April 24, 2017

ZONE A COMBUSTION EVALUATION REPORT
PASCO SANITARY LANDFILL

Pasco Sanitary Landfill
Pasco, WA

Appendices

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Appendices

APPENDIX A. FIELD PROGRAM ACTIVITES

A.1 Field Program

The field program consisted of two separate activities. First, nine temperature/gas ("T/G") monitoring stations were installed into Zone A. Five were located between the randomly placed drums and stacked drums areas, three were located inside the randomly placed drum area, and one was placed outside of the eastern boundary of the stacked drum area. Second, six large-diameter bucket auger borings were advanced adjacent to the thermocouple (TC) / soil gas probe (GI) monitoring stations. Samples were collected from the mixed debris unit.

A.2 Temperature and Soil Gas (T/G) Monitoring Locations

Nine TC/GI monitoring locations were installed in Zone A and completed within the upper portion of the Touchet Beds (Figure A.1). Each location consisted of a co-located thermocouple array and a soil gas probe monitoring array. The thermocouple and soil gas probe arrays were installed in adjacent but separate boreholes. All TC and GI boreholes were drilled using rotosonic drilling methods.

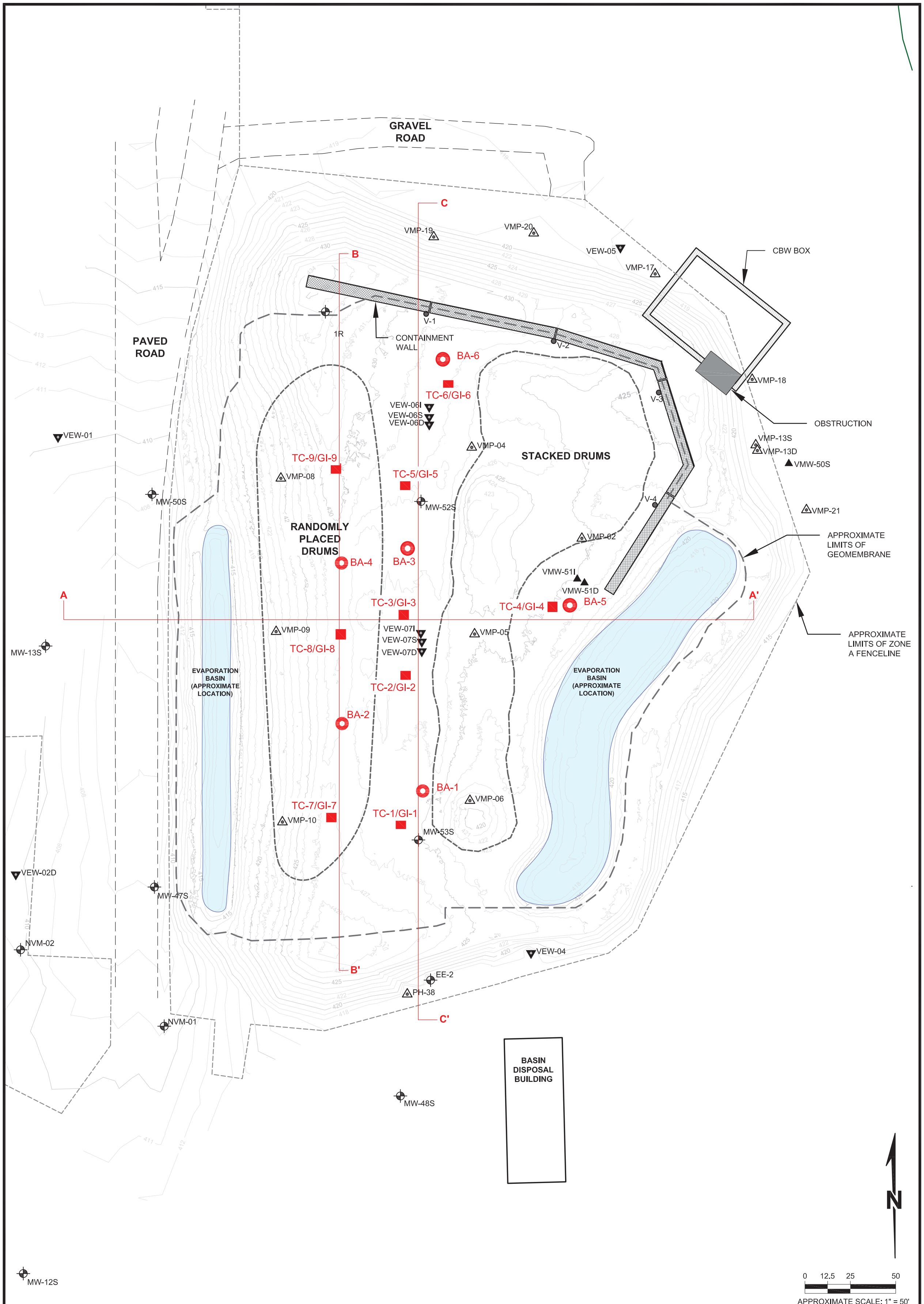
Installation depths for individual thermocouple and gas probes in areas within the randomly disposed drum area were generally based on the following criteria:

- Engineered fill at the original Visqueen elevation.
- Elevation corresponding to the original middle elevation of the randomly placed drum layer.
- Middle of the compacted/burned waste (if present, or if not present one near the bottom of the randomly placed drums).
- Middle of the mixed debris unit (if present).

Installation depths were discussed amongst IWAG representatives and selected if the features above were encountered, or based on other factors that may assist with data collection objectives.

Target depths for individual thermocouple and gas probes in areas outside of the randomly disposed drum area were generally determined based on the following criteria:

- Middle of the engineered fill layer of the 2002 cap.
- Engineered fill at the original Visqueen elevation.
- Elevation corresponding to the original middle elevation of the stacked drum layer.
- Middle of the mixed debris unit (if present).
- Approximately three feet into the native upper Touchet Beds.



NOTES

EB-1	EXPLORATORY BORING LOCATION
MW-53S	MONITORING WELL LOCATION
VMP-17	VACUUM MONITORING PROBE LOCATION
TC-1/GI-1	THERMOCOUPLE AND GAS MONITORING LOCATIONS
BA-1	BUCKET-AUGER BORINGS
A — A'	CROSS SECTION LOCATION

ENVIRONMENTAL PARTNERS INC

PROPOSED THERMOCOUPLE/GAS MONITORING AND BUCKET-AUGER BORING LOCATIONS

PROJECT	03916.0
PREPARED FOR	IWAG GROUP III PASCO LANDFILL
LOCATION	1901 DIETRICH ROAD PASCO, WASHINGTON

FIGURE	DRAWN BY	REVIEWED BY	DATE
3.1	VPB	ARM	4/19/17

The minimum vertical offset between individual thermocouples and gas probes is generally within 6 feet of each other. The boring for the soil gas probe was completed following installation of the thermocouple array. Gas probes were placed at or very near the same depths below the surface as the thermocouples.

Each of the thermocouple and soil gas probe arrays had five or six thermocouples or probes attached to a data logging device at the surface. Photos of typical thermocouple and soil gas probe installations can be found in Appendix B. The thermocouple arrays are similar in design and construction to the thermocouple arrays previously installed at the Site for monitoring subsurface temperatures in the Balefill Area, except installed using rotosonic techniques.

A.3 Drilling Locations and Preparation

The TC and GI locations were selected using geophysical data and bore log information from nearby wells. TC and GI locations are presented on Figure A.1. Borings for the TC and GI arrays were drilled using a rotosonic drill rig.

A chase truck and other support equipment were staged on the north side of Zone A. Necessary support equipment was transported to the drilling location using a skid loader. Separate exclusion zones were erected around each drill location to prevent unauthorized personnel from entering the drill areas.

Soil logging/data collection descriptions and the health and safety monitoring stations were set up up-wind or cross-wind from the drilling location based on conditions at the specific drilling location. Worker exposure monitoring described in the Health and Safety Plan (HASP) was implemented prior to and during drilling. Upgrading worker protection to Level C PPE was never required due to encountering exposure risks or personal air monitoring results.

A.4 Drilling Methods

Drilling was performed using a limited access, low ground pressure, track mounted drill rig. Drilling began at the ground surface and proceeded through the layers of the existing landfill cover system: woven geotextile, drainage layer, geomembrane, geosynthetic clay liner, geogrid, and engineered fill. The rig utilized a 6-inch inside diameter drill casing. The upper five feet of cover system were held in place by advancing a 10-inch diameter outer steel sleeve into the borehole. This casing stabilized the uppermost five feet and prevented the drainage layer from sliding back into the borehole.

Drilling proceeded in 5-foot intervals. Following each 5-foot interval or when the final target destination was reached, drilling was stopped and the casing removed from the borehole. Drill cuttings from each continuous 5-foot interval were placed in a 5-foot long clear polyethylene plastic bag. The bag was immediately placed into a plywood corebox labeled with the boring designation, sample interval, and orientation.

At the terminal depth of drilling, the boring was checked for total depth using a weighted tape measure dropped inside the casing. Following confirmation of the terminal depth, either a thermocouple array or soil gas monitoring array was constructed alongside the boring awaiting installation. Construction of these arrays is discussed below.

The retained soil samples were logged and inspected as described below.

When it was not possible to complete a boring within a working day, the uncased portion of the boring was sealed with bentonite. During advancement of drilling prior to reaching the terminal depth, the bottom foot of the borehole was sealed with bentonite and hydrated. Reasons for not completing a borehole included inclement weather and lack of daylight.

A.5 Soil Logging and Observations

The bagged and continuous soil cores were placed in prefabricated plywood coreboxes labeled with borehole number and depths. Each core was inspected, field screened, and logged.

At each location, the boring for the thermocouple array was drilled first, and continuously logged to determine the target depth for the thermocouples and soil gas probes. Logging consisted of describing soil conditions using the Unified Soil Classification System (ASTM D2488 with visual-manual procedures) in addition to descriptions of non-soil debris. Non-soil materials were described by their apparent colors, compositions and relative abundances in the soil matrices. In some cases, recovery of soils and/or debris was prohibitive, particularly in dry, fine materials.

The soil conditions were screened using a thermocouple to assess the temperature, and a photoionization detector (PID) to assess the presence of VOCs. Logging and photography of the soil cores required that the core bags be cut open to allow inspection. PID measurements, soil descriptions, and other noteworthy observations were recorded on the boring logs.

As 5-foot soil-core intervals were extracted, the contents were removed from the borehole, and transferred to plastic liners. Snow was often used to cool the contents of the drilling barrel prior to transferring into the liners, due to the added temperatures of the rotosonic drilling method. Liners with the soil and debris contents were directly transferred to wooden core-boxes for each 5-foot core, awaiting field measurements and soil logging descriptions. Temperatures were immediately collected approximately every foot of the soil cores by inserting a direct-reading Type K thermocouple and handheld temperature monitoring device into the center of the soil core and allowing the temperature(s) to stabilize. Internal temperatures and corresponding depths were recorded on the boring logs. Soils were insulated as practicable between the time of their removal and temperature data collection to prevent thermal cooling of the soils prior to data collection.

Temperature readings from the Type K thermocouple were several degrees higher than temperature readings from the handheld Infrared (IR) thermometer. In order to provide a more conservative portrait of subsurface temperatures, the thermocouple was used to collect soil core temperatures during drilling.

PID measurements were collected after temperature measurements, and before the core bags were cut for visual inspection. The core bags were generally punctured at five locations (at 1-foot intervals) and the inlet tube to the PID was inserted into the headspace between the bag and the soil core. For health and safety reasons, olfactory observations of the soils were not permitted.

Logging and photography of the soil cores were performed after temperature and PID screening. The core bag was cut open to allow for visual inspection. Soil types were logged using the Unified Soil Classification System (ASTM 2488D) by a Washington State Professional Engineer. The relative abundance of each natural soil material such as silt, sand, and gravel was noted as well as the apparent visual percentage of non-natural waste for each soil type. Waste types were inspected and described. Photographs of each soil core were collected following soil logging activities. Additional photographs of items of particular interest were also taken.

After inspection, the core boxes were taped closed, stacked on a pallet, and covered with plastic. The stored cores will remain onsite until disposal and managed as IDW as described below.

The boring logs are provided in Attachment B. Geologic cross sections showing data generated from this project are shown in Figures 3a, 3b, and 3c (see main report). These cross sections include key excerpts of the boring logs from zones that contain mixed debris.

A.6 Thermocouple Array Installation

Thermocouple Field Program

A total of nine thermocouple arrays were installed in the locations indicated on Figure A.1. Prior to installation, the drilling cores were inspected to determine the depths at which the thermocouples would be installed. The thermocouple installation depths were determined based on comparing the pre-determined Target Zones presented above with relative soil temperatures and compositions in the soil cores. If a previously described “burned debris” or “mixed garbage and debris” layer was not encountered, depths were generally selected where potentially combustible materials existed in the soils at a greater content. Thermocouple installation depths are presented in Table A.1.

The thermocouple array was constructed above ground upon completion of the boring. A ½-inch diameter rod of CPVC was constructed adjacent to the hole. At each selected elevation, a single T-type thermocouple with a stainless steel sheath was connected to the outside of the rod. The stainless steel sheaths from each thermocouple were rolled alongside the rod to prevent coiling, and were connected to the rod using duct tape; see Photo 1.

The assembled thermocouple array was then lowered into the casing. After setting the thermocouple array into the casing, bentonite was placed to a depth of 6-inches below the bottommost thermocouple. After bentonite, 12-inches of sand pack consisting of #10/20 clean washed Colorado Silica Sand was placed into the casing, covering 6-inches below the thermocouple to 6-inches above the thermocouple. The surrounding casing was lifted as sand was placed in order to ensure the sandpack covered the thermocouple. Bentonite chips were then placed above the sand to a depth of 6-inches below the next thermocouple. The bentonite chips were hydrated by pouring about 5-gallons of tap water down the boring. The rotosonic well casing continued to be removed as alternating sand and bentonite were placed up to the geomembrane. Appendix B shows a typical completed thermocouple array.

Concrete was placed between one foot above the geomembrane and the ground surface. The 10-inch steel sleeve remained in the ground and extends above ground surface outside of the well monument. After drilling was completed, each thermocouple and gas probe array was excavated to expose the geomembrane and surrounding area to allow for sealing of the boot as indicated on Appendix B. The 10-inch diameter steel sleeve was used to accommodate a proper seal with the geomembrane. The sleeve extends approximately above the geomembrane into the concrete seal. The inside of the sleeve was filled with bentonite and hydrated to form an airtight seal between the sleeve and the thermocouple leads. The thermocouple array seal and surface seals were completed with bentonite inside the top of the thermocouple sleeve to provide a seal around the thermocouple bundle. Concrete was added around the outside of the sleeve to support the well monument. Wells were completed under the supervision of a licensed well driller and in accordance with Minimum Standards for Maintenance and Construction of Wells (Washington Administrative Code [WAC] 173-160).

Prior to boot installation, the mating surface between the boot and existing geomembrane was thoroughly cleaned. The boot was temporarily sealed with butyl tape. After placement of all boots, the boots were welded into place by Northwest Linings, by persons certified in geomembrane welding.

After boot sealing was completed, the area surrounding the thermocouples was backfilled and a monument was installed. The annulus between the well casing and the monument was sealed with cement grout and the area around the base of the monument was backfilled with concrete.

A 1-inch diameter hole was drilled through the side of the well monuments at each TC location to allow the thermocouple lead wires to pass out of the monument into a control box fastened atop the well monument. The control box contains the data loggers that store temperature data. The wires passing from the monument to the control box are covered with corrugated plastic cord covers to prevent damage to the leads. Data loggers collect and store information in 1-hour intervals.

Cross sections showing in-situ temperature data generated from this project are shown in Figures 4a, 4b, and 4c (see main report).

Troubleshooting Actions

Data from three different thermocouple depths (TC2-16, TC2-27, and TC6-29) resulted in very high variability and diurnal temperature variations during the Jan-25 to Mar-2, 2017 timeframe. Upon further investigation, it was discovered that Type K extensions were attached to the subsurface Type T thermocouples in order to allow for adequate length during the field installation. Discussions with the thermocouple vendor (TC Direct) indicated that having two dissimilar thermocouple types connected for extension purposes can create an additional “measurement point” at the point of the extension connection. As such, the recorded temperatures during the time period were likely of surface temperatures. The extensions at TC-27 and TC6-29 were removed prior to the six-day validation test described below. The extension at TC2-16 was buried deep and could not be removed at this location. As such, collected data was considered invalid at this depth.

Additionally, on March 28, it was discovered that the data loggers had not been programmed to read the Type T thermocouples installed for the Zone A investigation, but were still programmed to read Type K thermocouples that were used in the Balefill investigation. The data logger vendor provided an approximate correction factor which indicated the current programming only resulted in a small (1/42 or 2.4%) error in the temperature collected to date. However, because: 1) the vendor said the correction was approximate, 2) it was important to have confidence in the temperature data collected to date, and 3) the tight Zone A report schedule, the team felt it was a high priority to confirm the magnitude of the error was indeed small, consistent with the vendor information.

A six-day validation test was then performed. The validation test consisted of taking hourly data from all locations and depths for three days: i) without Type K extensions at any location except TC2-16; and with ii) data loggers programmed to read the original Type K thermocouples as done during the January 25 – March 2, 2017 time period. After the first three-day period, all data loggers were reprogrammed to read Type T thermocouples and an additional three days of hourly data were collected for comparison. The results of the six-day test confirm the error was small (0.8%). As such, data collected to date was not corrected.

Finally, temporary and artificial temperature increases ("spikes") occurred after plugging data loggers into the thermocouples each data collection sampling date. This artifact of initially plugging thermocouples into data loggers was confirmed by the data logger vendor. As such, data from these spikes were disregarded in summary statistics shown below, but were maintained in the time series figures, along with the dates that data was downloaded.

A.7 Soil Gas Probe Array Installation

A total of nine soil gas probe arrays were installed at the locations indicated on Figure A.1, adjacent to and at the same depth as a corresponding thermocouple. Appendix B shows a typical completed soil gas probe array.

Each probe consists of a 3-inch long stainless steel screen or "implant" (see Appendix B for details). To ensure a tight seal between the tubing and the screen, each probe was connected to the ¼-inch diameter Teflon tubing with stainless steel ferrules and compression fittings.

The soil gas probe arrays were constructed in a process similar to the thermocouple arrays: using a ½-inch diameter CPVC rod with a single soil gas probe with tubing duct taped to the outside of the rod at each selected elevation (Photo 2).

The completed soil gas probe array was then lowered into the hole, and the hole backfilled in a process similar to the thermocouple array by alternating 1-foot think layers of sand pack around the screens and hydrated bentonite chips above. The 10-inch steel casing remained in the borehole, and the uppermost 2-feet of the borehole were filled with cement. At the surface, the ¼-inch diameter Teflon tubing from each soil gas probe was completed with a spring-activated quick-connect type compression port to allow for discrete sampling events. The quick-connect fittings are housed within the well monument.

The geomembrane booting and patching procedures were the same as for the thermocouple array patching.

Cross sections showing in-situ soil gas data generated from this project are shown in Figures 5a, 5b, and 5c (see main report).

A.8 Surveying

After the monuments were completed, all thermocouple and soil gas probe arrays were surveyed for horizontal and vertical coordinates. The top of each well monument rim and horizontal positions were surveyed to the nearest 0.01-foot. Surveyed points were marked on the monument. All locations were surveyed by a Washington-licensed land surveyor, referenced to semi-permanent monuments already onsite, and tied to the State Plane Coordinate System (NAD 1983-91) and NAVD88.

A.9 Rotosonic Soil Cores and IDW Management

The soil cores generated during the rotosonic drilling are stored onsite in sealed wooden coreboxes labeled with the drilling date, borehole name, and depths to allow for possible further investigation. The cores are currently stored in a temporarily fenced-off region immediately north of Zone A, and will be stored there until completion of final reporting.

A.10 Bucket Auger Investigation

SCS Engineers (SCS) personnel were onsite between February 13 and February 16, 2017, to observe and log the material recovered from six large diameter bucket auger borings. The borings were advanced by Donald B. Murphy Contractors (DBM), Inc. (Driller) using an IMT AF180 drill rig with a 5-foot long 24-inch diameter core barrel auger and 5-foot long 24-inch diameter open flight auger tooling. Recovered materials were brought to the surface where they were documented and inspected by SCS for the following:

- Depth of the recovery, and the corresponding pass number, as reported by the Driller.
- Material characteristics and descriptions of encountered soils, geosynthetics, and encountered debris were recorded to the extent possible. The visual material characteristics recorded included, but were not limited to:
  - Color(s) of the encountered material(s),
  - Moisture content,
  - Presence of ash or combusted material, and
  - Estimation of each materials percentage in the recovery (by volume).
- Temperature, as recorded by a handheld infrared (IR) thermometer.
- Presence of smoke and/or steam (if present).
- Presence of encountered liquids.
- Driller's notes and comments regarding the progress of the boring, and descriptions of the work performed by the Driller were also recorded as appropriate.

