0.00
0.0468	1.189	-0.25	16	0.00	0.00	0.00
0.0331	0.841	0.25	20	0.00	0.00	0.00
0.0278	0.707	0.50	25	0.00	0.00	0.00
0.0234	0.595	0.75	30	0.00	0.00	0.00
0.0197	0.500	1.00	35	0.00	0.00	0.00
0.0166	0.420	1.25	40	0.00	0.00	0.00
0.0139	0.354	1.50	45	0.00	0.00	0.00
0.0117	0.297	1.75	50	0.08	0.08	0.08
0.0098	0.250	2.00	60	0.50	0.50	0.58
0.0083	0.210	2.25	70	1.03	1.03	1.61
0.0070	0.177	2.50	80	1.18	1.18	2.79
0.0059	0.149	2.75	100	1.18	1.18	3.97
0.0049	0.125	3.00	120	1.42	1.42	5.39
0.0041	0.105	3.25	140	1.87	1.87	7.26
0.0035	0.088	3.50	170	2.47	2.47	9.73
0.0029	0.074	3.75	200	3.18	3.18	12.91
0.0025	0.063	4.00	230	3.88	3.88	16.79
0.0021	0.053	4.25	270	4.42	4.42	21.21
0.00174	0.0442	4.50	325	4.83	4.83	26.04
0.00146	0.0372	4.75	400	5.04	5.04	31.08
0.00123	0.0313	5.00	450	5.09	5.09	36.17
0.000986	0.0250	5.32	500	6.24	6.24	42.40
0.000790	0.0201	5.64	635	5.58	5.58	47.98
0.000615	0.0156	6.00		5.30	5.30	53.28
0.000435	0.0110	6.50		6.32	6.32	59.60
0.000308	0.00781	7.00		5.78	5.78	65.38
0.000197	0.00500	7.65		6.95	6.95	72.33
0.000077	0.00195	9.00		13.20	13.20	85.53
0.000038	0.000977	10.00		8.34	8.34	93.87
0.000019	0.000488	11.00		5.52	5.52	99.39
0.000015	0.000375	11.38		0.61	0.61	100.00
TOTALS				**100.00**	**100.00**	**100.00**

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	2.93	0.0052	0.131
10	3.52	0.0034	0.087
16	3.95	0.0025	0.065
25	4.45	0.0018	0.046
40	5.20	0.0011	0.027
50	5.78	0.0007	0.018
60	6.53	0.0004	0.011
75	7.92	0.0002	0.004
84	8.84	0.0001	0.002
90	9.54	0.0001	0.001
95	10.20	0.0000	0.001

Measure	Trask	Inman	Folk-Ward
Median, phi	5.78	5.78	5.78
Median, in.	0.0007	0.0007	0.0007
Median, mm	0.018	0.018	0.018
Mean, phi	5.32	6.40	6.19
Mean, in.	0.0010	0.0005	0.0005
Mean, mm	0.025	0.012	0.014
Sorting	3.332	2.447	2.325
Skewness	0.755	0.253	0.235
Kurtosis	0.243	0.486	0.858
Grain Size Description (ASTM-USCS Scale)		Silt (based on Mean from Trask)	

Description	Retained on Sieve #	Weight Percent
Gravel	4	0.00
Coarse Sand	10	0.00
Medium Sand	40	0.00
Fine Sand	200	12.91
Silt	>0.005 mm	59.42
Clay	<0.005 mm	27.67
	Total	**100**

PARTICLE SIZE SUMMARY

(METHODOLOGY: ASTM D422M)