Odor was listed in the Work Plan (IWAG, 2016.) as a characteristic that would be documented during the advancement of the large diameter borings. Once the borings penetrated the geomembrane of the Zone A final cover system, odors readily escaped from the borings. Because of the proximity of the spoils piles to the borings, it was not possible to distinguish between the odors related to material being logged and the odors from the borings.

Each of the six borings were advanced until reaching the native Touchet soil bed that underlies Zone A as described in the Work Plan. Total depths of the borings ranged between 34 and 38 feet below ground surface (ft bgs) as reported by the Driller. Boring logs are included as Appendix C.

For each interval logged, the recovered materials were brought to the surface on or within the tooling being used to advance the boring, open flight auger or core barrel auger, respectively. The Driller elected to use different tooling depending on the subsurface conditions encountered. The open flight auger was primarily used where non-cohesive or loose soils and/or materials were encountered. The core barrel was used when advancing through cohesive soils and/or materials or where compaction of the recovered materials could be achieved. Regardless of the tooling used, the recovery brought to the surface represented disturbed samples, with a portion of the recovery often being slough. Slough is commonly defined as materials that have crumbled and fallen away from the sides of the boring and accumulate at the bottom between passes of the tooling. Recovered slough in the large diameter borings were typically the result of loose material and/or soils, or where removal of the tooling caused a disturbance to the bore hole.

Each portion of recovery consisted of a 3 to 5-foot thick section of materials, recovered by advancing the boring 0.5 to 2 feet, as reported by the driller. The upper portion of the recovery typically consisted of slough from the previous pass that had accumulated within the boring. Depending on the boring, cohesiveness of the soils and/or materials, tooling used, and operation of the drill rig, the amount of slough encountered was typically responsible for the upper 2 to 3 feet of the recovery. The remaining portion of the recovered materials was then representative of the interval being drilled through.

Encountered slough was accounted for by SCS personnel when preparing the logs by only recording the bottom portion of the recovery, below the thickness of slough. With the open flight auger, the logs were prepared by having the Driller's personnel remove recovered materials from the bottom flights of the auger, below the slough, for inspection and documentation. The bottom section of the materials recovered by the core barrel was removed for inspection by having the Driller agitate the tooling, dislodging the bottom section of the recovery.

Where the Driller was not able to advance the depth of the boring from the previous pass, due to the amount of slough encountered, additional cleanup passes were required to remove the slough. Cleanup of the encountered slough consisted of one to six additional passes of the tooling in the boring. The number and locations of the cleanup passes that were required in borings BA-1, BA-2, BA-4, and BA-5 are noted on the boring logs included in Appendix C. Additional cleanup passes to advance the boring were not required in borings BA-3 and BA-6.

Following recovery, the materials were documented for the items outlined above and as described in the Work Plan and any desired samples collected. During the drilling process, two to six bulk bag samples of the recovered materials were collected where mixed debris was encountered. Each bulk bag was labeled with the boring number, depth at which the sample was obtained, and the date and time of collection. At the end of each day, SCS personnel reviewed the field boring log(s) and selected up to three samples from the boring(s) to be field-preserved and sent to the laboratory for TVS analysis. After collecting and preserving the samples for TVS analysis, the bulk bag samples that had been collected were placed in water tight 5-gallon plastic containers. These containers were labeled for each boring and set aside with the soil cutting drums for disposal at the end of the project. Additional information regarding the sampling procedures and results are discussed in Section 8. Each recovery (pass of the bucket auger tooling) was photographed as part of the documentation for each boring. A photographic log of the recovered materials from each boring is included as Appendix C.

Following documentation, the recovered materials were disposed of as described in the Work Plan. Recovered soils from above the layer(s) of mixed debris, generally above the Visqueen layer, were stockpiled separately and used for backfilling the boring as described in Section 4.2. In the borings where the Visqueen was not observed, the recovered materials and soils that had the potential to contain mixed debris were containerized in 55-gallon drums. Each drum was labeled with the boring number and recovery interval and stockpiled for disposal within the fenced compound near the site entrance.

A.11 Bucket Auger Boring Logs

Complete boring logs for each boring can be found in Appendix C. A summary of the observations and measurements made at each boring can be found in Table A.1 below.

Table A.1: Summary of Boring Completion

Well Designation	BA-1	BA-2[1]	BA-3	BA-4	BA-5	BA-6
Date and Time Boring Started	2/14/2017 12:40PM	2/13/2017 11:00AM	2/15/2017 07:35AM	2/14/2017 07:40AM	2/15/2017 11:40AM	2/16/2017 07:30AM
Date and Time Backfill Completed	2/14/2017 04:45PM	2/14/2014 10:19AM	2/15/2017 11:20AM	2/14/2017 12:20PM	2/15/2017 02:25PM	2/16/2017 09:45AM
Total Depth of Boring (ft-bgs)[2]	38	35	36	36	34	36
Depth to Visqueen (ft-bgs)[2][3]	14	NA	15	18.5	NA	18
Minimum Observed Temperature (°F)[4]	82.5	48.0	39.0	83.0	78.5	88.0
Maximum Observed Temperature (°F)[4]	117.0	100.0	107.1	128.0	118.0	121.5
Average Observed Temperature (°F)[5]	102.1	79.9	84.1	97.0	99.2	104.0
Average Ambient Temperature During Boring (°F)[6]	26	29	30	26	30	38

Notes:
1. Backfill of BA-2 completed to the depth of encountered geomembrane the same day as boring. Final backfill to surface completed the following day.
2. All depths recorded as reported by the Driller, unless noted otherwise.
3. Depth the Visqueen noted if observed. NA = Not Applicable.
4. Recorded by SCS using a hand-held IR thermometer following recovery of materials.
5. Average of all temperatures recorded in the boring.
6. As recorded by local weather station KPSC, approximately 3.1 miles away from the site.

BA-1: Recovered soils above the encountered layer of Visqueen were characteristic of silty sands and sandy gravels. Layers of geotextile, geomembrane, and geogrid were encountered above the layer of Visqueen. Soils below the Visqueen layer were characteristic of low plasticity sandy silts and silty sands. Decomposed refuse was observed in lenses mixed in various proportions with the adjacent soils. Backfill of the boring was completed with well graded 3/4-inch crushed rock, two 3-foot-thick hydrated bentonite chip seals, and clean soil removed from the section of the boring above the Visqueen layer. Three samples were collected for TVS analysis from the layers of soil mixed with decomposed refuse (commonly referred to as the mixed debris layer).

BA-2: A Visqueen layer was not observed in this boring. A single layer of geotextile and two layers of geomembrane were observed as shown in the boring log. Recovered soils were characteristic of low plasticity silts, silty sands, and silty sandy gravels. Decomposed refuse was observed primarily in mixtures with silt. Backfill of the boring was completed with well graded 3/4-inch crushed rock, a 3-foot thick hydrated bentonite chip lower seal, a 5.5-foot thick hydrated bentonite chip upper seal, and clean soils removed from the boring above the encountered refuse. Three samples were collected for TVS analysis within the mixed debris layer.

BA-3: Recovered soils above the encountered layer of Visqueen were characteristic of silty sand with lenses of sandy gravel. Layers of geotextile, geomembrane, and geonet were encountered above the layer of Visqueen. Soils below the Visqueen layer were characteristic of silty sands and low plasticity silts. Decomposed refuse was observed in lenses mixed in various proportions with the adjacent soils. Backfill of the boring was completed with well graded 3/4-inch crushed rock, a 3.5-foot thick hydrated bentonite chip lower seal, a 3-foot thick hydrated bentonite chip upper seal, and clean soil removed from the section of the boring above the Visqueen layer. Three samples were collected for TVS analysis within the mixed debris layer.

BA-4: Recovered soils above the encountered layer of Visqueen were characteristic of low plasticity silts with lenses of well graded sand, silty gravel, and silty sand. Layers of geotextile, geomembrane, and geogrid were observed above the Visqueen layer. Soils encountered below the Visqueen layer were characteristic of silty sand and sandy silt. Decomposed refuse was observed in lenses mixed in various proportions with the adjacent soils. Backfill of the boring was completed with well graded 3/4-inch crushed rock, a 4-foot thick hydrated bentonite chip lower seal, a 5.5-foot thick hydrated bentonite chip upper seal, and clean soil removed from the section of the boring above the Visqueen layer. Three samples were collected for TVS analysis within the mixed debris layer.

BA-5: A Visqueen layer was not observed in this boring. Two layers of geotextile and two layers of geomembrane were observed in the boring. Recovered soils were characteristic of silty sand, poorly graded gravel, and low plasticity silt. Decomposed refuse was observed in lenses mixed in various proportions with the adjacent soils. Backfill of the boring was completed with well graded 3/4-inch crushed rock, two 3-foot thick hydrated bentonite chip seals, and clean soils removed from the boring above the encountered refuse. Three samples were collected for TVS analysis within the mixed debris layer.

BA-6: Recovered soils above the Visqueen layer were characteristic of silty sand and poorly graded gravel. Three layers of geotextile and a layer of geonet were encountered above the Visqueen layer. Soils encountered below the Visqueen layer were characteristic of silty sand and sandy silt. Decomposed refuse was observed in lenses mixed in various proportions with the adjacent soils. Backfill of the boring was completed with well graded 3/4-inch crushed rock, two 3-foot thick hydrated bentonite chip seals, and clean soil removed from the section of the boring above the Visqueen layer. Two samples were collected for TVS analysis within the mixed debris layer.

REFERENCES

IWAG Group III, 2016. Revised Detailed Work Plan to Evaluate Potential Combustion in Zone A (Work Plan). In association and consultation with GSI Environmental, SCS Consultants, Anchor QEA, and Environmental Partners Inc.

April 24, 2017

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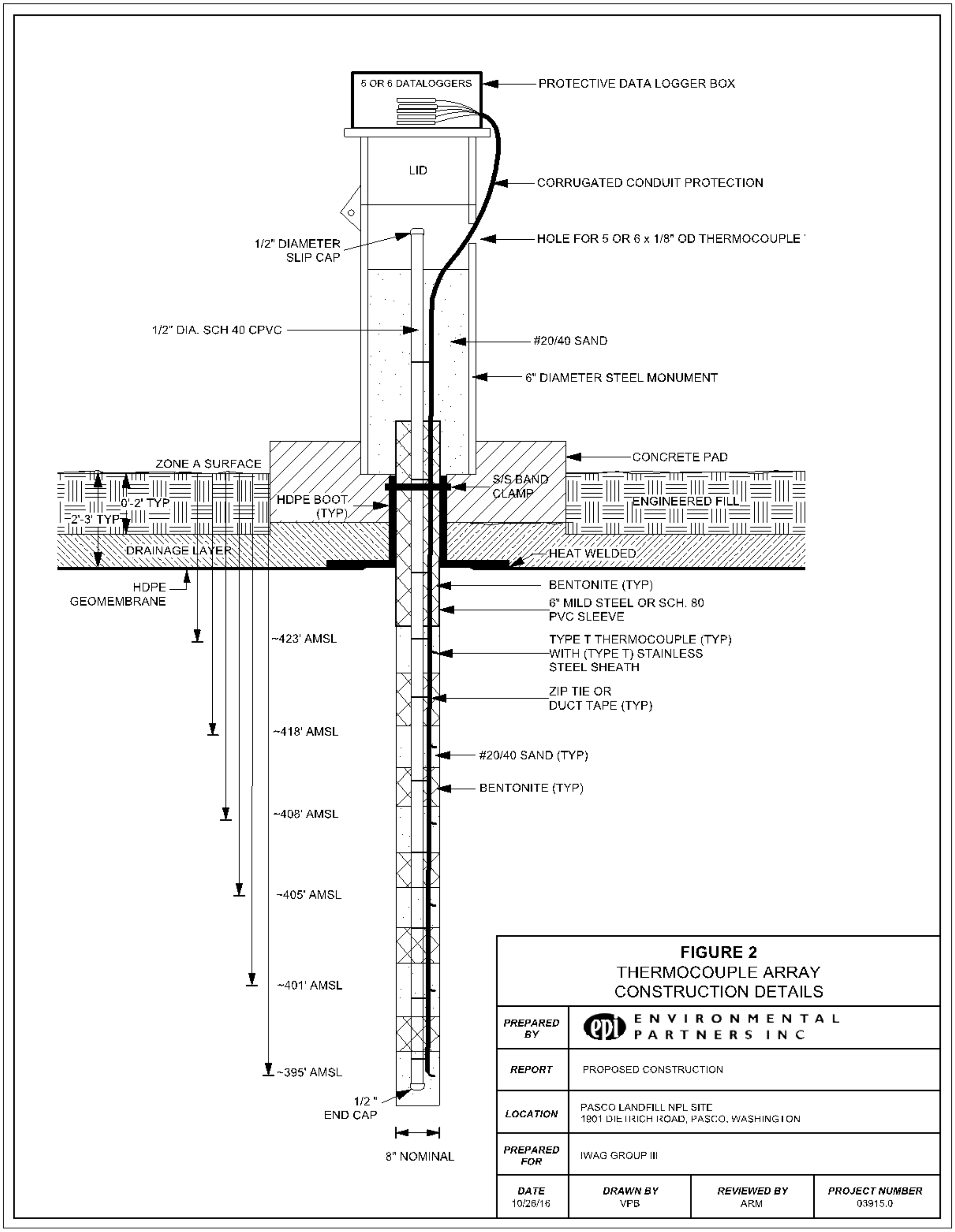
Appendices

Appendix B: Thermocouple and Soil Gas Probe Installation


5 OR 6 DATALOGGERS
PROTECTIVE DATA LOGGER BOX
LID
CORRUGATED CONDUIT PROTECTION
1/2" DIAMETER SLIP CAP
HOLE FOR 5 OR 6 x 1/8" OD THERMOCOUPLE
1/2" DIA. SCH 40 CPVC
#20/40 SAND
6" DIAMETER STEEL MONUMENT
CONCRETE PAD
ZONE A SURFACE
0'-2' TYP
2'-3' TYP
HDPE BOOT (TYP)
S/S BAND CLAMP
ENGINEERED FILL
DRAINAGE LAYER
HEAT WELDED
HDPE GEOMEMBRANE
BENTONITE (TYP)
6" MILD STEEL OR SCH. 80 PVC SLEEVE
~423' AMSL
TYPE T THERMOCOUPLE (TYP) WITH (TYPE T) STAINLESS STEEL SHEATH
ZIP TIE OR DUCT TAPE (TYP)
~418' AMSL
#20/40 SAND (TYP)
BENTONITE (TYP)
~408' AMSL
~405' AMSL
~401' AMSL
~395' AMSL
1/2 " END CAP
8" NOMINAL
FIGURE 2
THERMOCOUPLE ARRAY
CONSTRUCTION DETAILS
PREPARED BY
ENVIRONMENTAL PARTNERS INC
REPORT
PROPOSED CONSTRUCTION
LOCATION
PASCO LANDFILL NPL SITE
1901 DIETRICH ROAD, PASCO, WASHINGTON
PREPARED FOR
IWAG GROUP III
DATE
10/26/16
DRAWN BY
VPB
REVIEWED BY
ARM
PROJECT NUMBER
03915.0

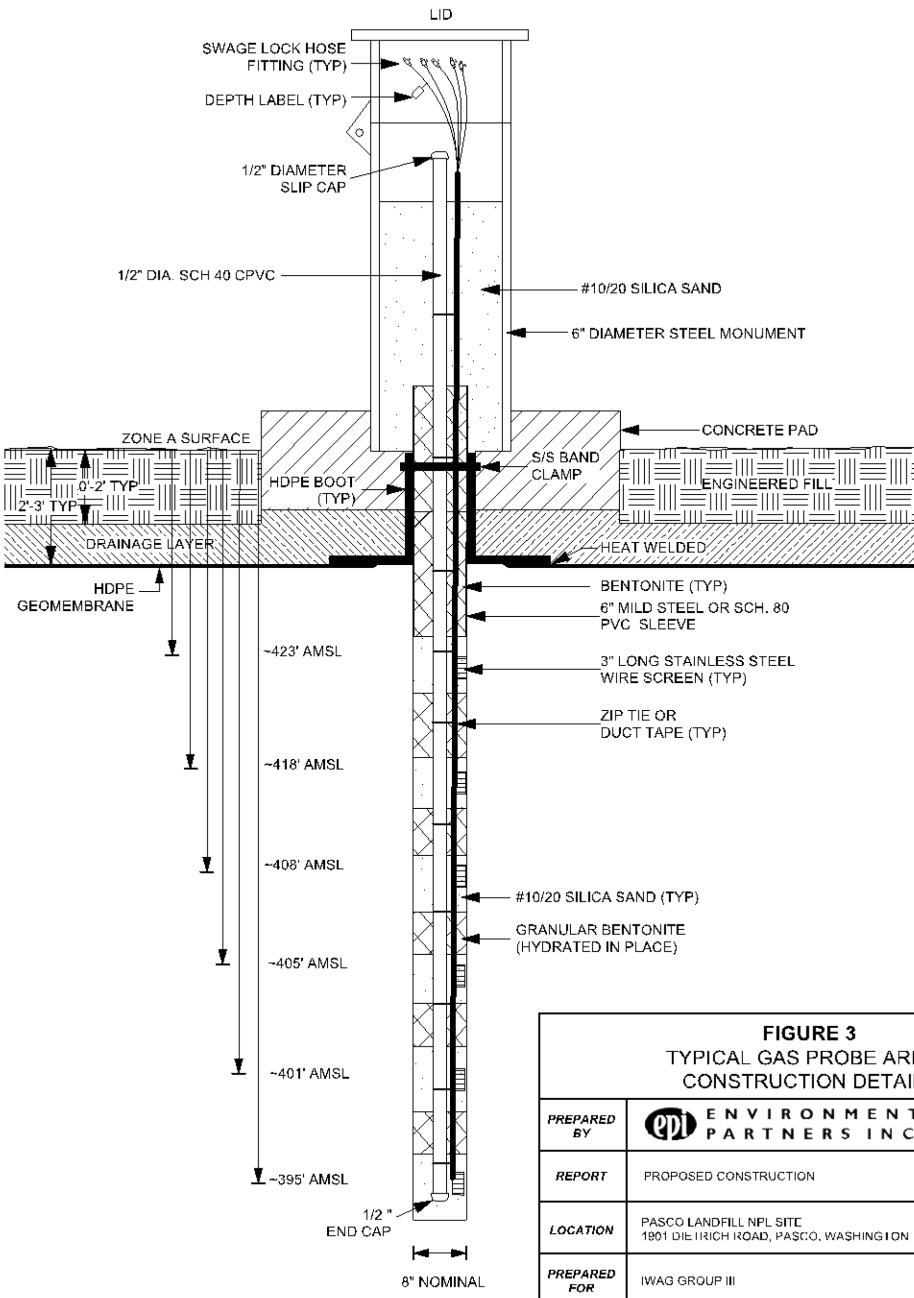


FIGURE 3
TYPICAL GAS PROBE ARRAY
CONSTRUCTION DETAILS

PREPARED BY	ENVIRONMENTAL PARTNERS INC		
REPORT	PROPOSED CONSTRUCTION		
LOCATION	PASCO LANDFILL NPL SITE 1901 DIETRICH ROAD, PASCO, WASHINGTON		
PREPARED FOR	IWAG GROUP III		
DATE 10/26/16	DRAWN BY VPB	REVIEWED BY ARM	PROJECT NUMBER 03915.0

ENVIRONMENTAL PARTNERS INC

Stainless Steel Implant Swagelok Fitting.pdf
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3" Stainless Steel Implant W/ 1/8" Swagelok Fittin

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Top > Soil Vapor Sampling > **3" Stainless Steel Implant w/ 1/8" Swagelok Fitting**

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3" Stainless Steel Implant W/ 1/8" Swagelok Fitting

SKU: SVPT96-3SW18
PRICE: 44.95

3" Stainless Steel Implant w/ 1/8" Swagelok Fitting Description

These implants are constructed of double woven stainless steel wire screen. With the Swagelok fitting, the implant will accept 1/8" OD tubing sizes. The solid end allows for either an anchor point or open-hole placement.

Choose Options

Quantity: 1

Item Message:

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Email To Friend

Suggested Accessories

Optional Steel Anchor Point for 3", 6", 12" Vapor Implants | **Qty:**

Add to Cart

ENVIRONMENTAL PARTNERS INC

BORING ID: GI-1 DRAFT

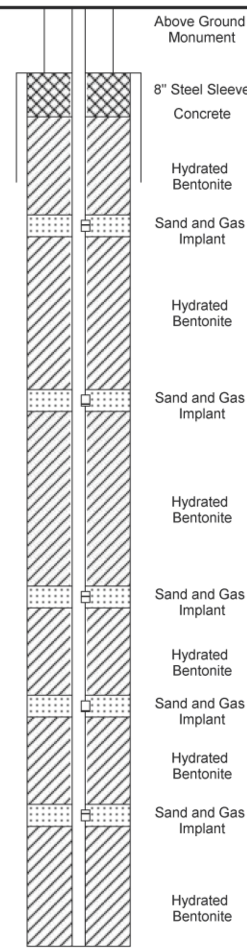
SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/5/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **425'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine** / BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)
	Above Ground Monument
ML	SILT; brown; damp; no odors; vegetative soil cover
GP	Pea gravel 4': Geomembrane
ML	SANDY SILT; trace gravel; light olive brown; dry
SM	SILTY SAND WITH GRAVEL; few cobbles; light gray; damp; odors
ML	SILT WITH GRAVEL; 20% gravel, 25% sand; olive gray; damp; odors 12': Geogrid
ML	SILT; 5%-10% fine sand; olive gray; damp; odors
ML	SILT WITH SAND; 20% fine sand; olive gray; damp; odors 2" gray silt 4" wood fragments, cardboard, plastic; 80% non-soil debris; 20% soil
ML	SILT; 90% silt, 10% wood and plastic debris; black
	Compacted debris; cardboard and chunks of wood; black on outside of wood, not on inside
ML	SILT; silt with wood and glass; dark gray
	Wood debris with silt; few glass; black; moist; strong odor
ML	SILT; dark gray; damp; odors Trace wood fragments
ML	SILT; trace fine sand; dark olive gray; damp; strong odors; no debris
	End of Borehole

Interval (feet)	% Recovery
0–5	100
5–10	100
10–15	100
15–20	100
20–25	80
25–30	100
30–35	100
35–40	100

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	425		
1		33	2.8
2		45	16.4
3		53	6.2
4	421	65	1.7
5		96	1.2
6		81	1.9
7		94	2.8
8	417	107	1.5
9		127	3.2
10			3.4
11		154	48
12	413	176	25
13		158	13.8
14		158	4
15		160	4.5
16	409	155	7.4
17		161	8.8
18		164	29.9
19		171	48
20	405	169	1023
21			
22		170	327
23		179	834
24	401	167	540
25		170	278
26		196	1048
27		195	1141
28	397	177	>3000
29		185	>3000
30		203	1500
31		177	>5000
32	393	185	2500
33		186	5000
34		191	5000
35		194	5000
36	389	195	>5000
37		183	>5000
38		188	>5000
39		196	>5000
40	385	206	>5000

Well Construction



NOTES:

1 of 1

ENVIRONMENTAL PARTNERS INC

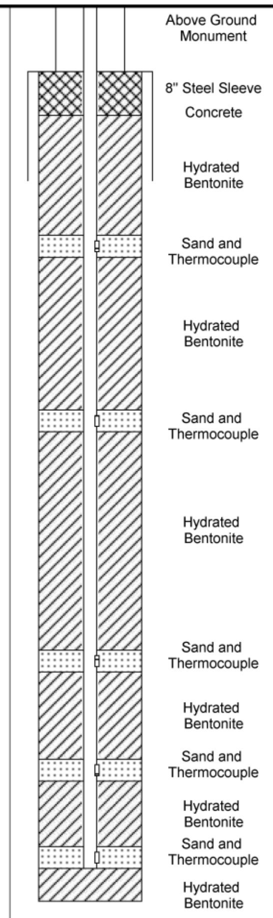
BORING ID: TC-2 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/16/17 - 1/17/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **427'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **C. McFadden/A. Morine** — BOREHOLE SIZE: **6"**	TOTAL DEPTH: **38' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Elevation (ft AMSL)
		Above Ground Monument		
0	ML	SILT; brown; damp; no odors; vegetative soil cover	100	427
4	ML	SILT; trace fine to coarse sand; light brown; moist; soil cover		423
	ML	SANDY SILT; brown; dry; same as 9-10'	75	
8	ML	SILT; trace sand; no debris		419
	ML	SANDY SILT; 30% fine grained sand, 10% gravel, 60% silt; dark brown; moist Same as above; damp		
12	ML	SILT; light brown; trace sand; trace gravel; dry at 13.5' 14.5': 2 layers of Visqueen; >99% soil	100	415
	ML	GRAVELY SILT; mostly silt with some gravel and few round cobbles; dark brown		
16	ML	SILT; dark brown 18': Same as above; 1 plastic piece 19.5': Same as above; concrete pieces; trace organic debris	100	411
20	ML	SILT; brown; damp; no debris	100	407
24				403
	ML	SILT; dark brown; moist 25.5': Same as above; black rubber piece	100	
28		Spongy material; gray; non-native; stretches and becomes stringy and resin-like		399
	ML	SILT; dark brown; moist 33': Same as above; piece of metal; round; cut by rig	100	
32				395
	ML	SILT; brown; damp; no debris	100	
36				391
		End of Borehole		
40				387

Temperature F°	PID (ppm)
103	12.7
101	14.3
108	15
147	17
139	
140	10
124	16
107	17
135	31
160	28
170	37
174	63
180	79
188	92
187	145
200	
197	37
182	39
163	66
154	79
188	16
189	81
190	82
190	88
203	97
	85
	PID down
185	
183	
178	
174	
182	2500
192	
167	

Well Construction



NOTES:

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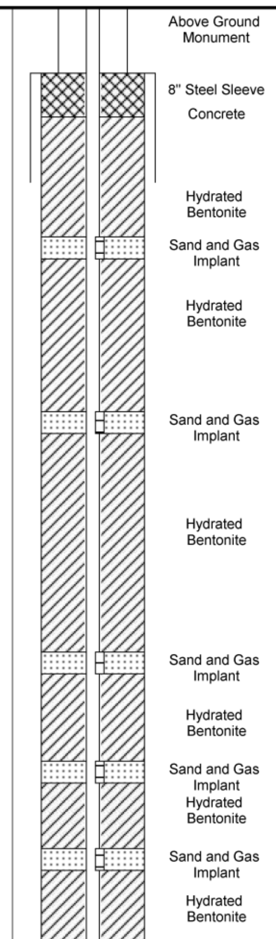
EPI ENVIRONMENTAL PARTNERS INC		**BORING ID: GI-2 DRAFT**	
SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**		CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**		PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**		DATE: **1/17/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**		GROUND SURFACE ELEV. FT AMSL: **427'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden**	BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)
	Above Ground Monument
ML	SILT; brown; damp; no odors; vegetative soil cover 4': Geofabric
GP	Pea gravel drainage layer 5': HDPE liner
ML	SILT WITH GRAVEL
ML	GRAVELY SILT; gray/brown; damp; no odors
ML	SILT; brown; damp; no odors
ML	GRAVELY SILT; gray/brown; damp; no odors 12.5': Geogrid
ML	SILT; trace fine sand; brown; moist; no odors; no debris
GM	SILTY GRAVEL WITH SAND; brown; moist; strong odors; no debris
ML	SILT; trace fine sand; damp-moist Same as above; dark brown; some organics 24.5': Same as above; rubber chunk; one piece of metal with silt and concrete
ML	SILT; trace fine sand; damp; odors 26': Same as above; trace rubber and metal pieces
ML	SILT; trace fine sand with few metal drum pieces; damp; odors
	SILT; trace fine sand; damp; odors; no debris
	SILT; trace fine sand with few metal drum pieces; damp; odors
ML	SILT; trace fine sand; medium brown; moist; strong odors; no debris
	End of Borehole

Interval (feet)	% Recovery
0–5	100
5–10	80
10–15	100
15–20	100
20–25	100
25–30	100
30–35	100
35–40	20

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	427		
2		37	2.5
3		46	3.6
4	423	55	2.4
5		93	2.2
6		51	18.8
7		78	13
8	419	103	14.2
9		112	13.2
10		170	15
11		162	123
12	415	152	180
13		156	802
14		166	650
15		186	241
16	411	193	
17		155	
18		157	
19		171	
20	407	198	
21		201	601
22		172	627
23		173	782
24	403	173	737
25		175	761
26		183	1,114
27		160	1,500
28	399	163	3,000
29		160	3,500
30		174	3,800
31		159	780
32	395	157	1,800
33		172	2,200
34		163	2,200
35		163	2,200
36	391	165	2,062
40	387		

Well Construction



NOTES:

1 of 1

ENVIRONMENTAL PARTNERS INC

BORING ID: TC-3 DRAFT

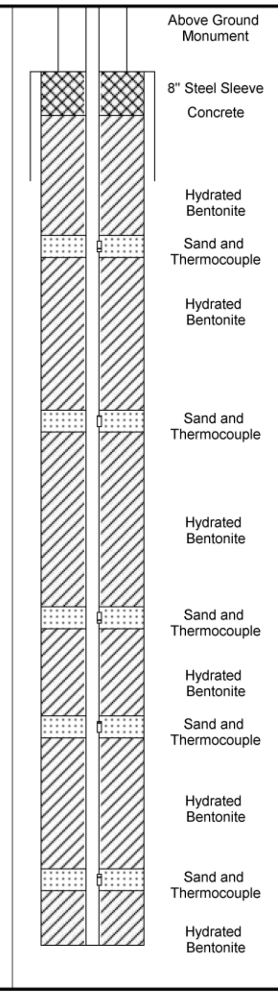
SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/18/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **426'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden** — BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

Description
USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other

USCS	Description
	Above Ground Monument
ML	SILT; brown; damp; no odors; vegetative soil cover
GP	Pea gravel 4': Geomembrane
ML	SILT WITH GRAVEL
ML	SILT; brown; moist; no odor
ML	GRAVELY SILT; brown; moist; no odor 10.5': Geogrid
ML	SILT; 10% fine sand; brown; moist; odors Same as above; trace gravel
ML	GRAVELY SILT; 95% gravelly silt with minor cobbles, 5% plastic and glass debris; dark brown; moist; odors
ML	SILT; 85% silt, 15% wood; tan-brown; moist
ML	SILT; trace cobbles; tan-brown; moist; odors; no debris
ML	Wood; 85% wood, 15% silt; dark brown
	SILT; trace cobbles; tan-brown; moist; odors; no debris
	Wood; 95% wood; large chunks; dark brown
ML	SILT; trace glass; light brown; moist; odors
ML	SILT; minor gravel and black crumbly material; black to dark brown; damp; odors
ML	SILT WITH GRAVEL; 70% silt and cobbles, 30% wood; dark brown; damp; odors
ML	SILT; tan/brown; moist; no debris
	Silt and debris; black spongy material with some drum pieces; pink and gray; moist; odors
ML	SILT; light brown; no debris; appears native Same as above; lighter gray-brown
	End of Borehole

Depth (feet)	Interval & % Recovery	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0		426		
2	100		48	0
3			57	0
4		422	75	0
5			86	0
6			108	0
7	100		104	0
8		418	109	0
9			121	0
10			180	0
11				527
12	100	414	135	879
13			143	2469
14			148	2500
15			156	538
16		410	166	2416
17	100		167	940
18			177	3760
19			169	2320
20		406	152	1290
21			177	2196
22	100		186	368
23			190	1200
24		402	194	1014
25			189	2101
26			187	891
27			186	737
28	100	398	179	923
29			176	4500
30			185	5000
31			192	PID down
32	100	394	158	
33			162	
34			158	
35			153	
36		390	179	
37	100		167	
38			172	
39			183	
40		386	189	

Well Construction



NOTES:

1 of 1

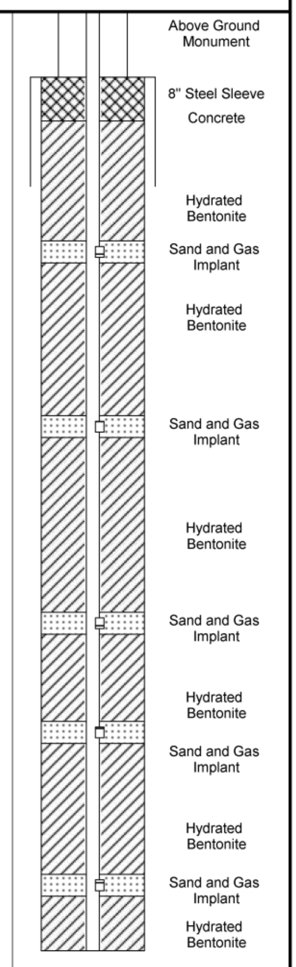
EPI ENVIRONMENTAL PARTNERS INC

BORING ID: GI-3 DRAFT

SITE ADDRESS **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/18/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **426'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine** / BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other	Interval & % Recovery	Elevation (ft AMSL)	Temperature F°	PID (ppm)
		Above Ground Monument				
0		SILT; brown; damp; no odors; vegetative soil cover		426		
	ML		100			
					41	PID down
4	GP	Pea gravel 4.5': Geofabric liner		422	50	
					63	
		GRAVELY SILT; pea gravel and silt; trace cobbles			78	
			100		92	
8	ML			418	102	
					114	
					151	
		SILT; trace fine sand; light brown; damp; no odors			147	
12			100	414	151	
		12': Same as above; light gray			155	
					194	
	ML				197	
16				410		
			100			
		Wood; large chunks; brown; moist; odors				
20		SILT; trace fine sand; light brown; damp; no odors		406		
	ML				166	
		Same as above; 5% white crumbly material	100		164	
		Debris; 50% white debris; minor wood			161	
24		Wood; 90% wood, 10% silt; dark brown		402	150	
		SILT; 10% wood, 90% silt; gray; moist; odors			176	
	ML	SILT; 85% silt, 15% metal wire debris				
	ML	SILT; black; moist; odors	60		184	
28		Silt and Wood; 50% silt, 50% wood chunks; dark brown; moist; odors		398	182	
	ML				176	
	ML	SILT; 90% silt, 10% metal and wood debris; white crumbly material			189	
		SILT; 85% silt, 15% metal drum pieces; medium to dark brown; moist; odors			146	
32			80	394	145	
		SILT; medium brown; moist; odors; no debris			142	
					138	
		35': Top half of sample is lost			138	
36	ML			390		
			50			
					182	
		39': Same as above; dark gray			197	
40		End of Borehole		386	196	

Well Construction



NOTES:

1 of 1

ENVIRONMENTAL PARTNERS INC

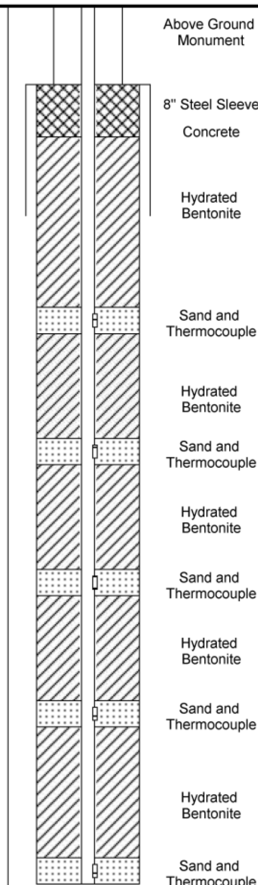
BORING ID: TC-4 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/24/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **425'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden**; BOREHOLE SIZE: **6"**	TOTAL DEPTH: **30' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery
	Above Ground Monument	
ML	SILT; brown; damp; no odors; vegetative soil cover	50
GP	Pea gravel 5': HDPE liner	
ML	GRAVELY SILT; brown; damp; no odors	100
ML	SILT WITH GRAVEL; brown; damp; no odors 9.5': Geogrid	
ML	SILT; trace gravel and fine to coarse sand; medium brown; moist; no odor 13.5': 2 layers of Visqueen 15': Same as above; few wood pieces 15'-16.5': Same as above; no wood	100
	SILT; 15% wood, 85% silt; dark brown; moist	
	Debris; 80% wood, tire pieces, steel, and other metal debris, 20% silt; dark brown; moist; slight odor	100
	Debris; 50% wood, tires, and other minor debris, 50% silt; dark brown; moist; odors	100
	Debris; 95% wood, cardboard, fabric, and plastic debris	
ML	SILT; minor debris; dark brown; moist; odors SILT; dark tan; moist; odors; minor debris	
ML	SILT; trace fine sand; dark gray; damp; slight odor Same as above; light gray	100
	End of Borehole	

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	425		
		61	1.9
4	421	71	1.4
		69	3.1
		114	3.7
		149	4.8
8	417	102	6.4
		118	3.8
		177	5.2
		157	3.8
12	413	113	7.8
		115	4.6
		120	6.8
		137	2.1
16	409	180	38
		182	303
		190	185
		183	49.9
20	405	150	58.7
		164	45.8
		157	461
		149	176
24	401	142	267
		137	689
		162	902
		128	118
28	397	131	231
		134	171
		155	146
32			
36			

Well Construction



NOTES:

1 of 1

ENVIRONMENTAL PARTNERS INC

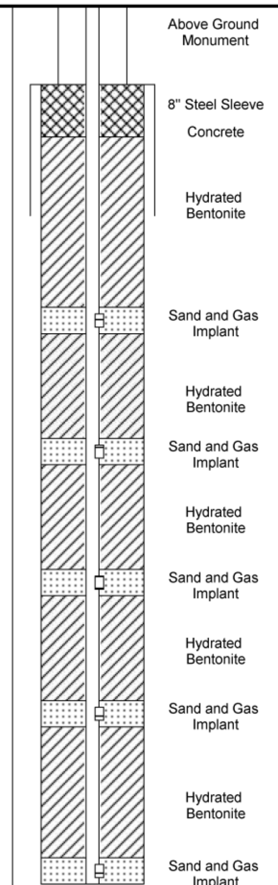
BORING ID: GI-4 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/24/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **425'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine** / BOREHOLE SIZE: **6"**	TOTAL DEPTH: **30' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery
	Above Ground Monument	
ML	SILT; brown; damp; no odors; vegetative soil cover 4': HDPE liner	100
ML	GRAVELY SILT; brown-gray; dry-damp; no odors 9.5': Geogrid	100
	SILT; tan; dry to damp; dense; no odors	
ML	SILT; 10% fine to coarse sand, trave gravel; light brown; moist; no odors 14': Same as above; trace rubber; dark brown	100
ML	SILT WITH GRAVEL; few cobbles; brown; moist; no debris	
ML	SILT; trace medium-fine sand; brown; moist; no odor	100
ML	Silt with Debris; 60% silt, 40% wood, trace rubber; dark brown; moist; no odor	
ML	SILT; few wood debris; medium brown; moist; strong odor	100
	Debris; 70% debris: wood, rubber, wire, cardboard; dark brown; moist	
	Debris; 90% debris: wood, rubber, fabric, metal; 10% soil; dark brown; moist; strong odor	
ML	SILT; gray; minor debris	
ML	SILT; brown-gray; no debris	100
	End of Borehole	

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	425		
		42	1.1
		50	1.5
		63	1.7
4	421	78	2.4
		83	2.6
		86	6.7
		104	7.8
8	417	97	12.5
		120	13
		200	12.7
		206	19.5
12	413	154	9.1
		143	10
		163	18.1
		198	11.5
16	409		
20	405		
		201	50.9
		196	234
		192	465
24	401	172	3370
		187	136
			270
		130	1405
28	397	128	285
		132	3280
		181	188
32			
36			

Well Construction



NOTES:

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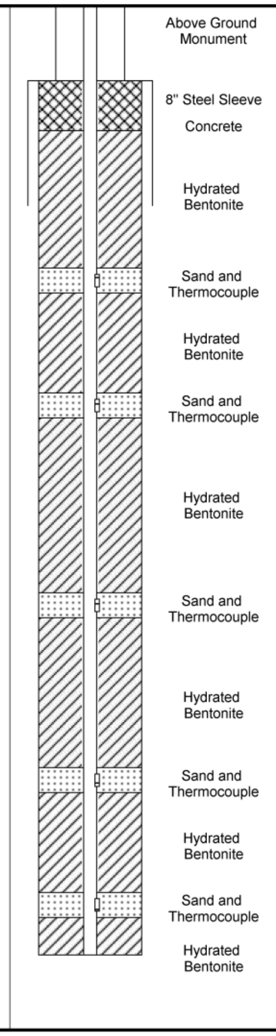
ENVIRONMENTAL PARTNERS INC