PROJECT NAME: EBALDC West Grand & Brush
PROJECT NO: 15166

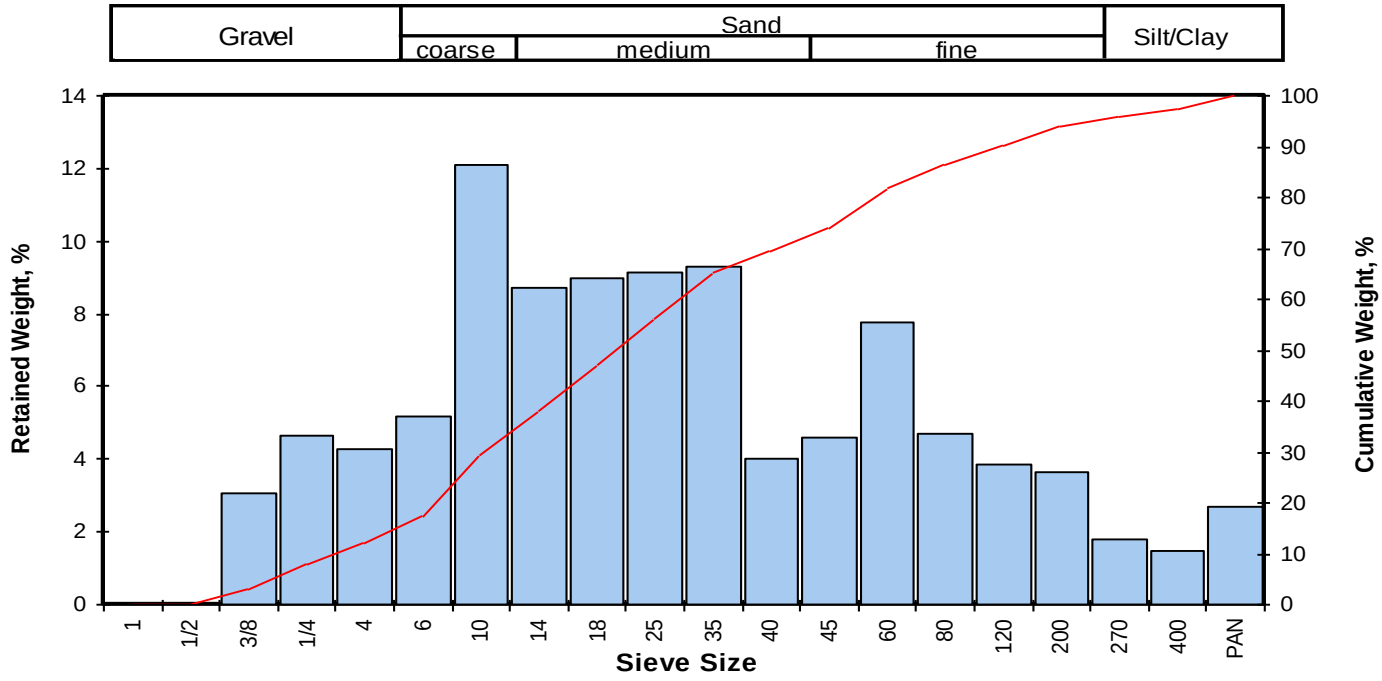
Sample ID	Depth, ft.	Mean Grain Size Description USCS/ASTM (1)	Median Grain Size, mm	Particle Size Distribution, wt. percent				
				Gravel	Sand Size			Silt/Clay
					Coarse	Medium	Fine	
S-9-BSV5	9.5	Medium sand	0.892	12.03	17.26	40.13	24.59	5.99

(1) Based on Mean from Trask

PTS Laboratories, Inc.

Particle Size Analysis - ASTM D422M

Client:	Essel Environmental Consulting	**PTS File No:**	46112
Project:	EBALDC West Grand & Brush	**Sample ID:**	S-9-BSV5
Project No:	15166	**Depth, ft:**	9.5



Opening		Phi of	U.S. Sieve	Sample Weight	Incremental Weight,	Cumulative Weight,
Inches	Millimeters	Screen	No.	grams	percent	percent
0.9844	25.002	-4.64	1	0.00	0.00	0.00
0.4922	12.501	-3.64	1/2	0.00	0.00	0.00
0.3740	9.500	-3.25	3/8	2.54	3.08	3.08
0.2500	6.351	-2.67	1/4	3.84	4.66	7.74
0.1873	4.757	-2.25	4	3.54	4.29	12.03
0.1324	3.364	-1.75	6	4.25	5.16	17.19
0.0787	2.000	-1.00	10	9.98	12.11	29.29
0.0557	1.414	-0.50	14	7.19	8.72	38.02
0.0394	1.000	0.00	18	7.40	8.98	46.99
0.0278	0.707	0.50	25	7.55	9.16	56.15
0.0197	0.500	1.00	35	7.65	9.28	65.43
0.0166	0.420	1.25	40	3.29	3.99	69.42
0.0139	0.354	1.50	45	3.77	4.57	73.99
0.0098	0.250	2.00	60	6.42	7.79	81.78
0.0070	0.177	2.50	80	3.89	4.72	86.50
0.0049	0.125	3.00	120	3.18	3.86	90.36
0.0029	0.074	3.75	200	3.01	3.65	94.01
0.0021	0.053	4.25	270	1.48	1.80	95.80
0.0015	0.037	4.75	400	1.22	1.48	97.28
			PAN	2.24	2.72	100.00
TOTALS				82.44	100.00	100.00