BORING ID: TC-5 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/5/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **429'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden** — BOREHOLE SIZE: **6"**	TOTAL DEPTH: **35' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Elevation (ft AMSL)	Temperature F°	PID (ppm)
		Above Ground Monument				
0	ML	SILT; brown; damp; no odors; vegetative soil cover	100	429		
2					35	7.8
3					43	6.4
4		4': Geomembrane		425	54	5.6
5	GP	Pea gravel			65	4.6
6	SM	SILTY SAND WITH GRAVEL; light gray damp; no odors	100		89	23
7					94	35
8				421	92	19.1
9					114	13.3
10	ML	SILT; trace to few fine to coarse sand; gray; dry-damp; odor			145	11.6
11					156	325
12	ML	SILT; gray; damp; odor	100	417	153	397
13					148	478
14					156	392
15					168	378
16			100	413	194	636
17					198	438
18					197	1300
19					180	878
20		SILT; trace wood; gray; damp; odor		409	167	1107
21		Silt and Wood; 50% wood, 50% silt with few sand and gravel; dark gray; moist; odors			178	1700
22	ML	SILT; trace wood; gray; damp; odor	100		180	2500
23		Concrete Debris; chunks and ground (recycled); light gray; dry			188	1377
24		Debris; 80% wood and metal coil debris, 20% silt and sand; sheen on wood; very moist		405	183	3300
25					171	4700
26		Concrete Debris; 100% concrete chunks and ground (recycled); light gray; dry			203	3300
27		Debris; 80% wood and metal coil debris, 20% silt and sand; sheen on wood; very moist	100		190	<5000
28				401	161	<5000
29		Debris; compressed cardboard; black and brown; moist to damp; strong odors			188	<5000
30	ML	SILT; dark gray; moist to damp; strong odors			181	<5000
31		30.5': Same as above; light gray			187	2900
32			100	397	167	1900
33					165	2400
34					176	1900
35		End of Borehole			182	1500
36				393		

Well Construction



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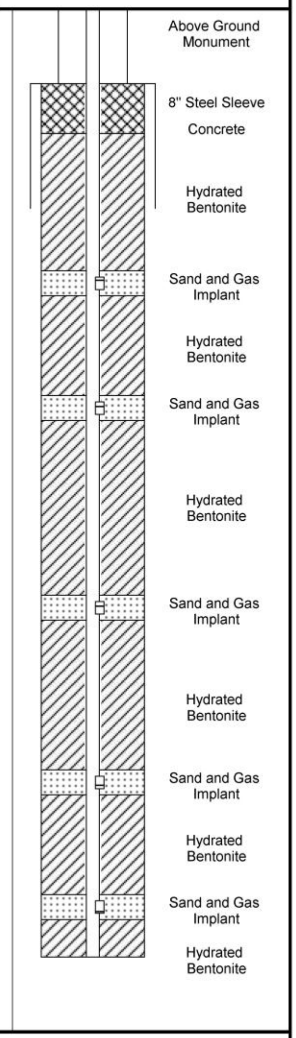
ENVIRONMENTAL PARTNERS INC

BORING ID: GI-5 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/9/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **429'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine** / BOREHOLE SIZE: **6"**	TOTAL DEPTH: **35' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery	Elevation (ft AMSL)	Temperature F°	PID (ppm)
		Above Ground Monument				
0	ML	SILT; brown; damp; no odors; vegetative soil cover	100	429		
					34	0.8
					35	0.8
					44	1.8
4	GP	4': Geomembrane Pea gravel		425	68	1
	SM	SILTY SAND WITH GRAVEL; light gray damp; no odors	100		100	1
					92	3.1
					99	2.6
8				421	97	2.4
					112	3.3
	ML	SILT; trace to few fine to coarse sand; gray; damp; slight odor	100		146	2.1
					108	5.1
12				417	134	4.7
					136	14.3
		14': Geogrid			172	14.1
			100		191	2.4
16	ML	16': Same as above; dark gray		413	202	76
		17': Same as above; light gray			203	168
					201	164
					197	104
20		20': Same as above; damp to moist	100	409	178	702
					175	134
		Silt and Concrete Debris; transitions to soil and recycled concrete			183	268
					196	203
24		Wood Debris; 90% wood, 10% silt Silt and Wood Debris; 50% silt with few fine to coarse sand, 50% wood debris; gray; damp; slight odor		405	162	840
			100		169	950
		Debris; compressed cardboard; black and brown; moist; strong odor			135	236
					137	3991
28				401	102	96
					125	1257
		Same as above; more black than brown; cardboard pieces smaller, some pea sized	100		106	1560
					149	1522
32				397	165	1288
	ML	SILT; gray; moist-damp; strong odor; native soil			178	3441
					195	>5000
		End of Borehole			192	124
36				393		

Well Construction



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ENVIRONMENTAL PARTNERS INC

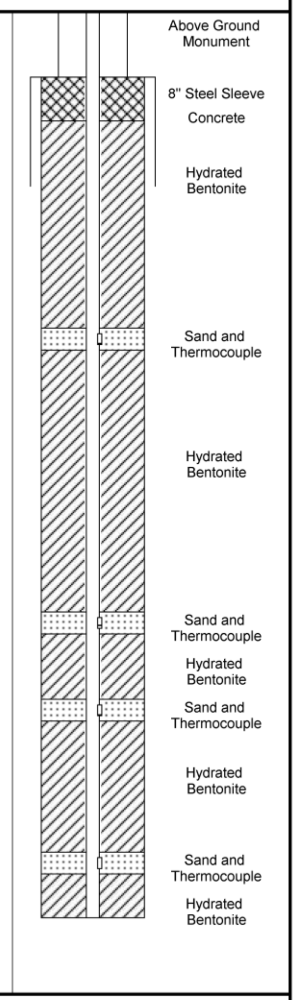
BORING ID: TC-6 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/23/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **430'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden** — BOREHOLE SIZE: **6"**	TOTAL DEPTH: **38.5' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery
above 0		Above Ground Monument	
0–10	ML	SILT; brown; damp; no odors; vegetative soil cover	50
		5': Black visqueen	50
		Same as above; minor fine sand	
		Same as above; minor angular gravel	
10–15	ML	GRAVELY SILT; brown; damp; no odors	100
15–18	ML	SILT WITH SAND; 15-20% fine sand; brown; moist; no odors	100
18–24.5	ML	SILT: light brown; dry-damp; no odors; no debris	100
24.5–25		SILT; 90% silt, 10% wall paper, wire, fabric, and other minor debris; brown; dry; slight odor	
25–28	ML	SILT: light brown; dry-damp; no odors; no debris	100
28–29	ML	SILT: brown; damp; odor; no debris	
29–30		Debris; 90% wood, plastic, metal, and other debris, 10% silt	
30–32.5		Silt and Debris; 50% debris, 50% silt, trace metal; dark brown; moist; odors	80
32.5–38.5	ML	SILT; 10% fine sand; gray; damp; odors	100
38.5		End of Borehole	

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	430		
4	426	50	
5		42	
6			2.3
7		76	
8	422	124	4.6
10		137	1.9
12	418	163	2.1
13		147	3.9
14		204	5.9
15		195	8.5
16	414	192	13.7
17		196	1.1
18		194	14.3
19		186	68.9
20	410	184	100
21		200	67.9
22		203	27.1
23		204	437
24	406	204	392
25		199	191
26		187	520
27		202	
28	402	203	
29		202	
30		188	
31		199	675
32	398	202	451
33			9.1
34		179	26
35		180	59
36	394	192	324
37		192	49.9
38		198	361
40	390		

Well Construction



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ENVIRONMENTAL PARTNERS INC

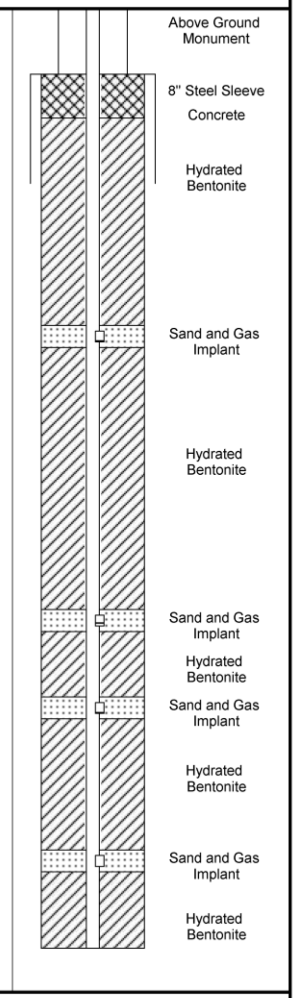
BORING ID: GI-6 DRAFT

SITE ADDRESS **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/23/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **430'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden** — BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery
	Above Ground Monument	
ML	SILT; brown; damp; no odors; vegetative soil cover	100
		100
ML	GRAVELY SILT; medium brown; moist; no odors 14.5': Geogrid Same as above; moist	100
		50
ML	SILT; trace black rock pieces; medium brown; damp; odors; no debris	
ML	GRAVELY SILT; light gray; dry-damp; odors	
	Wood; 90% wood, 10% silt	100
GM	SILTY GRAVEL; 10% wood debris, 90% silty gravel; dark brown; moist; strong odors	
	Debris; 90% plastic debris with trace other debris, 10% gravelly silt	
ML	GRAVELY SILT; trace wood pieces; dark brown; moist	100
	Silt and Debris; 50% plastic and wood debris, 50% silt	
	GRAVELY SILT; 80% gravelly silt, 20% wood pieces; black-brown	
ML	SILT; medium brown; moist; no debris Same as above; gray	100
		100
	End of Borehole	

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	430		
		43	2.6
4	426	55	3
		78	2.6
		86	4.9
		104	4.1
8	422	85	4.3
		96	5.8
		128	4.4
		168	16.9
12	418	123	12.3
		121	47.5
		134	11.5
		160	39.9
16	414		
20	410		
		168	147
		163	389
		156	1510
24	406	167	2110
		170	1157
		186	606
		170	1271
28	402	167	1791
		173	1624
		179	646
		188	115
32	398	182	288
		193	1315
		199	132
		202	70.1
36	394		
40	390		

Well Construction



NOTES:

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ENVIRONMENTAL PARTNERS INC

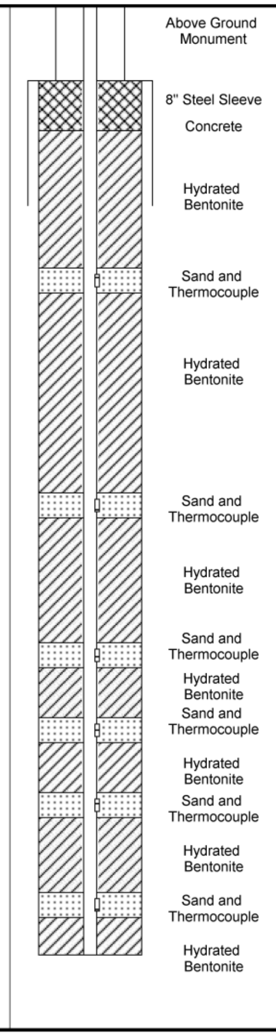
BORING ID: TC-7 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/9/17 - 1/10/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **427'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine** / BOREHOLE SIZE: **6"**	TOTAL DEPTH: **35' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery
above 0		Above Ground Monument	
0–5	ML	SILT; brown; damp; no odors; vegetative soil cover 5': Geofabric	100
5–8	ML	SILT; few coarse-fine sand and trace gravel; brown; dry-damp; no odor	90
8–13	ML	SILT WITH SAND; coarse to fine sand with trace gravel; light gray; damp to dry; no odors	100
13–14	SW.	SAND; fine to coarse sand with trace gravel; brown; damp; no odor	
14–21	ML	SILT; trace gravel; light gray-brown; damp; no odor 17': Geogrid 19': Same as above; dense	100
21–23	SP	SAND; fine sand with minor silt; tan; dry; slight odor	100
23–24		Debris; 60% plastic and metal debris, 40% soil; dark brown to black and tan; odors	
24–27	SP	SAND; fine sand with minor silt and few gravel; tan; dry; slight odor Same as above; piece of bung from steel drum	50
27–30	SP	SAND; fine sand with minor silt with chunks of gray stone or compressed sand (not concrete); tan; dry; slight odor	
30–35	ML	SANDY SILT; minor gravel and trace coarse to fine sand; olive-gray; damp; strong odors; no debris	100
35		End of Borehole	

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	427		
1		33	2.1
2		37	0.6
3		41	0.2
4	423	48	1.1
5		84/102	0.6
6		82	2.3
7		78	1
8	419	80	2.8
9		42	1.6
11		81	11
12	415	76	4.5
13		98	4.8
14		108	3.2
15		169	8.5
16	411	155	13
17		154	18
18		122	5.3
19		123	5.2
20	407	171	26
21		124	94
22		122	118
23		133	594
24	403	158	2308
25		147	400
28	399	134	
29		129	689
30		149	1169
31		158	823
32	395	147	730
33		143	3410
34		150	4200
35		165	>5000
36	391		

Well Construction



NOTES:

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ENVIRONMENTAL PARTNERS INC

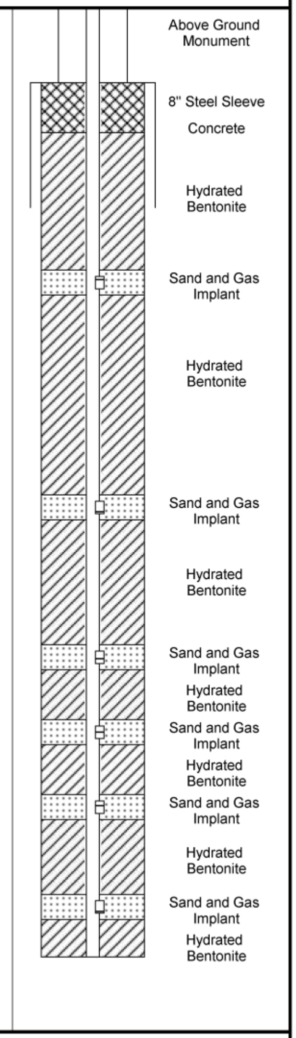
BORING ID: GI-7 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/10/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **427'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine** / BOREHOLE SIZE: **6"**	TOTAL DEPTH: **35' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery
above 0		Above Ground Monument	
0–2	ML	SILT; brown; damp; no odors; vegetative soil cover	100
2–7	ML	SILT; few fine to coarse sand; light brown; damp; no odor 4.5': HDPE liner Same as above; no pea gravel 7': Geofabric	
7–8	GP-GM	Pea gravel with Silt	60
8–13	ML	SILT; few fine to coarse sand; light brown; damp; no odor	
13–15	ML	SILT WITH GRAVEL; 15% gravel, 10% coarse to fine sand	80
15–17		No recovery; very little resistance drilling	
17–19	ML	SILT; 10% fiber pieces; light gray; dry-damp; no odors	60
19–21	ML	SILT; light brown; damp; no odors; no debris	
21–22		80% white compressed material, 20% soil	
22–23		20% white powder and metal debris, 80% soil	100
23–24.5		80% white compressed material, 20% soil; tan; moist	
24.5–27.5	ML	SILT WITH GRAVEL; 90% silt, 10% fine to coarse sand; black; moist; odor 25': Same as above; White-red brick-like material	
27.5–31	ML	SILT; light brown; moist; odors Same as above; increasing density; light gray Same as above; dark brown Same as above; trace brown fibers	100
31–35	ML	SILT; brown; damp-moist; odors; no debris	100
35		End of Borehole	

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	427		
1		36	2.3
2		39	0.8
3		42	0.3
4	423	49	0.3
5		75	0.4
7		65	0.7
8	419	80	0.6
9		99	1.2
10		95	0.6
11		75	10
12	415	88	19
13		94	3.4
14		108	1
15		196	1.2
16	411		
17		188	10
18		149	1.8
19		164	2.6
20	407	152	5.1
21		146	194
22		124	282
23		129	352
24	403	136	316
25		134	257/260
26		155/139	491
27		129	524
28	399	135	1731
29		138	1247
30		154	997
31		154	621
32	395	160	1501
33		174	672
34		169	1372
35		156	1485
36	391		

Well Construction



NOTES:

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ENVIRONMENTAL PARTNERS INC

BORING ID: TC-8 DRAFT

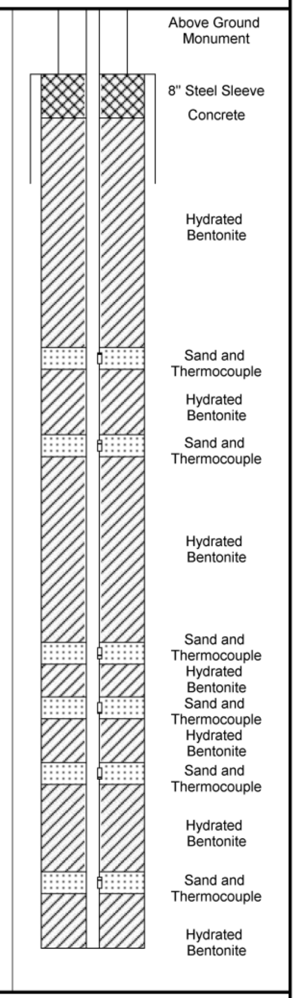
SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/11/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **426'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine** / BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)
	Above Ground Monument
ML	SILT; brown; damp; no odors; vegetative soil cover
ML	SILT; trace fine sand; brown-tan; moist-damp; no odors
GP-GM	Poorly-Graded Gravel with Silt and Sand drainage layer
ML	SILT WITH SAND; 10% gravel; brown; moist; no odors
ML	SILT; trace sand; brown; moist; no odors
SM	SILTY SAND; 10% gravel; gray; dry; no odors 13': Same as above; 5% fine to coarse sand; trace cobbles; dry-damp 14': Geogrid
ML	SILT; light brown; damp-moist; no odors; no debris Same as above; increased sand and gravel Same as above; dark brown Same as above; light brown Same as above; moist
ML	SILT; 10% fine sand; light brown; damp; no odors; no debris
ML	SANDY SILT WITH GRAVEL; 35% drum pieces 65% silt, sand, and gravel; yellow-green 27'-28.5': Same as above; no debris
ML	SILT; some rock/gravel pieces; yellow-green
ML	SILT; 85% silt with black and white gravel pieces; dark gray; dry to damp; odors
ML	SILT; trace gravel; dark brown; moist; strong odors; no debris 32'-33': Same as above; 90% silt, 10% metal drum pieces and trace glass 33'-34': Same as above; no metal trace glass 34'-35': Same as above; no debris
ML	SILT; trace fine-coarse sand; light gray; moist; strong odors; no debris
	End of Borehole

Interval	% Recovery
0-5	100
5-10	70
10-15	100
15-20	100
20-25	50
25-30	100
30-35	100
35-40	100

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	426		
1		33	0
2		36	0
3		38	0.1
4	422	46	0
5		60	0
6		33	0
7		50	0.8
8	418	52	1.4
9		53	0.4
10		106	0.3
11		79	1
12	414	58	2.3
13		120	5
14		106	11
15		110	4.4
16	410	147	24
17		198	23
18		190	11
19		108	26
20	406	188	7.9
21		137	5.3
22		154	74
23		161	74
24	402	130	112
25		132	61
26		140	120
27		141	508
28	398	135	1409
29		157	375
30		182	191
31		189	3182
32	394	185	4658
33		183	4011
34		169	>5000
35		183	1587
36	390	200	>5000
37		197	>5000
38		201	>5000
39		193	>5000
40	386	202	1200

Well Construction



NOTES:

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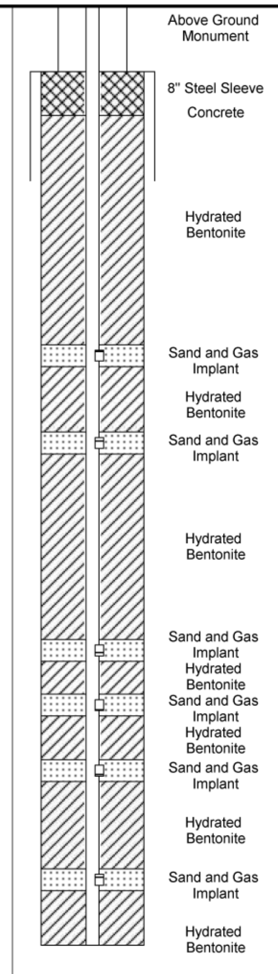
ENVIRONMENTAL PARTNERS INC

BORING ID: GI-8 DRAFT

SITE ADDRESS **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/11/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **426'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **C. McFadden** — BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

Depth (feet)	USCS	Description USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other	Interval & % Recovery	Elevation (ft AMSL)	Temperature F°	PID (ppm)
		Above Ground Monument				
0	ML	SILT; brown; damp; no odors; vegetative soil cover		426		
			75		38	
4				422	57	
					79	
		6': HDPE Liner Geosynthetic clay liner				11.5
	GP-GM	POORLY-GRADED GRAVEL WITH SILT; mostly fine gravel with minor silt and few sand; brown; dry	75		86	19.8
8				418	88	20.1
					86	
					103	22.6
		No Recovery				
12			65	414	60	264
	ML	SILT; brown; dry			156	250
	GP-GM	14': Geogrid POORLY-GRADED GRAVEL WITH SILT; fine gravel with minor silt and few sand; brown; dry			173	264
16	ML	SILT; trace fine sand; brown; dry		410	145	106
			80		145	175
		17': Same as above; no sand			148	180
					155	170
20		19': Same as above; 1" piece of plastic		406		
		20': Same as above; no debris			150	190
			90		148	2491
					163	124
24				402	182	125
					179	64
						570
		26'-27': Green rock; hard; similar to white rock at 28'	100		178	960
28		27'-28': Rubber and silt; 30% silt; rubber not blackened; brown		398	182	1025
					187	1156
	ML	28'-29.5': White-yellow rock; no debris			201	1530
		SILT; trace fine sand; brown; dry			172	PID
32		Debris; Rubber pieces and bright green rock pieces	100	394	185	Down
	ML	SILT; 10% green rock pieces, some large, most small; trace fine sand; trace white pieces; light brown; moist; strong odor; no debris			192	
					182	
					152	
36		No Recovery		390		
	ML	SILT; drum piece at 37'; trace fine sand; brown; dry	75		124	
					160	96
					161	104
40		End of Borehole		386	163	100

Well Construction



NOTES:

1 of 1

April 24, 2017
DRAFT

ENVIRONMENTAL PARTNERS INC

BORING ID: TC-9 DRAFT

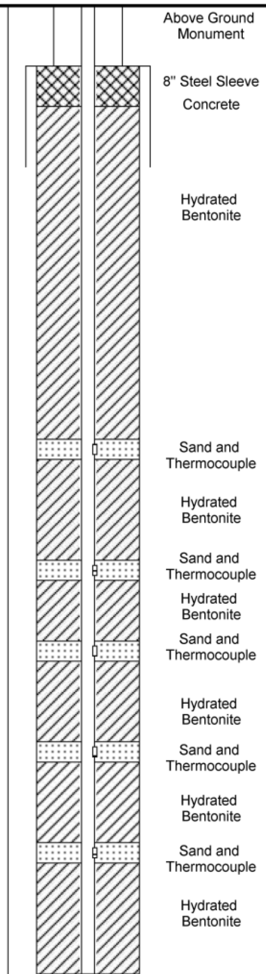
SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**		CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **Thermocouple**
DRILLING CONTRACTOR: **Cascade Drilling LP**		PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**		DATE: **1/19/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**		GROUND SURFACE ELEV. FT AMSL: **430'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden**	BOREHOLE SIZE: **6"**	TOTAL DEPTH: **45' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)
	Above Ground Monument
ML	SILT; brown; damp; no odors; vegetative soil cover
GP	Pea gravel
ML	SILT; brown; moist; no odor
ML	SILT; light gray; damp; no odor Silt with pea gravel 11.5': HDPE liner
ML	SILT; trace fine sand; medium brown; moist; no odors
ML	GRAVELY SILT; trace cobbles; brown; damp; no odors 18': Geogrid
ML	SILT; trace fine sand; brown; moist; no odors
ML	GRAVELY SILT; minor cobbles; light brown; damp; slight odor
ML	SILT; medium brown; moist; slight odor 24': Same as above; dark brown
	Wood; 90% wood, 10% silt; dark brown
	Little resistance
	Wood; 90% wood, 10% silt; dark brown
	Debris; 70% rubber, cardboard, and other debris, 30% silt; dark brown
ML	SILT; dark brown. Recovery is lost down sampler. Recovered soils may be homogenized. Cascade adds 4 gal of water to get recovery. Soils are wet due to water.
ML	SILT; trace gravel; light gray; damp; odors Same as above; dry 39': Same as above; metal fragment, possibly drag down Same as above; moist; no debris
	End of Borehole

Interval & % Recovery
50
75
100
100
100
40
0
50
100

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	430		
		44	PID Down
4	426	54	
		60	
		144	
		145	
8	422	120	
		111	
		120	
		153	
12	418	154	
		130	
		140	
		156	
16	414	153	343
		154	16.2
		130	2.1
		140	5.1
20	410	156	8.3
			654
		176	58.1
		138	12.2
24	406	132	27.8
		135	139
28	402	153	496
		136	193
		115	19.5
		139	71
32	398	162	399
		169	847
		182	847
		190	383
36	394		
		175	
		178	341
		182	300
40	390	186	141
		172	57
		178	59.1
		204	45.5
44	386	205	42.2
		202	60.2

Well Construction



NOTES:

1 of 1

ENVIRONMENTAL PARTNERS INC

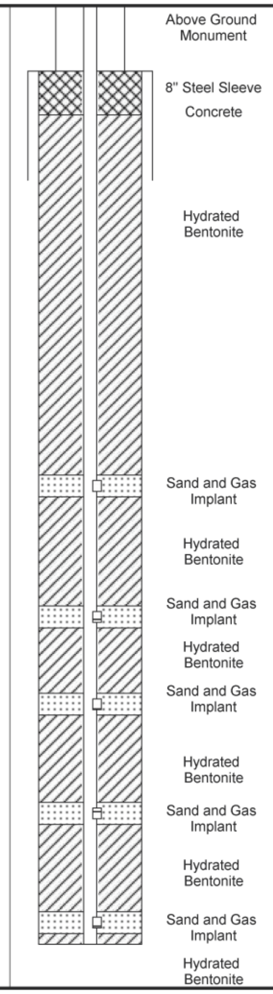
BORING ID: GI-9 DRAFT

SITE ADDRESS: **1901 Dietrich Rd, Pasco, Wa**	CLIENT: **IWAG Group III**	CASING MATERIAL AND SIZE: **3" gas impants**
DRILLING CONTRACTOR: **Cascade Drilling LP**	PROJECT #: **03916**	SCREEN SIZE: **N/A**
DRILLING EQUIPMENT: **Limited Access Rig**	DATE: **1/19/17**	SCREEN INTERVAL: **N/A**
DRILLING METHOD: **Roto Sonic**	GROUND SURFACE ELEV. FT AMSL: **430'**	FILTER PACK: **20/40 Sand**
LOGGED BY: **A. Morine/C. McFadden** — BOREHOLE SIZE: **6"**	TOTAL DEPTH: **40' bgs**	FILTER PACK INTERVAL: **N/A**

USCS	Description (USCS name; Color; Moisture; Density; Plasticity; Dilatency; EPI description; Other)	Interval & % Recovery
	Above Ground Monument	
ML	SILT; brown; damp; no odors; vegetative soil cover	50
GP-GM	Pea gravel and silt 7': HDPE liner	100
ML	SILT WITH SAND; 20% coarse to fine sand with trace gravel; medium brown; moist; no odors Same as above; 10% gravel, trace cobbles	40
ML	GRAVELY SILT; 20% gravel, 10% coarse to fine sand; medium brown; moist; no odors 17.5': Geogrid	100
ML	SILT; trace gravel; medium brown; moist; no odors; no debris	100
ML	GRAVELY SILT; gray-brown; moist; slight odor	
	Wood; 90% wood, 10% silt	
ML	Little resistance until 29': Top 1'-2' of recovery is silt with minor plastic and white hard material; few cobbles; dark brown; damp	25
ML	Bottom 1' of recovery is silt; light brown; trace fine sand; no debris	
ML	SILT; 10% coarse gravel, trace of metal debris and white-green crumbles	100
ML	SILT; medium brown; trace black brittle chunks; lightweight 34.5'-35': Same as above; 55% black chunks	
ML	SILT; brown-gray; damp-moist; metal chunk at 35'; no other debris 37': Same as above; light gray; no debris	100
	End of Borehole	

Depth (feet)	Elevation (ft AMSL)	Temperature F°	PID (ppm)
0	430		
		39	1.2
4	426	37	1.2
		57	1.1
		82	1.9
		82	1.2
8	422	84	1.4
		86	1.1
		91	1.5
12	418		
		114	16.5
		135	4.7
		199	9.5
16	414		
		153	
		197	
		149	
20	410	193	
		120	10.9
		135	7.1
		149	3.5
24	406	144	15.3
		123	19.6
28	402	119	
		119	
		125	36.9
		200	70.7
32	398	194	
		193	337
		178	94.4
		178	32.1
36	394	194	23.6
		192	52.2
		184	62.7
		186	80.3
40	390	201	351

Well Construction



NOTES:

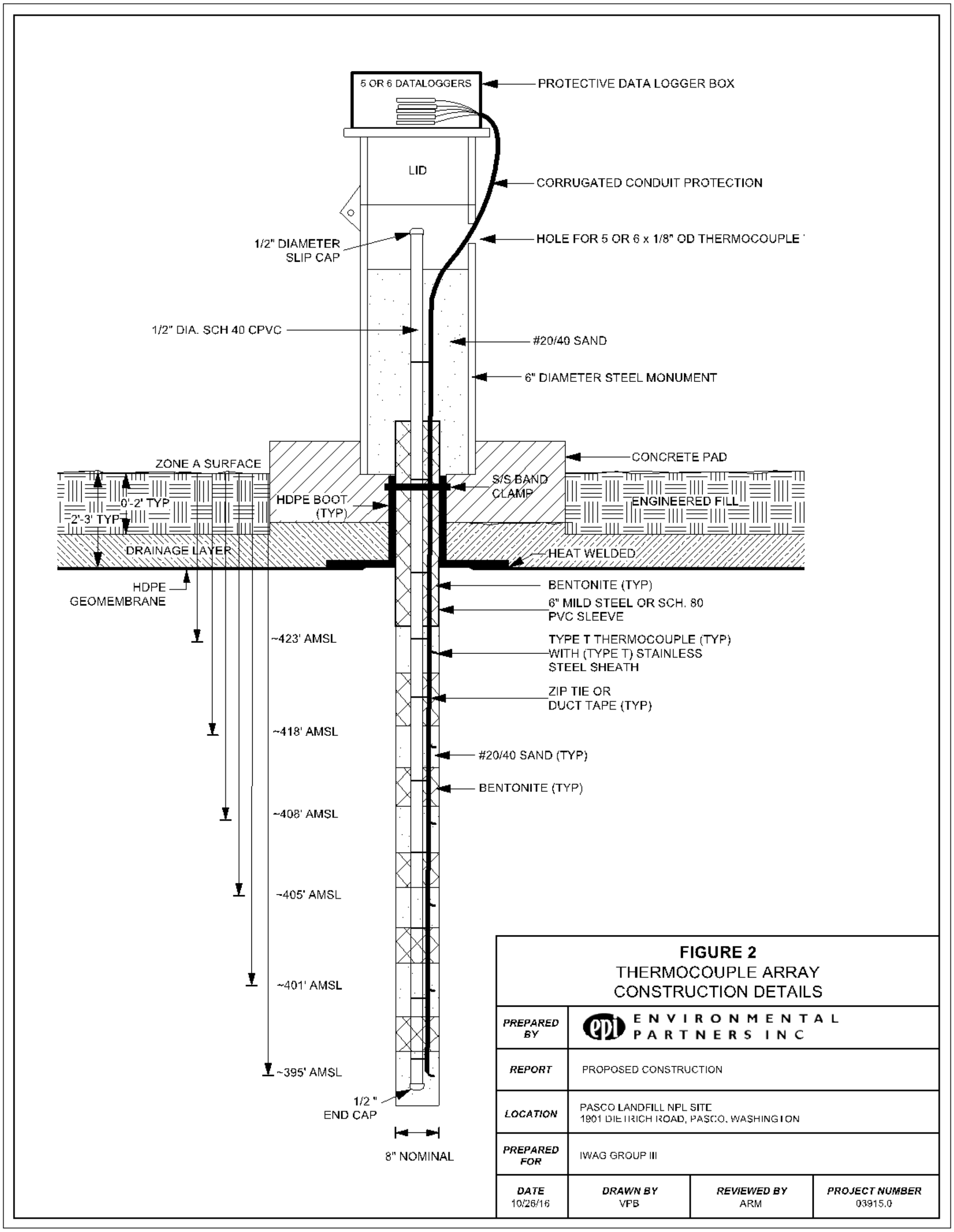
1 of 1

B.2 Photographs of Typical Thermocouple and Soil Gas Arrays

Photograph 1: Typical thermocouple array.

Photograph 2: Typical soil gas array.

B.3 Thermocouple and Gas Probe Array Construction Details



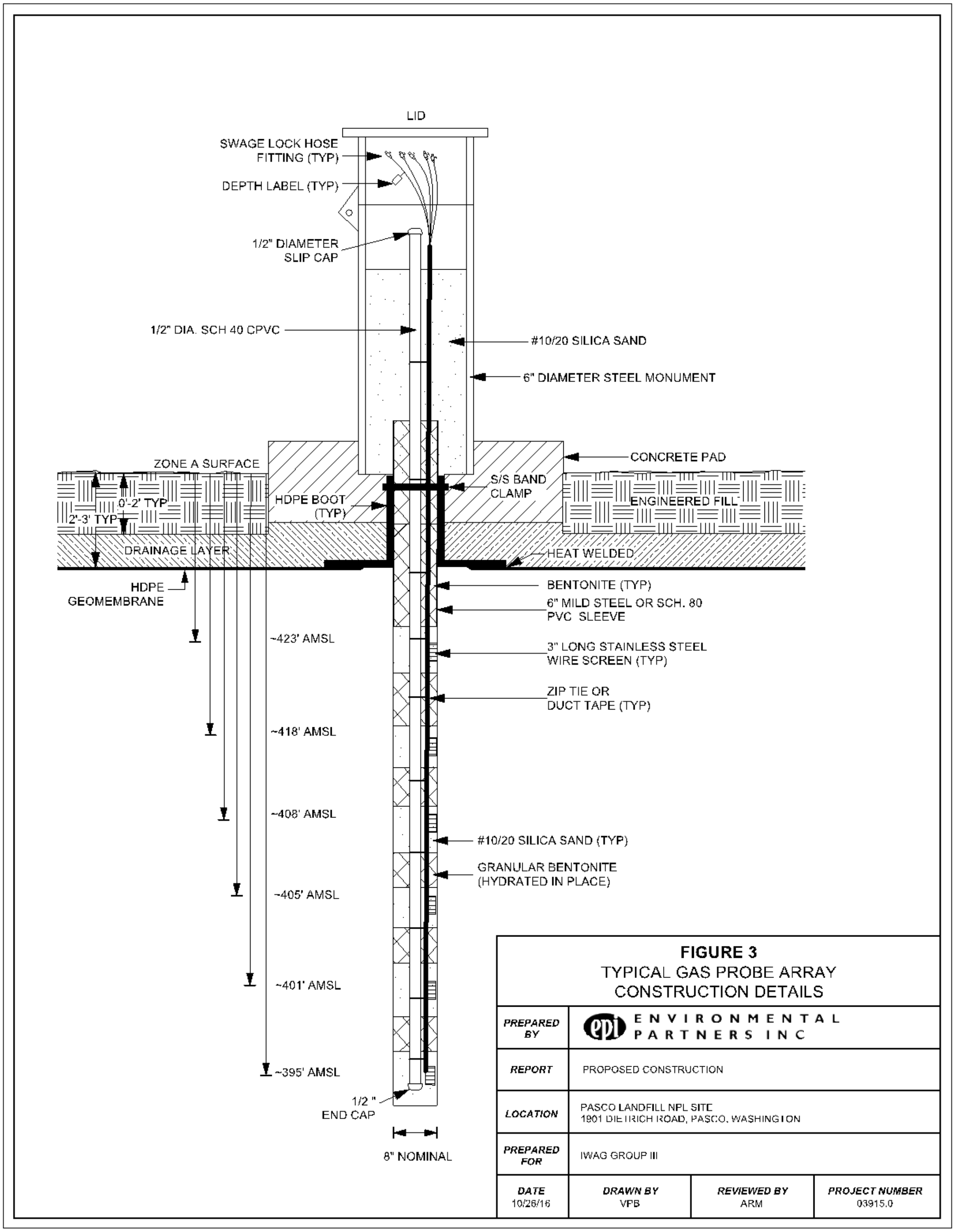


FIGURE 3
TYPICAL GAS PROBE ARRAY CONSTRUCTION DETAILS

April 24, 2017

ZONE A COMBUSTION EVALUATION REPORT
PASCO SANITARY LANDFILL

Pasco Sanitary Landfill
Pasco, WA

Appendices

Appendix C: Bucket Auger Boring Logs and Photographs

APPENDIX C. BUCKET AUGER BORING LOGS AND PHOTOGRAPHS

SOIL CLASSIFICATION SYSTEM CHART

GROUP/GRAPHIC SYMBOL	TYPICAL DESCRIPTION
GW	Well-graded gravels, gravels, gravel/sand mixtures, little or no fines
GP	Poorly graded gravels, gravel-sand mixtures, little or no fines
GM	Silty gravels, gravel-sand-silt mixtures
GM-REF REF-GM	Silty gravel and refuse or fibrous organic mixtures
GC	Clayey gravels, gravel-sand-clay mixtures
SW	Well-graded sands, gravelly sands, little or no fines
SP	Poorly graded sand, gravelly sands, little or no fines
SM	Silty sands, sand-silt mixtures
SM-REF REF-SM	Silty sand and refuse or fibrous organic mixtures
SC	Clayey sands, sand-clay mixtures
ML	Inorganic silts of low to medium plasticity, rock flour, sandy silts, gravelly silts, or clayey silts with slight plasticity
ML-REF REF-ML	Sandy silt and refuse or fibrous organic mixtures
CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays

SCS ENGINEERS
Environmental Consultants and Contractors
14945 SW Sequoia Parkway, Suite 180
Portland, Oregon 97224
(503) 639-9201 FAX: (503) 684-6948

PROJECT NO. 9000003.04	DES BY LEL	SOIL CLASSIFICATION CHART	DATE APRIL 2017
SCALE AS SHOWN	CHK BY SEA		FIGURE LF-434
CAD FILE STD0L434	APP BY JMR		

BA-1 BORING LOG AND PHOTOGRAPHIC LOG

S C S E N G I N E E R S

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-1

Pasco Sanitary Landfill
1901 Dietrich Road
Pasco, Washington

JOB NUMBER: 04209046.06

REMARKS:
All depths as reported by drilling equipment unless otherwise noted.