Cumulative Weight Percent greater than			
Weight	Phi	Particle Size	
percent	Value	Inches	Millimeters
5	-3.01	0.3169	8.048
10	-2.45	0.2147	5.454
16	-1.87	0.1434	3.643
25	-1.27	0.0947	2.405
40	-0.39	0.0516	1.310
50	0.16	0.0351	0.892
60	0.71	0.0241	0.612
75	1.56	0.0133	0.338
84	2.24	0.0084	0.212
90	2.95	0.0051	0.129
95	4.03	0.0024	0.061

Measure	Trask	Inman	Folk-Ward
Median, phi	0.16	0.16	0.16
Median, in.	0.0351	0.0351	0.0351
Median, mm	0.892	0.892	0.892
Mean, phi	-0.46	0.18	0.18
Mean, in.	0.0540	0.0346	0.0348
Mean, mm	1.372	0.880	0.884
Sorting	2.667	2.050	2.091
Skewness	1.010	0.010	0.054
Kurtosis	0.194	0.716	1.019

Grain Size Description (ASTM-USCS Scale)	Medium sand (based on Mean from Trask)

Description	Retained on Sieve #	Weight Percent
Gravel	4	12.03
Coarse Sand	10	17.26
Medium Sand	40	40.13
Fine Sand	200	24.59
Silt/Clay	<200	5.99
	Total	100

Phone: (562) 907-3607
Fax: (562) 907-3610

PTS File No: 46112
Client: Essel Environmental Consulting
Report Date: 02/26/16

PTS Laboratories

ORGANIC CARBON DATA - TOC (foc)

(Methodology: Walkley-Black)

Project Name: EBALDC West Grand & Brush
Project No: 15166

SAMPLE ID.	DEPTH, ft.	ANALYSIS DATE	ANALYSIS TIME	SAMPLE MATRIX	TOTAL ORGANIC CARBON, mg/kg	FRACTION ORGANIC CARBON, g/g
S-5 1/2 - BSV1	6.05	20160223	1255	SOIL	370	3.70E-04
S-9-BSV5	9.35	20160223	1255	SOIL	530	5.30E-04
S-5-BSV2	5.5	20160223	1255	SOIL	750	7.50E-04
S-9-BSV2	9.7	20160223	1255	SOIL	370	3.70E-04
Blank	N/A	20160223	1255	BLANK	ND	ND
SRM D089-542	N/A	20160223	1255	SRM	5540	5.54E-03
				Reporting Limit:	100	1.00E-04

QC DATA

SRM ID/Lot No.	REC (%)	Control Limits	Certified Concentration mg/kg	QC Performance Acceptance Limits, mg/kg Lower	Upper
SRM D089-542	99	75-125	5610	4208	7013

ND = Not Detected

PTS Laboratories, Inc.

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

COMPANY	Essel Environmental Consulting
ADDRESS	351 California Street, Suite 615
CITY	San Francisco
ZIP CODE	94104
PROJECT MANAGER	Rodger Witham/Nik Lahiri
email	nlahiri@esseltek.com
PROJECT NAME	EBALDC West Grand & Brush
PHONE NUMBER	510-366-8054
PROJECT NUMBER	15166
FAX NUMBER	
SITE LOCATION	22nd Street and Brush Street, Oakland, California
SAMPLER SIGNATURE	

PO# 15166

TURNAROUND TIME
24 HOURS ☐ 5 DAYS ☐
72 HOURS ☐ NORMAL ☑
OTHER: _____

SAMPLE INTEGRITY (CHECK):
INTACT ✓ TEMP(F) 62

PTS QUOTE NO.

PTS FILE: 46112

ANALYSIS REQUEST

SAMPLE ID	DATE	TIME	DEPTH, FT	NUMBER OF SAMPLES	SOIL PROPERTIES PACKAGE	HYDRAULIC CONDUCTIVITY PACKAGE	PORE FLUID SATURATIONS PACKAGE	TCEQ/TNRCC PROPERTIES PACKAGE	CAPILLARITY PACKAGE	FLUID PROPERTIES PACKAGE	PHOTOLOG; CORE PHOTOGRAPHY	VAPOR TRANSPORT PACKAGE	POROSITY: TOTAL, AIR FILLED, WATER FILLED	POROSITY: EFFECTIVE, ASTM D425M	SPECIFIC GRAVITY, ASTM D854	BULK DENSITY (DRY), API RP40 or ASTM D2937	AIR PERMEABILITY, API RP40	HYDRAULIC CONDUCTIVITY, EPA9100/API RP40 or D5084	GRAIN SIZE DISTRIBUTION, ASTM D422 or 4464M	TOC: WALKLEY-BLACK	ATTERBERG LIMITS, ASTM D4318	VAPOR INTRUSION PACKAGE	FREE PRODUCT MOBILITY PACKAGE	COMMENTS
S-5½-BSV1	2/15/16	7:55 a.m.	5½-6½	1																		X		
S-9-BSV5	2/15/16	8:01 a.m.	9-10	1																		X		
S-5-BSV2	2/15/16	1:12 p.m.	5-6	1																		X		
S-9-BSV2	2/15/16	1:16 p.m.	9-10	1																		X		