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
0	0–2					SM		12:40. Begin drilling at surface with open flight auger. Brown silty sand. Moist. (Driller set fall protection casing at surface.)	0
	2–5					GEOT / GM		12:48. 2-ft bgs. Black woven Geotextile underlain by gray sandy gravel. Moist. Photos: IMG_5804, IMG_5805	Site soil backfill to surface. No well casing installed.
1									
	5–6					GEOM / GP		12:50. 5-ft bgs. Black Geomembrane underlain by brown sandy gravel. Moist. Photo: IMG_5806	5
2	6–7.5					SM		12:52. 6-ft bgs. Brown sandy gravel. (Driller setting up containers for cuttings below this depth.) Photo: IMG_5807	Hydrated Bentonite Chip Seal (25 Bags)
	7							13:16. 7-ft bgs. Same as above. Photo: IMG_5808	
	7.5–10					GP		13:19. 8.5-ft bgs. Brown silty sand transitioning to gray sandy gravel. Moist. Photo: IMG_5810	Site soil backfill.
3	10							13:20. 9.5-ft bgs. Gray sandy gravel. Moist to wet. Photo: IMG_5811	

Drilling Company: **DBM Contractors, Inc.**
Drilling Method: **IMT AF180**
Logged By: **Sam Adlington**
Sampling Method: **24-inch Core Barrel and Auger**

Date Started: **2/14/17**
Date Ended: **2/14/17**
Boring Diameter: **24-inch**

Time Started: **12:40**
Time Ended: **16:45**
Total Depth: **38.0 ft.**

SCS ENGINEERS — BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-1

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description
	10						13:22. 10.5-ft bgs. Gray sandy gravel. Moist to wet. Photo: IMG_5812
	11				82.5	**GEOG** / SM	13:24. 11-ft bgs. Brown silty sand. Moist to wet. Pieces of black Geomembrane and Geogrid present.
	12				93.5		13:26. 12-ft bgs. Same as above. Moist and steamy. Photo: IMG_5813
4	13				91.0	SM	13:27. 13-ft bgs. Transition to brown silty sand. Moist to wet and steamy. Photo: IMG_5814
	14					**VQ** / ML	13:29. 14-ft bgs. Brown silty sand transitioning to grey sandy silt below white Visqueen layer.
	15						13:32. 15-ft bgs. Gray sandy silt. Moist to wet and steamy. Photo: IMG_5815
5	16				98.5		13:36. 16-ft bgs. Gray sandy silt. Moist to wet and steamy. Photo: IMG_5816
	17				101.5	ML	13:38. 17-ft bgs. Same as above. Moist to wet and steamy. Photo: IMG_5817
	18					ML	13:39. 18-ft bgs. Same as above. Moist to wet and steamy.
6	19		BA-1 20'	21.1	102.5	SM	13:40. 19-ft bgs. Gray silty sand with ~5% (by volume) gray-brown wood debris and <5% gray-brown decomposed refuse, including opaque plastics. Moist to wet and steamy. Photos: IMG_5819, IMG_5820, IMG_5821, IMG_5822, IMG_5823
	20				116.0		13:52. 20-ft bgs. Gray silty sand with with ~30% gray-brown decomposed refuse, including opaque plastics. Moist to wet. Photo: IMG_5824
	21		BA-1 22'	6.90	117	SM	13:57. 21-ft bgs. Same as above. Moist to wet and steamy. Photos: IMG_5825, IMG_5826, IMG_5827
	22						

Completion Detail

Depth (feet)	Completion Detail
10–13	Site soil backfill.
13–16	Hydrated Bentonite Chip Seal (25 Bags)
16–22	3/4-inch Crushed rock without fines.

SCS ENGINEERS

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-1

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
	22				105.5	SM		14:00. 22-ft bgs. Gray-brown silty sand with ~30% gray-brown decomposed refuse, including opaque plastics, and ~5% brown wood debris. Steam present. Photos: IMG_5828, IMG_5829	
7	23				88			14:20. 23-ft bgs. Dark brown silty sand with ~15% decomposed refuse and minimal (<5%) wood debris. Moist to wet and steamy. Photos: IMG_5830, IMG_5831	
	24				114	SM		14:27. 24-ft bgs. Same as above. Photo: IMG_5832	
	25				104			14:35. 25-ft bgs. Brown-gray silty sand with ~30% brown-tan decomposed refuse, including opaque plastics and foam, ~10% brown-tan wood debris, and some cobble and boulders. Steam present. Photos: IMG_5833, IMG_5834, IMG_5835	25
8	26				107	SM-REF		14:45. 26-ft bgs. Brown silty sand with ~50% brown-tan decomposed refuse, including opaque plastics and foam, ~5% cobble, and including minimal (<1%) paper products and wood debris. Steam present. Photos: IMG_5836, IMG_5837	
	27				105			14:52. 27-ft bgs. Brown sandy silty with ~50% brown decomposed refuse, including opaque plastics, and minor (<5%) wood debris. Moist to wet. Photos: IMG_5838, IMG_5839	
	28				105			14:58. 28-ft bgs. Brown-gray silty sand with ~30% gray decomposed refuse, including opaque plastics. Moist to wet and steamy. Photos: IMG_5840, IMG_5841	3/4-inch Crushed rock without fines.
	29				107	SM		15:05. 29-ft bgs. Brown-gray silty sand with minor (<5%) brown decomposed refuse, including opaque plastics. Moist and steamy. Photos: IMG_5842, IMG_5843, IMG_5844	
9			BA-1 30'	5.22	109			15:12 29-ft bgs. Brown sandy silt with minor (<5%) gravel and cobble. A piece of a metal drum was recovered on the auger. Photos: IMG_5846, IMG_5847, IMG_5848	
	30					SM			30
	31				102			15:19. 31-ft bgs. Brown silty sand with minor (<5%) decomposed refuse, including opaque plastics. Moist. Photos: IMG_5850, IMG_5851	
	32				102			15:25. 32-ft bgs. Brown silty sand with ~10% brown degraded refuse, some cobble, and large wood debris pieces. Wood debris consists of gray-brown dimensional lumber, approximately 2-inches by 6-inches. Steam present. Photos: IMG_5852, IMG_5853	
10	33				102 104 104 100	SM		15:30. 33-ft bgs. Brown silty sand with ~10% decomposed refuse. Some metal fragments present. Four (4) cleanup passes required to remove slough. Moist and steamy. Photos: IMG_5854 through IMG_5866	
	34								

SCS ENGINEERS

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-1

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
	34								
	35				99 105	ML		15:52. 35-ft bgs. Brown-gray silty sand with minor (<5%) brown decomposed refuse and metal fragments. Additional cleanup pass required. Moist. Photos: IMG_5867, IMG_5869	35 — 3/4-inch Crushed rock without fines.
11	36				97			16:00 36.5-ft bgs. Brown sandy silt with three (3) large metal pieces. Moist and steamy. Photos: IMG_5872, IMG_5873	
	37				97	ML		16:09. 37-ft bgs. Brown sandy with with minor (<5%) metal fragments. Moist. Photos: IMG_5874, IMG_5875	
	38				99.5			16:19. 38-ft bgs. Bottom of boring measured at 36.5-ft bgs with tooling removed. Brown-gray sandy silt. Dry to moist. Photos: IMG_5876, IMG_5877 Bottom of boring 38-ft bgs. Boring terminated due to reaching Touchet Bed soils.	Bottom of boring 38-ft bgs.
12	39								
	40								40
	41								
	42								
13	43								
	44								
	45								45
14	46								

Definitions and General Notes

Moisture Conditions:
Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp, but no visible water or other liquids.
Wet: Visible free water.

Particle Size Ranges:
Boulder: Greater than 12-inches in largest dimension.
Cobble: Between 3 and 12 inches in largest dimension.
Gravel: Greater than No. 4 Sieve (3/16-inch) and less than 3-inches in largest dimension.

Content Descriptions:
Minor: Less than 5% by volume.
Minimal: Less than 1% by volume.
Some: Scattered or interspersed with cuttings, likely slough.

Abbreviations:
GEOT: Geotextile
GEON: Geonet / Geofabric
GEOG: Geogrid
GEOM: Geomembrane
VQ: Visqueen
REF: Refuse

IMG_5804: Recovery 0 to 2 feet (ft) below ground surface (bgs).

IMG_5805: Recovery 2 to 3 ft bgs.

IMG_5806: Recovery 3 to 5 ft bgs.

IMG_5807: Recovery 5 to 6 ft bgs.

IMG_5808: Recovery 6 to 7 ft bgs.

IMG_5810: Recovery 7 to 8.5 ft bgs.

IMG_5811: Recovery 8.5 to 9.5 ft bgs.

IMG_5812: Recovery 9.5 to 10.5 ft bgs.

IMG_5813: Recovery 11 to 12 ft bgs.

IMG_5814: Recovery 12 to 13 ft bgs.

IMG_5815: Recovery 14 to 15 ft bgs.

IMG_5816: Recovery 15 to 16 ft bgs.

IMG_5817: Recovery 16 to 17 ft bgs.

IMG_5818: Recovery 17 to 18 ft bgs.

IMG_5819: Recovery 18 to 19 ft bgs.

IMG_5820: Recovery 18 to 19 ft bgs. Driller's assistant removing material from auger. (1/2)

IMG_5821: Recovery 18 to 19 ft bgs. Driller's assistant removing material from auger. (2/2)

IMG_5822: Recovery 18 to 19ft bgs. Spread recovery by Driller's assistant. (1/2)

IMG_5823: Recovery 18 to 19ft bgs. Spread recovery by Driller's assistant. (2/2)

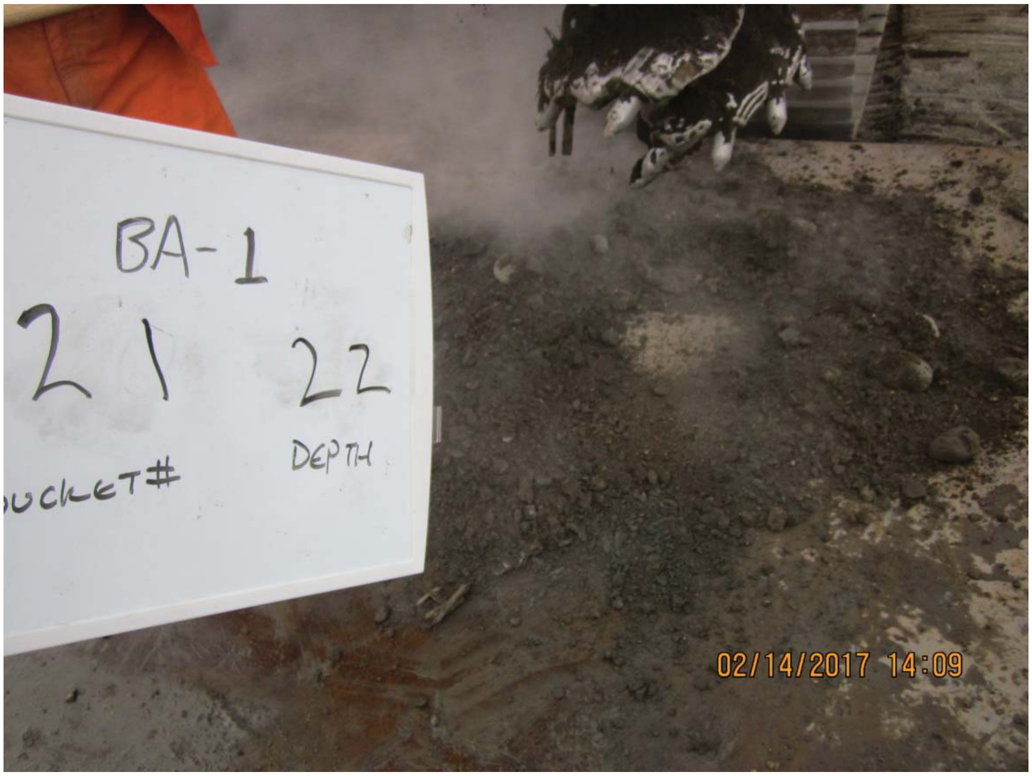
IMG_5824: Recovery 19 to 20 ft bgs.

IMG_5825: Recovery 20 to 21 ft bgs.

IMG_5826: Recovery 20 to 21 ft bgs. Spread for inspection. (1/2)

IMG_5827: Recovery 20 to 21 ft bgs. Spread for inspection. (2/2)

IMG_5828: Recovery 21 to 22 ft bgs.



IMG_5829: Recovery 21 to 22 ft bgs. Spread for inspection by Driller's assistant.

IMG_5830: Recovery 22 to 23 ft bgs.

IMG_5831: Recovery 22 to 23 ft bgs. Spread for inspection by Driller's assistant.

IMG_5832: Recovery 23 to 24 ft bgs.

IMG_5833: Recovery 24 to 25 ft bgs.

IMG_5834: Recovery 24 to 25 ft bgs. Spread for inspection by Driller's assistant. (1/2)

IMG_5835: Recovery 24 to 25 ft bgs. Spread for inspection by Driller's assistant. (2/2)

IMG_5836: Recovery 25 to 26 ft bgs.

IMG_5837: Recovery 25 to 26 ft bgs. Spread for inspection by Driller's assistant.

IMG_5838: Recovery 26 to 27 ft bgs.

IMG_5839: Recovery 26 to 27 ft bgs. Spread for inspection by Driller's assistant.

IMG_5840: Recovery 27 to 27 ft bgs.

IMG_5841: Recovery 27 to 28 ft bgs. Spread for inspection by Driller's assistant.

IMG_5842: Recovery 28 to 29 ft bgs. Pass No. 1.

IMG_5843: Recovery 28 to 29 ft bgs. Pass No. 1. Spread for inspection by Driller's assistant. (1/2)

IMG_5844: Recovery 28 to 29 ft bgs. Pass No. 1. Spread for inspection by Driller's assistant. (2/2)

IMG_5845: Recovery 28 to 29 ft bgs. Pass No. 2.

IMG_5846: Recovery 28 to 29 ft bgs. Pass No. 2. Driller's assistant spreading recovery for inspection.

IMG_5847: Recovery 28 to 29 ft bgs. Pass No. 2. Piece of metal drum recovered on auger. (1/2)

IMG_5848: Recovery 28 to 29 ft bgs. Pass No. 2 Piece of metal drum recovered on auger. (2/2)

IMG_5850: Recovery 29 to 31 ft bgs.

IMG_5851: Recovery 29 to 31 ft bgs. Spread for inspection by Driller's assistant.

IMG_5852: Recovery 31 to 32 ft bgs.

IMG_5853: Recovery 31 to 32 ft bgs. Spread for inspection by Driller's assistant.

IMG_5854: Recovery 32 to 33 ft bgs. Pass No. 1.

IMG_5855: Recovery 32 to 33 ft bgs. Pass No. 1. Metal fragments recovered. (1/2)

IMG_5856: Recovery 32 to 33 ft bgs. Pass No. 1. Metal fragments recovered. (2/2)

IMG_5857: Recovery 32 to 33 ft bgs. Pass No 1. Spread for inspection by Driller’s assistant.

IMG_5858: Recovery 32 to 33 ft bgs. Pass No. 2. Lost depth of boring from previous passes due to slough within boring. (1/2)

IMG_5859: Recovery 32 to 33 ft bgs. Pass No. 2. Lost depth of boring from previous passes due to slough within boring. (2/2)

IMG_5860: Recovery 32 to 33 ft bgs. Pass No. 2. Spread for inspection by Driller's assistant.

IMG_5861: Recovery 32 to 33 ft bgs. Pass No. 3.

IMG_5862: Recovery 32 to 33 ft bgs. Pass No. 3. Spread for inspection by Driller's assistant.

IMG_5863: Recovery 32 to 33 ft bgs. Pass No. 4.

IMG_5864: Recovery 32 to 33 ft bgs. Pass No. 4. Spread for inspection by Driller's assistant. (1/3)

IMG_5865: Recovery 32 to 33 ft bgs. Pass No. 4. Spread for inspection by Driller's assistant. (2/3)

IMG_5866: Recovery 32 to 33 ft bgs. Pass No. 4. Spread for inspection by Driller's assistant. (3/3)

IMG_5867: Recovery 33 to 35 ft bgs.

IMG_5869: Recovery 33 to 35 ft bgs. Spread for inspection by Driller's assistant.

IMG_5872: Recovery 35 to 36.5 ft bgs.

IMG_5873: Recovery 35 to 36.5 ft bgs. Spread for inspection by Driller's assistant. Three (3) large metal pieces recovered.

IMG_5874: Recovery 36.5 to 37 ft bgs.

IMG_5875: Recovery 36.5 to 37 ft bgs. Spread for inspection by Driller's assistant.

IMG_5876: Recovery 37 to 38 ft bgs. Bottom of boring.

IMG_5877: Recovery 37 to 38 ft bgs. Spread for inspection by Driller's assistant. Bottom of boring.

BA-2 BORING LOG AND PHOTOGRAPHIC LOG

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-2

Pasco Sanitary Landfill
1901 Dietrich Road
Pasco, Washington

JOB NUMBER: 04209046.06

REMARKS:
All depths as reported by drilling equipment unless otherwise noted.

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
0	0					SM	11:00. Begin drilling at surface with 5-ft long core barrel tooling. Photo: IMG_5563	Site soil backfill to surface. No well casing installed.
	1					**GEOM**	11:07. 1-ft bgs. Light brown silt and Geomembrane. Photos: IMG_5564	
	2				54	ML	11:09. 2-ft bgs. Light brown silt. (Driller switched to open flight auger tooling.) Photos: IMG_5566, IMG_5567 11:26. 2.5-ft bgs. Same as above. Photo: IMG_5568	
1	3				53		11:29. 3-ft bgs. Same as above. Multiple passes required to clear loose material. Photos: IMG_5569, IMG_5570, IMG_5571	
	4							Hydrated Bentonite Chip Seal (77 Bags)
	5				58	**GEOT** ML **GEOM**	11:35. 5-ft bgs. Light brown silt overlying layers of Geotextile and Geomembrane. Multiple passes required to clear loose material. (Driller switched to 5-ft long core barrel and set fall protection casing.) Photos: IMG_5572 through IMG_5582	
2	6							
	7				48 49	ML	12:12. 7-ft bgs. Light brown silt. Moist. (Driller switched to open flight auger tooling prior to pass.) Photos: IMG_5583, IMG_5584 12:18. 7.5-ft bgs. Same as above. Photos: IMG_5586, IMG_5587, IMG_5588	
	8				59	ML	12:24. 8.5-ft bgs. Same as above. Photos: IMG_5589, IMG_5590	Site soil backfill.
3	9–10							

Drilling Company: **DBM Contractors, Inc.**
Drilling Method: **IMT AF180**
Logged By: **Ted Massart**
Sampling Method: **24-inch Core Barrel and Auger**

Date Started: **2/13/17**
Date Ended: **2/14/17**
Boring Diameter: **24-inch**
Time Started: **11:00**
Time Ended: **10:19**
Total Depth: **35.0 ft.**

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-2

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
	10							10
	10.5						12:28. 10.5-ft bgs. Light brown-gray silty sandy gravel. Moist. Photos: IMG_5591, IMG_5592	
	11					GP-GM		
								Site soil backfill.
	12				81		12:32. 12-ft bgs. Light brown-gray silty sand. Moist. Photos: IMG_5593, IMG_5594	
4	13					GP-GM		
	13.5				78		12:34. 13.5-ft bgs. Same as above. Photos: IMG_5596, IMG_5597	
	14							
	14.5				82	GP	12:36. 14.5-ft bgs. Gray sandy gravel. Photos: IMG_5598, IMG_5599	
	15							15
	16				89	GM	12:40. 16-ft bgs. Light brown-gray silty sandy gravel. Photos: IMG_5600, IMG_5601	
5								
	17				86		12:43. 17-ft bgs. Light brown-gray silty sandy gravel. Steam present. Photos: IMG_5602, IMG_5603	
	17.5				84	GM	12:45. 17.5-ft bgs. Same as above. Photos: IMG_5604, IMG_5605	
	18							Hydrated Bentonite Chip Seal (19 Bags)
	19							
6								
	20							20
	20.5				90 83	GM	12:49. 20.5-ft bgs. Light brown-gray silty sandy gravel. Steam present. A second pass was required to clear loose material. Photos: IMG_5606, IMG_5607, IMG_5608, IMG_5609	
	21							3/4-inch Crushed rock without fines.
	22							

Pasco Sanitary Landfill **JOB NUMBER: 04209046.06**

Depth (feet)	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description
22			84		13:00. 22-ft bgs. Light brown-gray silty sandy grave. Steam present. Photos: IMG_5610, IMG_5611
23			88		13:03. 23-ft bgs. Light brown-gray silty sandy gravel. Steam and odor. Photos: IMG_5612, IMG_5613
24.5			94	ML	13:07. 24.5-ft bgs. Dark brown silt. Moist and steamy. Photos: IMG_5614, IMG_5615
26	BA-2 26.3'	8.07	93	ML	13:11. 26-ft bgs. Dark brown silt with ~20% (by volume) refuse and minor (<5%) paper products, including cardboard. Refuse consisted of rubber, plastics, and textiles. Moist with steam. Photos: IMG_5616 through IMG_5632
26.5			100		14:10. 26.5-ft bgs. Dark brown silt with minor (<5%) refuse, including a rubber tire. Moist with steam. (Driller switched to 5-ft long core barrel tooling.) Photos: IMG_5633 through IMG_5639
27.5	BA-2 28'	22.7	100	ML	14:22. 27.5-ft bgs. Same as above. (Driller switched to open flight auger tooling.) Photos: IMG_5640 through IMG_5644
30	BA-2 30'	28.5		ML	
31			96		14:45. 31-ft bgs. Dark brown-gray silt with minor (<5%) refuse, including steel, wood, and plastic. Blackened wood indicates decomposition or previous combustion. Moist and steamy. Photos: IMG_5645 through IMG_5651
33			93 90	ML	15:10. 33-ft bgs. Dark brown-gray silt with minimal (<1%) refuse, including steel, wood, and plastic. Blackened piece of wood was recovered in the cuttings, indicating decomposition or previous combustion. Moist and steamy. Photos: IMG_5652, IMG_5653, IMG_5654

Depth scale: meters 7, 8, 9, 10; feet 22–34.