1. RELINQUISHED BY	2. RECEIVED BY	3. RELINQUISHED BY	4. RECEIVED BY
COMPANY: Essel Environmental Consulting	COMPANY: PTS LABS	COMPANY:	COMPANY:
DATE: 02/17/16 TIME: 3:00 pm	DATE: 2/18/16 TIME: 13:15	DATE: TIME:	DATE: TIME:

PTS Laboratories, Inc. • 8100 Secura Way • Santa Fe Springs, CA 90670 • Phone (562) 347-2500 • Fax (562) 279-1150

ATTACHMENT C
DTSC VAPOR INTRUSION MODEL SPREADSHEETS

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Benzene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
1.17E+02	1.0E-05	1.2E-03	1.3E-08	3.9E-04	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
71432	5.40E-01	**Benzene**

MESSAGE: See VLOOKUP table comments on chemical properties and/or toxicity criteria for this chemical.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Toluene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
7.76E+02	9.0E-06	7.0E-03	NA	2.2E-05	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
108883	3.00E+00	**Toluene**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Ethylbenzene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
1.77E+02	7.9E-06	1.4E-03	1.2E-09	1.3E-03	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
100414	5.80E-01	**Ethylbenzene**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **m-Xylene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
1.42E+03	7.9E-06	1.1E-02	NA	1.1E-04	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
108383	5.10E+00	**m-Xylene**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Acetone**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
2.48E+01	1.0E-04	2.5E-03	NA	7.8E-08	NA	NA

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
67641	1.80E+01	Acetone

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Methyl bromide (bromomethane)**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
2.89E+02	1.2E-05	3.4E-03	NA	6.4E-04	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
74839	9.90E-01	Methyl bromide (bromomethane)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Methylethylketone (2-butanone)**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
8.02E+00	6.1E-05	4.9E-04	NA	9.4E-08	NA	NA

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
78933	3.60E+00	Methylethylketone (2-butanone)

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **n-Butylbenzene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
6.71E+03	5.9E-06	4.0E-02	NA	2.2E-04	NA	NA

MESSAGE: Risk and/or HQ (or risk-based groundwater concentration) is based on route-to-route extrapolation.
MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
104518	1.10E+01	n-Butylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **sec-Butylbenzene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
2.44E+03	6.0E-06	1.5E-02	NA	3.5E-05	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
135988	6.20E+00	**sec-Butylbenzene**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Cumene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
3.82E+03	6.9E-06	2.6E-02	NA	6.3E-05	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
98828	8.70E+00	**Cumene**

MESSAGE: See VLOOKUP table comments on chemical properties and/or toxicity criteria for this chemical.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24	0.5
	Used to calculate risk-based groundwater concentration.						(NEW)	(NEW)

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Cumene**
Surrogate for 4-Isopropyl toluene

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
1.80E+03	6.9E-06	1.2E-02	NA	3.0E-05	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
98828	4.10E+00	**Cumene**

MESSAGE: See VLOOKUP table comments on chemical properties and/or toxicity criteria for this chemical.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **n-Propylbenzene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
1.09E+04	6.9E-06	7.5E-02	NA	7.2E-05	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
103651	2.70E+01	n-Propylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **1,2,4-Trimethylbenzene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
7.81E+03	7.1E-06	5.5E-02	NA	7.6E-03	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
95636	3.30E+01	1,2,4-Trimethylbenzene

MORE

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **1,3,5-Trimethylbenzene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
1.35E+03	6.9E-06	9.3E-03	NA	2.6E-04	NA	NA

MESSAGE: Risk and/or HQ (or risk-based groundwater concentration) is based on route-to-route extrapolation.
MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
108678	4.00E+00	1,3,5-Trimethylbenzene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Acenaphthene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
3.38E+01	2.0E-05	6.6E-04	NA	3.0E-06	NA	NA

MESSAGE: Risk and/or HQ (or risk-based groundwater concentration) is based on route-to-route extrapolation.
MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
83329	4.90E+00	Acenaphthene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Pyrene**
Surrogate for Anthracene

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W (µg/L)	Chemical
129000	1.10E+00	**Pyrene**

Results Summary

Soil Gas Conc. (C_{source}) (µg/m^3)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) (µg/m^3)	Cancer Risk	Noncancer Hazard	Risk-Based Groundwater Concentration: Cancer Risk = 10^{-6} (µg/L)	Risk-Based Groundwater Concentration: Noncancer HQ = 1 (µg/L)
4.78E-01	1.8E-04	8.4E-05	NA	7.6E-07	NA	NA

MESSAGE: Risk and/or HQ (or risk-based groundwater concentration) is based on route-to-route extrapolation.

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH (hour)$^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **2-Methylnaphthalene**
Surrogate for 1-Methylnaphthalene

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
2.91E+02	1.1E-05	3.1E-03	NA	2.1E-04	NA	NA

MESSAGE: Risk and/or HQ (or risk-based groundwater concentration) is based on route-to-route extrapolation.
MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
91576	1.50E+01	2-Methylnaphthalene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **2-Methylnaphthalene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
3.68E+02	1.1E-05	3.9E-03	NA	2.7E-04	NA	NA

MESSAGE: Risk and/or HQ (or risk-based groundwater concentration) is based on route-to-route extrapolation.
MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
91576	1.90E+01	2-Methylnaphthalene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Naphthalene**

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
6.04E+02	1.3E-05	7.7E-03	9.3E-08	2.5E-03	NA	NA

MESSAGE: Attenuation factor < 6E-05 is unreasonably low.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
91203	3.60E+01	Naphthalene

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

USEPA GW-SCREEN
Version 3.0, 04/2003

DTSC Modification
December 2014

Department of Toxic Substances Control
Vapor Intrusion Screening Model - Groundwater

DATA ENTRY SHEET

Scenario: **Residential**
Chemical: **Pyrene**
Surrogate for Phenanthrene

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION
(enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

Results Summary					Risk-Based Groundwater Concentration	
Soil Gas Conc. (C_{source}) ($\mu g/m^3$)	Attenuation Factor (alpha) (unitless)	Indoor Air Conc. ($C_{building}$) ($\mu g/m^3$)	Cancer Risk	Noncancer Hazard	Cancer Risk = 10^{-6} ($\mu g/L$)	Noncancer HQ = 1 ($\mu g/L$)
4.34E+00	1.8E-04	7.6E-04	NA	7.0E-06	NA	NA

MESSAGE: Risk and/or HQ (or risk-based groundwater concentration) is based on route-to-route extrapolation.

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_W ($\mu g/L$)	Chemical
129000	1.00E+01	**Pyrene**

MORE ↓

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER SCS soil type directly above water table	ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
15	396	SICL	24	5

MORE ↓

ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vandose zone soil vapor permeability, k_v (cm^2)	ENTER Vadose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^V (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)
SICL			SICL	1.63	0.383	0.3

Capillary zone soil water-filled porosity > vadose zone soil total porosity.

MORE ↓

Lookup Receptor Parameters

	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)	ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Exposure Time ET (hrs/day)	ENTER Air Exchange Rate ACH $(hour)^{-1}$
NEW=> Residential	1.0E-06	1	70	26	26	350	24 (NEW)	0.5 (NEW)
	Used to calculate risk-based groundwater concentration.							

END

APPENDIX F

LIMITATIONS

LIMITATIONS

The environmental investigation described in this report has been conducted in accordance with current regulatory guidance and the standards of environmental and geological practice performed in the general project area. No warranty, expressed or implied, is made regarding the professional opinions presented in the report.

Essel Environmental Consulting's descriptions, conclusions, and recommendations in the report, with respect to environmental conditions, are based on a limited number of sampling points and chemical analyses. Field observations made during the investigation and the samples collected and submitted for testing are considered to be representative of the area evaluated. Subsurface soil and ground-water conditions; however, may vary between and beyond sampling or observation points. Additional work, including further subsurface investigation, can reduce the inherent uncertainties associated with this type of investigation.

The interpretations and opinions contained in this report are based on the results of laboratory tests and analyses intended to detect the presence and concentration of specific chemical or physical constituents in samples collected from the subject site. Chemical testing was conducted by an analytical laboratory that is certified by the state of California to perform the analyses requested for this investigation. Essel Environmental Consulting is not associated with the laboratory that performed the analyses and claims no responsibility for any inaccuracy in laboratory results.

This document is intended to be used in its entirety. No portion of the document, by itself, is designed to completely represent every aspect of the project. Essel Environmental Consulting should be contacted if the reader requires any additional information, or has questions regarding content, interpretations presented, or completeness of this document.

This report, furthermore, is intended for the exclusive use by the client. Any use of the contents of this report by parties other than the client is undertaken at those parties' sole risk.