Completion Detail: 3/4-inch Crushed rock without fines. (25, 30)

Pasco Sanitary Landfill | **JOB NUMBER: 04209046.06**

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
	34					ML-SM		15:15. 33-ft bgs. Brown-gray silt with minimal (<1%) refuse. Apparent charred material was recovered in the cuttings. Moist. Photos: IMG_5655 through IMG_5660	3/4-inch Crushed rock without fines.
	35				85			15:22 35-ft bgs. Brown-gray silt. Moist and steamy. Photos: IMG_5661, IMG_5662 Bottom of boring 35-ft bgs. Boring terminated below refuse. Backfill of boring started, but not completed same day as drilling.	35 Bottom of boring 35-ft bgs.
11	36								
	37								
	38								
	39								
12	40								40
	41								
	42								
13	43								
	44								
	45								45
14	46								

Definitions and General Notes

Moisture Conditions:
Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp, but no visible water or other liquids.
Wet: visible free water.

Particle Size Ranges:
Boulder: Greater than 12-inches in largest dimension.
Cobble: Between 3 and 12 inches in largest dimension.
Gravel: Greater than No. 4 Sieve (3/16-inch) and less than 3-inches in largest dimension.

Content Descriptions:
Minor: Less than 5% by volume.
Minimal: Less than 1% by volume.
Some: Scattered or interspersed with cuttings, likely slough.

Abbreviations:
GEOT: Geotextile
GEON: Geonet / Geofabric
GEOG: Geogrid
GEOM: Geomembrane
VQ: Visqueen
REF: Refuse

IMG_5563: Boring location and setup.

IMG_5564: Open boring after initial pass. Geomembrane visible in boring. Depth of boring 1 foot (ft) below ground surface (bgs).

IMG_5566: Open boring. Depth of boring 2 ft bgs.

IMG_5567: Recovered soils from boring. Depth of boring 2 ft bgs. Stockpiled for re-use.

IMG_5568: Recovery 2 to 2.5 ft bgs.

IMG_5569: Recovery 2.5 to 3 ft bgs. Pass No. 1.

IMG_5570: Recovery 2.5 to 3 ft bgs. Pass No. 2

IMG_5571: Recovery 2.5 to 3ft bgs. Pass No. 3

IMG_5572: Recovery 3 to 5 ft bgs. Pass No. 1.

IMG_5573: Driller switching tooling to core barrel prior to setting surface casing.

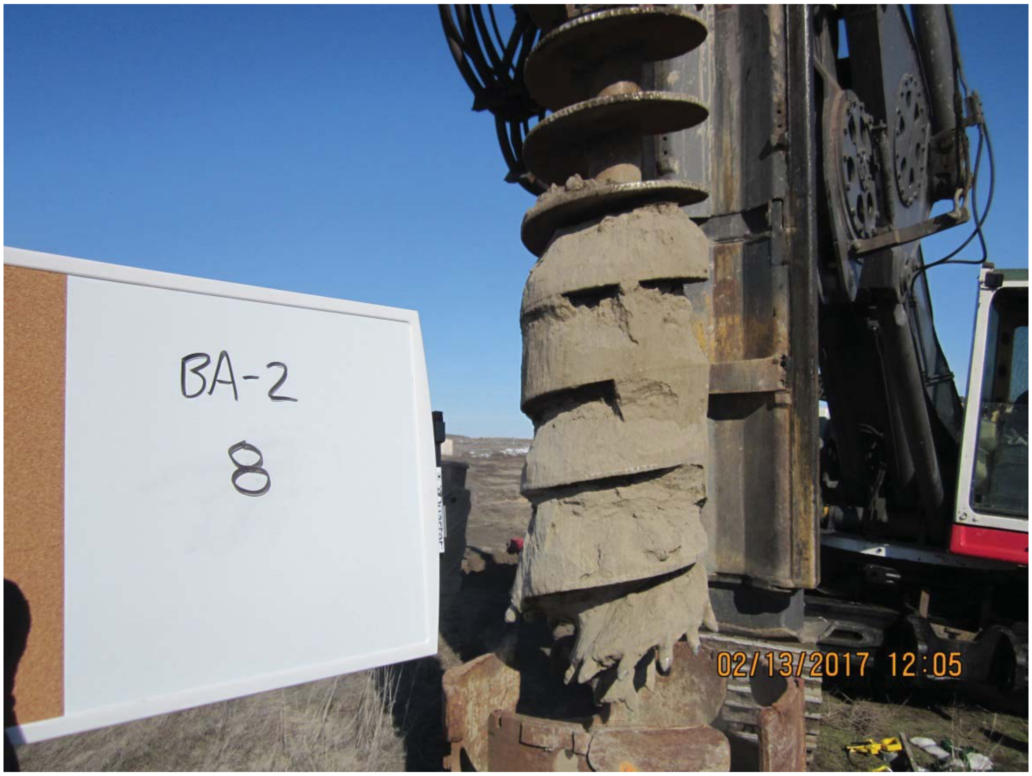
IMG_5574: Recovery 3 to 5 ft bgs. Pass No. 2. (1/2)

IMG_5575: Recovery 3 to 5 ft bgs. Pass No. 2. (2/2)

IMG_5576: Driller setting 48-inch diameter surface casing. (1/3)

IMG_5577: Driller setting 48-inch diameter surface casing. (2/3)

IMG_5578: Driller setting 48-inch diameter surface casing. (3/3)



IMG_5579: Recovery 3 to 5 ft bgs. Pass No. 3. (1/2)

IMG_5580: Recovery 3 to 5 ft bgs. Pass No. 3. (2/2)

IMG_5581: Recovery 3 to 5 ft bgs. Pass No. 4.

IMG_5582: Recovery 3 to 5 ft bgs. Piece of Geotextile recovered on auger. Pass No. 5.

IMG_5583: Recovery 5 to 7 ft bgs. Piece of Geomembrane visible. (1/2)

IMG_5584: Recovery 5 to 7 ft bgs. (2/2)

IMG_5586: Recovery 7 to 7.5 ft bgs. (1/3)

IMG_5587: Recovery 7 to 7.5 ft bgs. (2/3)

IMG_5588: Recovery 7 to 7.5 ft bgs. (3/3)

IMG_5589: Recovery 7.5 to 8.5 ft bgs. (1/2)

IMG_5590: Recovery 7.5 to 8.5 ft bgs. (2/2)

IMG_5591: Recovery 8.5 to 10.5 ft bgs. (1/2)

IMG_5592: Recovery 8.5 to 10.5 ft bgs. (2/2)

IMG_5593: Recovery 10.5 to 12 ft bgs. (1/2)

IMG_5594: Recovery 10.5 to 12 ft bgs. (2/2)

IMG_5596: Recovery 12 to 13.5 ft bgs. (1/2)

IMG_5597: Recovery 12 to 13.5 ft bgs. (2/2)

IMG_5598: Recovery 13.5 to 14.5 ft bgs. (1/2)

IMG_5599: Recovery 13.5 to 14.5 ft bgs. (2/2)

IMG_5600: Recovery 14.5 to 16 ft bgs. (1/2)

IMG_5601: Recovery 14.5 to 16 ft bgs. (2/2)

IMG_5602: Recovery 16 to 17 ft bgs. (1/2)

IMG_5603: Recovery 16 to 17 ft bgs. (2/2)

IMG_5604: Recovery 17 to 17.5 ft bgs. (1/2)

IMG_5605: Recovery 17 to 17.5 ft bgs. (2/2)

IMG_5606: Recovery 17.5 to 20.5 ft bgs. Pass No. 1. (1/2)

IMG_5607: Recovery 17.5 to 20.5 ft bgs. Pass No. 1. (2/2)

IMG_5608: Recovery 17.5 to 20.5 ft bgs. Pass No. 2.

IMG_5609: Recovery 20.5 to 21.5 ft bgs. The total pass count number shown (22) is erroneous.

IMG_5610: Recovery 21.5 to 22 ft bgs. (1/2)

IMG_5611: Recovery 21.5 to 22 ft bgs. (2/2)

IMG_5612: Recovery 22 to 23 ft bgs. (1/2)

IMG_5613: Recovery 22 to 23 ft bgs. (2/2)

IMG_5614: Recovery 23 to 24.5 ft bgs. (1/2)

IMG_5615: Recovery 23 to 24.5 ft bgs. (2/2)

IMG_5616: Recovery 24.5 to 26 ft bgs. (1/17)

IMG_5617: Recovery 24.5 to 26 ft bgs. (2/17)

IMG_5618: Recovery 24.5 to 26 ft bgs. (3/17)

IMG_5619: Recovery 24.5 to 26 ft bgs. (4/17)

IMG_5620: Recovery 24.5 to 26 ft bgs. (5/17)

IMG_5621: Recovery 24.5 to 26 ft bgs. (6/17)

IMG_5622: Recovery 24.5 to 26 ft bgs. (7/17)

IMG_5623: Recovery 24.5 to 26 ft bgs. (8/17)

IMG_5624: Recovery 24.5 to 26 ft bgs. (9/17)

IMG_5625: Recovery 24.5 to 26 ft bgs. (10/17)

IMG_5626: Recovery 24.5 to 26 ft bgs. (11/17)

IMG_5627: Recovery 24.5 to 26 ft bgs. (12/17)

IMG_5628: Recovery 24.5 to 26 ft bgs. (13/17)

IMG_5629: Recovery 24.5 to 26 ft bgs. (14/17)

IMG_5630: Recovery 24.5 to 26 ft bgs. (15/17)

IMG_5631: Recovery 24.5 to 26 ft bgs. (16/17)

IMG_5632: Recovery 24.5 to 26 ft bgs. (17/17)

IMG_5633: Recovery 26 to 26.5 ft bgs. (1/7)

IMG_5634: Recovery 26 to 26.5 ft bgs. (2/7)

IMG_5635: Recovery 26 to 26.5 ft bgs. (3/7)

IMG_5636: Recovery 26 to 26.5 ft bgs. (4/7)

IMG_5637: Recovery 26 to 26.5 ft bgs. (5/7)

IMG_5638: Recovery 26 to 26.5 ft bgs. (6/7)

IMG_5639: Recovery 26 to 26.5 ft bgs. (7/7)

IMG_5640: Recovery 26.5 to 27.5 ft bgs. (1/5)

IMG_5641: Recovery 26.5 to 27.5 ft bgs. (2/5)

IMG_5642: Recovery 26.5 to 27.5 ft bgs. (3/5)

IMG_5643: Recovery 26.5 to 27.5 ft bgs. (4/5)

IMG_5644: Recovery 26.5 to 27.5 ft bgs. (5/5)

IMG_5645: Recovery 27.5 to 31 ft bgs. (1/7)

IMG_5646: Recovery 27.5 to 31 ft bgs. (2/7)

IMG_5647: Recovery 27.5 to 31 ft bgs. (3/7)

IMG_5648: Recovery 27.5 to 31 ft bgs. (4/7)

IMG_5649: Recovery 27.5 to 31 ft bgs. (5/7)

IMG_5650: Recovery 27.5 to 31 ft bgs. (6/7)

IMG_5651: Recovery 27.5 to 31 ft bgs. (7/7)

IMG_5652: Recovery 31 to 33 ft bgs. Pass No. 1. (1/3)

IMG_5653: Recovery 31 to 33 ft bgs. Pass No. 1. (2/3)

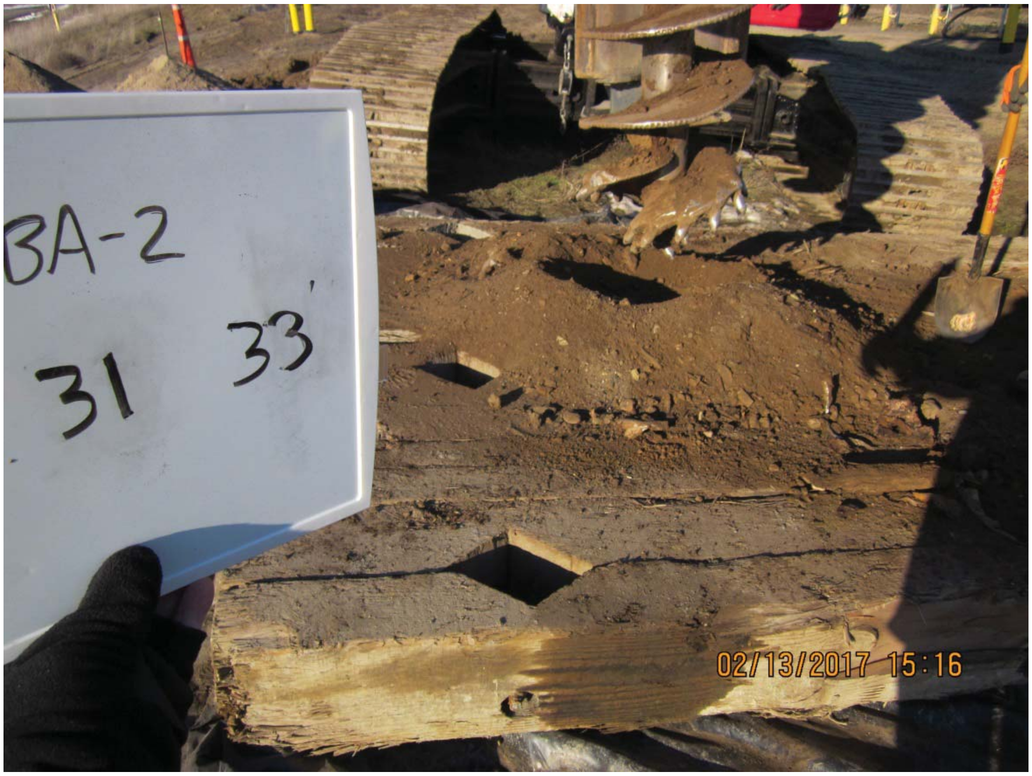
IMG_5654: Recovery 31 to 33 ft bgs. Pass No. 1. (3/3)

IMG_5655: Recovery 31 to 33 ft bgs. Pass No. 2. (1/6)

IMG_5656: Recovery 31 to 33 ft bgs. Pass No. 2. (2/6)

IMG_5657: Recovery 31 to 33 ft bgs. Pass No. 2. (3/6)

IMG_5658: Recovery 31 to 33 ft bgs. Pass No. 2. (4/6)



IMG_5659: Recovery 31 to 33 ft bgs. Pass No. 2. (5/6)

IMG_5660: Recovery 31 to 33 ft bgs. Pass No. 2. (6/6)

IMG_5661: Recovery 33 to 35 ft bgs. Bottom of boring. (1/2)

IMG_5662: Recovery 33 to 35 ft bgs. Bottom of boring. (2/2)

BA-3 BORING LOG AND PHOTOGRAPHIC LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-3

Pasco Sanitary Landfill
1901 Dietrich Road
Pasco, Washington

JOB NUMBER: 04209046.06

REMARKS:
All depths as reported by drilling equipment unless otherwise noted.

Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
0					SM	08:02. Begin drilling at surface with open flight auger tooling. Brown silty sand. Moist to wet. (Driller set fall protection casing at surface.) Photos: IMG_5881, IMG_5882	Site soil backfill to surface. No well casing installed.
2.5					GEOT / SM	08:14. 2.5-ft bgs. Black woven Geotextile overlying a gray sandy gravel. Moist. Photo: IMG_5882	
5.5					GP / GEOM	08:16. 5.5-ft bgs. Gray sandy gravel overlying a layer of black woven Geotextile and Geomembrane. Moist. Photo: IMG_5883	Hydrated Bentonite Chip Seal (21 Bags) (5–8 ft)
7				39	SM	08:22. 7-ft bgs. Gray sandy gravel with minor (<5% by volume) cobble. Moist. Photo: IMG_5884	
8				72.6	SM	08:25. 8-ft bgs. Same as above. Moist and steamy. Photos: IMG_5885, IMG_5886	Site soil backfill.

Depth scale: meters 0–3; feet 0–10.

Drilling Company:	**DBM Contractors, Inc.**	Date Started:	**2/15/17**
Drilling Method:	**IMT AF180**	Date Ended:	**2/15/17**
Logged By:	**Sam Adlington**	Boring Diameter:	**24-inch**
Sampling Method:	**24-inch Core Barrel and Auger**	Time Started:	**07:35**
		Time Ended:	**11:20**
		Total Depth:	**36.0 ft.**

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-3

Pasco Sanitary Landfill | **JOB NUMBER: 04209046.06**

Depth (feet)	Depth (meters)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description
10							
11						SM	
12					77.3	**GEON** **GEOT**	08:29. 12-ft bgs. Brown-gray silty sandy gravel with Geonet / Geofabric and Geotextile fragments in cuttings overlying brown silty sand. Moist and steamy. Photo: IMG_5887
13	4					GP	
14						GP	
15					79.4	**VQ**	08:29. 15-ft bgs. Gray silty sand overlying layer of white Visqueen and gray silty sand. Moist and steamy. Photo: IMG_5888
16	5					SM	08:36. 16-ft bgs. Same as above. Fragments of white Visqueen layer present in cuttings. Moist and steamy. Photo: IMG_5889
17							
18					74.7	ML	08:35. 18-ft bgs. Gray sandy silt. Dense and compact. Moist and steamy. Photo: IMG_5890
19	6						08:40. 19.5-ft bgs. Gray sandy silt with patches of brown sandy silt. Moist and steamy. Photo: IMG_5891
20							
21					76.0	ML	08:42. 21-ft bgs. Gray dense sandy silt overlying brown silty sand with minimal (<1%) wood debris. Moist and steamy. Photo: IMG_5892, IMG_5893
					72.6		
22							

Completion Detail

Depth (feet)	Completion
10–14	Site soil backfill.
14–17.5	Hydrated Bentonite Chip Seal (26 Bags)
17.5–22	3/4-inch Crushed rock without fines.

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (feet)	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description
22					08:55. 21.5-ft bgs. Gray silty sand and ~30% brown-black decomposed refuse, including opaque plastics and textiles. Steamy. Photos: IMG_5894, IMG_5895
23	BA-3 23'	8.08	84.7	SM-REF	09:02. 23-ft bgs. Gray silty sand with ~30% black decomposed refuse, including opaque plastics. Moist and steamy. Photos: IMG_5896, IMG_5897
24.5				SM	09:10. 24.5-ft bgs. Gray silty sand with minor (<5%) black decomposed refuse, including opaque plastics, and some metal pieces. Moist to wet and steamy. Photos: IMG_5898, IMG_5899
26	BA-3 26'	20.2	88.6	REF	09:15. 26-ft bgs. Brown-black decomposed refuse (opaque plastics) with ~25% brown black decomposed wood debris, ~20% brown-black decomposed paper, and minor (<5%) soil. Moist and steamy. (Driller switched to 5-ft long core barrel tooling.) Photos: IMG_5900, IMG_5901, IMG_5902
27.5			92.7	SM-REF	09:30. 27.5-ft bgs. Dark brown gravely sand with ~40% brown-tan wood and paper fiber debris. Moist and steamy. Photos: IMG_5903, IMG_5904, IMG_5905
29	BA-3 29'	8.17	98.0		09:45. 29-ft bgs. Dark brown silty sand with ~20% boulders and ~20% brown-tan wood debris. Moist and steamy. Photos: IMG_5906, and IMG_5907
30.5			97.1	SM	09:58. 30.5-ft bgs. Brown-tan silty sand with ~30% brown decomposed wood debris. Moist. One large metal fragment recovered overlying light brown silt lens. Dry to moist and steamy. Photos: IMG_5908, IMG_5909
33			98.6	SM	10:03. 33-ft bgs. Brown silty sand with some to minor (<5%) brown decomposed refuse, including opaque plastics, and minor (<5%) gravel and cobble. Moist and steamy. Photos: IMG_5910, IMG_5911

Completion Detail: 3/4-inch Crushed rock without fines.

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
	34–35					SM		3/4-inch Crushed rock without fines.
	35–36				107.1	ML	10:17. 35.5-ft bgs. Brown-tan silty sand with minor (<5%) brown wood debris overlying brown sandy silt. Moist. Photo: IMG_5912	
11	36				102.7		10:29. 36-ft bgs. Bottom of boring measured at 36-ft bgs with tooling removed. Brown sandy silt with minor (<5%) gravel and cobble. Dry to moist and steamy. Photos: IMG_5913, IMG_5914, IMG_5915	Bottom of boring 36-ft bgs.

Bottom of boring 36-ft bgs.

Boring terminated due to reaching Touchet Bed soils.

Definitions and General Notes

Moisture Conditions:
Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp, but no visible water or other liquids.
Wet: visible free water.

Particle Size Ranges:
Boulder: Greater than 12-inches in largest dimension.
Cobble: Between 3 and 12 inches in largest dimension.
Gravel: Greater than No. 4 Sieve (3/16-inch) and less than 3-inches in largest dimension.

Content Descriptions:
Minor: Less than 5% by volume.
Minimal: Less than 1% by volume.
Some: Scattered or interspersed with cuttings, likely slough.

Abbreviations:
GEOT: Geotextile
GEON: Geonet / Geofabric
GEOG: Geogrid
GEOM: Geomembrane
VQ: Visqueen
REF: Refuse

Depth scale (feet): 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46; (meters): 11, 12, 13, 14

IMG_5881: Driller setting fall protection casing at surface.

IMG_5882: Recovery 0 to 3.5 feet (ft) below ground surface (bgs.). Piece of Geotextile recovered on bottom flight of auger.

IMG_5883: Recovery 3.5 to 5.5 ft bgs. Piece of Geotextile recovered on auger.

IMG_5884: Recovery 5.5 to 7 ft bgs.

IMG_5585: Recovery 7 to 8 ft bgs. (1/2)

IMG_5886: Recovery 7 to 8 ft bgs. (2/2)

IMG_5887: Recovery 8 to 12 ft bgs. Pieces of Geotextile and Geonet recovered on bottom flight of auger.

IMG_5888: Recovery 12 to 15 ft bgs.

IMG_5889: Recovery 15 to 16 ft bgs. Pieces of Visqueen (white) recovered on the auger.

IMG_5890: Recovery 16 to 18 ft bgs.

IMG_5891: Recovery 18 to 19.5 ft bgs.

IMG_5892: Recovery 19.5 to 21 ft bgs. Wood debris recovered on bottom flights of auger. (1/2)

IMG_5893: Recovery 19.5 to 21 ft bgs. Wood debris recovered on bottom flights of auger. Spread for inspection by Driller's assistant. (2/2)

IMG_5894: Recovery 21 to 21.5 ft bgs. (1/2)

IMG_5895: Recovery 21 to 21.5 ft bgs. Spread for inspection by Driller's assistant. (2/2)

IMG_5896: Recovery 21.5 to 23 ft bgs. (1/2)

IMG_5897: Recovery 21.5 to 23 ft bgs. Spread for inspection by Driller's assistant. (2/2)

IMG_5898: Recovery 23 to 24.5 ft bgs. (1/2)

IMG_5899: Recovery 23 to 24.5 ft bgs. Spread for inspection by Driller's assistant. (2/2)

IMG_5900: Recovery 24.5 to 26 ft bgs. (1/3)

IMG_5901: Recovery 24.5 to 26 ft bgs. Spread for inspection by Driller's assistant. (2/3)

IMG_5902: Recovery 24.5 to 26 ft bgs. (3/3)

IMG_5903: Recovery 26 to 27.5 ft bgs. Spread for inspection by Driller's assistant. (1/3)

IMG_5904: Recovery 26 to 27.5 ft bgs. Recovered materials being drummed for disposal. (2/3)

IMG_5905: Recovery 26 to 27.5 ft bgs. Recovered materials being drummed for disposal. (3/3)

IMG_5906: Recovery 27.5 to 29 ft bgs. Fragment of boulder encountered. (1/2)

IMG_5907: Recovery 27.5 to 29 ft bgs. Fragments of boulder and wood debris encountered. (2/2)

IMG_5908: Recovery 29 to 30.5 ft bgs. (1/2)

IMG_5909: Recovery 29 to 30.5 ft bgs. (2/2)

IMG_5910: Recovery 30.5 to 33 ft bgs. (1/2)

IMG_5911: Recovery 30.5 to 33 ft bgs. (2/2)

IMG_5912: Recovery 33 to 35.5 ft bgs.

IMG_5913: Recovery 35 to 36 ft bgs. Bottom of boring. (1/3)

IMG_5914: Recovery 35 to 36 ft bgs. Bottom of boring. (2/3)

IMG_5915: Recovery 35 to 36 ft bgs. Bottom of boring. (3/3)

BA-4 BORING LOG AND PHOTOGRAPHIC LOG

SCS ENGINEERS

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-4

Pasco Sanitary Landfill
1901 Dietrich Road
Pasco, Washington

JOB NUMBER: 04209046.06

REMARKS:
All depths as reported by drilling equipment unless otherwise noted.

Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description
0					ML	07:40. Begin drilling at surface with open flight auger tooling. Brown silt. Moist. (Driller set fall protection casing at surface.) Photos: IMG_5663
4.5						07:49. 4.5-ft bgs. Brown silt. Moist. Photos: IMG_5664, IMG_5665
5					GEOT SW	07:51. 5-ft bgs. Brown sand overlying black woven Geotextile. Photos: IMG_5666, IMG_5667, IMG_5668
6					GEOM ML	07:54. 6-ft bgs. Brown-gray sand overlying Geomembrane. Photos: IMG_5669, IMG_5670
7					ML	08:02. 7-ft bgs. Light brown sandy silt. Multiple passes required to clear loose material. Photos: IMG_5675 through IMG_5682
8						08:09. 8-ft bgs. Same as above. Photos: IMG_5687, IMG_5688
9					ML	08:10. 9-ft bgs. Light brown silt. Multiple passes required to clear loose material and slough. Photos: IMG_5689 through IMG_5694

Depth scale: meters 0, 1, 2, 3; feet 0–10.

Completion Detail

- Site soil backfill to surface. No well casing installed.
- Hydrated Bentonite Chip Seal (74 Bags)
- Site soil backfill.

Drilling Company:	**DBM Contractors, Inc.**	Date Started:	**2/14/17**
Drilling Method:	**IMT AF180**	Date Ended:	**2/14/17**
Logged By:	**Ted Massart**	Boring Diameter:	**24-inch**
Sampling Method:	**24-inch Core Barrel and Auger**		

Time Started:	**07:40**
Time Ended:	**12:20**
Total Depth:	**35.0 ft.**

SCS ENGINEERS

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-4

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (feet)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
10		SM	08:15. 10-ft bgs. Light brown silty sand with minor (<5% by volume) gravel. Photos: IMG_5695, IMG_5696	
11		SM-GM	08:16. 11-ft bgs. Light brown-gray silty sandy gravel. Photos: IMG_5697, IMG_5698	Site soil backfill.
12	83		08:19. 12-ft bgs. Light brown-gray silty sandy gravel. Steam present. Multiple passes required to clear loose material. Photos: IMG_5699 through IMG_5706	
13	84	SM-GM	08:26. 13-ft bgs. LIght brown-gray silty sandy gravel. Steam present. Photos: IMG_5707 through IMG_5710	
14	89		08:30. 14-ft bgs. Light brown-gray silty sandy gravel. Steam present. Photos: IMG_5711, IMG_5712	
15		SM-GM		Hydrated Bentonite Chip Seal (16 Bags)
15.5	86	**GEOG**	08:33. 15.5-ft bgs. Light brown-gray silty sandy gravel. Pieces of Geogrid in cuttings, ~12-inches in diameter. Steamy. Photos: IMG_5713, IMG_5714, IMG_5715	
16.5		GM	08:35. 16.5-ft bgs. Light brown-gray silty sandy gravel. Photos: IMG_5716, IMG_5717	
17.5	90	GM	08:38. 17.5-ft bgs. Light brown silty. Moist and steamy. Photo: IMG_5718	
18.5	90	**VQ**	08:41. 18.5-ft bgs. Light brown silt. Pieces of Visqueen recovered in cuttings. Steam present. Photos: IMG_5719, IMG_5720	
19.5	92	ML	08:44. 19.5-ft bgs. Light brown silt. Moist and steamy. Photo: IMG_5721	
20.5	94	ML	08:47. 20.5-ft bgs. Light brown silt. Moist and steamy. Photo: IMG_5722	3/4-inch Crushed rock without fines.
21.5	97		08:52. 21.5-ft bgs. Light brown silt. Moist and steamy. Photos: IMG_5723, IMG_5724	

Depth scale: feet 10–22; meters 4, 5, 6. Columns Sample Location, Sample Number, TVS Result (%) and Graphic Log carry no text.

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description
	22			99		08:55. 22.5-ft bgs. Light brown silt. Moist and steamy. Photos: IMG_5725, IMG_5726, IMG_5727
7	23			94	SM-ML	08:57. 23.5-ft bgs. Light brown silt. Moist and steamy. Photos: IMG_5728, IMG_5729
	24			99	SM	09:01. 24.5-ft bgs. Light brown silt with <2% refuse (paper, platic, and wire), including some blackened debris by decomposition or previous combustion. Photos: IMG_5730 through IMG_5735
	25	BA-4 35	3.00			
8	26			121	SM-GM	09:19. 26-ft bgs. Light brown silty sandy gravel with <2% refuse, including plastics and glass. Dry to moist with steam. Photos: IMG_5736 through IMG_5742
	27					
	28	BA-4 36	16.6	128	SM	09:32. 28.5-ft bgs. Brown silt with <2%refuse, including plastic and glass. Dry to moist with steam. Multiple passes required to remove loose material. Photos: IMG_5743 through IMG_5765
9	29	BA-4 39'	6.53	100		10:31. 29.5-ft bgs. Light brown silt with minimal (<1%) refuse, including plastic, glass, and wood. Dry to moist. Photos: IMG_5766 through IMG_5772
	30			99	SM	10:47. 30-ft bgs. Light brown silt with some minimal (<1%) refuse, including plastic, wood, and metal. Dry. Photos: IMG_5773 through IMG_5778
	31			101	SM	11:08. 31.5-ft bgs. Light brown silt with minimal (<1%) refuse, including plastics, metal, wood and glass. Dry. Photos: IMG_5779 through IMG_5785
	32			100		11:20. 32.5-ft bgs. Same as above. Photos: IMG_5786 through IMG_5792
10	33			97	SM	11:34. 33.5-ft bgs. Light brown silt with some minimal (<1%) refuse, including plastic, metal, wood, glass. Dry. Photos: IMG_5793 through IMG_5799
	34					

Completion Detail

25

3/4-inch Crushed rock without fines.

30

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-4

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
	34								3/4-inch Crushed rock without fines.
						ML			
	35							11:49. 35-ft bgs. Light brown silt . Dry. Photos: IMG_5800 through IMG_5803 Bottom of boring 35-ft bgs. Boring terminated below refuse.	Bottom of boring 35-ft bgs.
11	36								
	37								
	38								
	39								
12	40								
	41								
	42								
13	43								
	44								
	45								
14	46								

Definitions and General Notes

Moisture Conditions:
Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp, but no visible water or other liquids.
Wet: visible free water.

Particle Size Ranges:
Boulder: Greater than 12-inches in largest dimension.
Cobble: Between 3 and 12 inches in largest dimension.
Gravel: Greater than No. 4 Sieve (3/16-inch) and less than 3-inches in largest dimension.

Content Descriptions:
Minor: Less than 5% by volume.
Minimal: Less than 1% by volume.
Some: Scattered or interspersed with cuttings, likely slough.

Abbreviations:
GEOT: Geotextile
GEON: Geonet / Geofabric
GEOG: Geogrid
GEOM: Geomembrane
VQ: Visqueen
REF: Refuse

IMG_5663: Driller setting fall protection casing at surface.

IMG_5664: Recovery 0 to 4.5 feet (ft) below ground surface (bgs.) (1/2)

IMG_5665: Recovery 0 to 4.5 feet (ft) below ground surface (bgs.) (2/2)

IMG_5666: Recovery 4.5 to 5 ft bgs. Piece of Geotextile recovered on auger. (1/3).

IMG_5667: Open boring with fall protection casing. Depth of boring 5 ft bgs. (2/3)

IMG_5668: Recovery 4.5 to 5 ft bgs. (3/3)

IMG_5669: Recovery 5 to 6 ft bgs. Piece of Geomembrane recovered. (1/2)

IMG_5670: Recovery 5 to 6 ft bgs. Piece of Geomembrane recovered. (2/2)

IMG_5675: Recovery 6 to 7 ft bgs. Pass No. 1. (1/8)

IMG_5676: Recovery 6 to 7 ft bgs. Pass No. 1. (2/8)

IMG_5677: Recovery 6 to 7 ft bgs. Pass No. 1. (3/8)

IMG_5678: Recovery 6 to 7 ft bgs. Pass No. 2. (4/8)

IMG_5679: Recovery 6 to 7 ft bgs. Pass No. 2. (5/8)

IMG_5680: Recovery 6 to 7 ft bgs. Pass No. 3. (6/8)

IMG_5681: Recovery 6 to 7 ft bgs. Pass No. 3. (7/8)

IMG_5682: Recovery 6 to 7 ft bgs. Pass No. 4. (8/8)

IMG_5687: Recovery 7 to 8 ft bgs. (1/2)

IMG_5688: Recovery 7 to 8 ft bgs. (2/2)

IMG_5689: Recovery 8 to 9 ft bgs. Pass No. 1. (1/6)

IMG_5690: Recovery 8 to 9 ft bgs. Pass No. 1. (2/6)

IMG_5691: Recovery 8 to 9 ft bgs. Pass No. 2. (3/6)

IMG_5692: Recovery 8 to 9 ft bgs. Pass No. 2. (4/6)

IMG_5693: Recovery 8 to 9 ft bgs. Pass No. 3. (5/6)

IMG_5694: Recovery 8 to 9 ft bgs. Pass No. 3. (6/6)

IMG_5695: Recovery 9 to 10 ft bgs. (1/2)

IMG_5696: Recovery 9 to 10 ft bgs. (2/2)

IMG_5697: Recovery 10 to 11 ft bgs. (1/2)

IMG_5698: Recovery 10 to 11 ft bgs. (2/2)

IMG_5699: Recovery 11 to 12 ft bgs. Pass No. 1. (1/8)

IMG_5700: Recovery 11 to 12 ft bgs. Pass No. 1. (2/8)

IMG_5701: Recovery 11 to 12 ft bgs. Pass No. 2. (3/8)

IMG_5702: Recovery 11 to 12 ft bgs. Pass No. 2. (4/8)

IMG_5703: Recovery 11 to 12 ft bgs. Pass No. 3. (5/8)

IMG_5704: Recovery 11 to 12 ft bgs. Pass No. 3. (6/8)

IMG_5705: Recovery 11 to 12.5 ft bgs. Pass No. 4. (7/8)

IMG_5706: Recovery 11 to 12.5 ft bgs. Pass No. 4. (8/8)

IMG_5707: Recovery 12.5 to 13 ft bgs. (1/2)

IMG_5708: Recovery 12.5 to 13 ft bgs. (2/2)

IMG_5709: Recovery 13 to 13.5 ft bgs. (1/2)

IMG_5710: Recovery 13 to 13.5 ft bgs. (1/2)

IMG_5711: Recovery 13.5 to 14 ft bgs. (1/2)

IMG_5712: Recovery 13.5 to 14 ft bgs. (2/2)

IMG_5713: Recovery 14 to 15.5 ft bgs. Piece of Geogrid recovered on bottom flight of auger. (1/3)

IMG_5714: Recovery 14 to 15.5 ft bgs. Piece of Geogrid recovered on bottom flight of auger. (2/3)

IMG_5715: Recovery 14 to 15.5 ft bgs. (3/3)

IMG_5716: Recovery 15.5 to 16.5 ft bgs. (1/2)

IMG_ 5717: Recovery 15.5 to 16.5 ft bgs. (2/2)

IMG_5718: Recovery 16.5 to 17.5 ft bgs.

IMG_5719: Recovery 17.5 to 18.5 ft bgs. Piece of Visqueen (white) recovered on bottom flight of auger. (1/2)

IMG_5720: Recovery 17.5 to 18.5 ft bgs. Piece of Visqueen recovered on bottom flight of auger. (2/2)

IMG_5721: Recovery 18.5 to 19.5 ft bgs.

IMG_5722: Recovery 19.5 to 20.5 ft bgs.

IMG_5723: Recovery 20.5 to 21.5 ft bgs. (1/2)

IMG_5724: Recovery 20.5 to 21.5 ft bgs. (2/2)

IMG_5725: Recovery 21.5 to 22.5 ft bgs. (1/3)

IMG_5726: Recovery 21.5 to 22.5 ft bgs. (2/3)

IMG_5727: Recovery 21.5 to 22.5 ft bgs. (3/3)

IMG_5728: Recovery 22.5 to 23.5 ft bgs. (1/2)

IMG_5729: Recovery 22.5 to 23.5 ft bgs. (2/2)

IMG_5730: Recovery 23.5 to 24.5 ft bgs. (1/6)

IMG_5731: Recovery 23.5 to 24.5 ft bgs. (2/6)

IMG_5732: Recovery 23.5 to 24.5 ft bgs. (3/6)

IMG_5733: Recovery 23.5 to 24.5 ft bgs. (4/6)

IMG_5734: Recovery 23.5 to 24.5 ft bgs. (5/6)

IMG_5735: Recovery 23.5 to 24.5 ft bgs. (6/6)

IMG_5736: Recovery 24.5 to 26 ft bgs. (1/7)

IMG_5737: Recovery 24.5 to 26 ft bgs. (2/7)

IMG_5738: Recovery 24.5 to 26 ft bgs. (3/7)

IMG_5739: Recovery 24.5 to 26 ft bgs. (4/7)

IMG_5740: Recovery 24.5 to 26 ft bgs. (5/7)

IMG_5741: Recovery 24.5 to 26 ft bgs. (6/7)

IMG_5742: Recovery 24.5 to 26 ft bgs. (7/7)

IMG_5743: Recovery 26 to 28.5 ft bgs. Pass No. 1. (1/15)

IMG_5744: Recovery 26 to 28.5 ft bgs. Pass No. 1. (2/15)

IMG_5745: Recovery 26 to 28.5 ft bgs. Pass No. 1. (3/15)

IMG_5746: Recovery 26 to 28.5 ft bgs. Pass No. 1. (4/15)

IMG_5747: Recovery 26 to 28.5 ft bgs. Pass No. 1. (5/15)

IMG_5748: Recovery 26 to 28.5 ft bgs. Pass No. 1. (6/15)

IMG_5749: Recovery 26 to 28.5 ft bgs. Pass No. 1. (7/15)

IMG_5750: Recovery 26 to 28.5 ft bgs. Pass No. 1. (8/15)

IMG_5751: Recovery 26 to 28.5 ft bgs. Pass No. 1. (9/15)

IMG_5752: Recovery 26 to 28.5 ft bgs. Pass No. 2. (10/15)

IMG_5754: Recovery 26 to 28.5 ft bgs. Pass No. 2. (11/15)

IMG_5762: Recovery 26 to 28.5 ft bgs. Pass No. 2. (12/15)

IMG_5763: Recovery 26 to 28.5 ft bgs. Pass No. 2. (13/15)

IMG_5764: Recovery 26 to 28.5 ft bgs. Pass No. 2. (14/15)

IMG_5765: Recovery 26 to 28.5 ft bgs. Pass No. 2. (15/15)

IMG_5766: Recovery 28.5 to 29.5 ft bgs. (1/7)

IMG_5767: Recovery 28.5 to 29.5 ft bgs. (2/7)

IMG_5768: Recovery 28.5 to 29.5 ft bgs. (3/7)

IMG_5769: Recovery 28.5 to 29.5 ft bgs. (4/7)

IMG_5770: Recovery 28.5 to 29.5 ft bgs. (5/7)

IMG_5771: Recovery 28.5 to 29.5 ft bgs. (6/7)

IMG_5772: Recovery 28.5 to 29.5 ft bgs. (7/7)

IMG_5773: Recovery 29.5 to 30 ft bgs. (1/6)

IMG_5774: Recovery 29.5 to 30 ft bgs. (2/6)

IMG_5775: Recovery 29.5 to 30 ft bgs. (3/6)

IMG_5776: Recovery 29.5 to 30 ft bgs. (4/6)

IMG_5777: Recovery 29.5 to 30 ft bgs. (5/6)

IMG_5778: Recovery 29.5 to 30 ft bgs. (6/6)

IMG_5779: Recovery 30 to 31.5 ft bgs. (1/7)

IMG_5780: Recovery 30 to 31.5 ft bgs. (2/7)

IMG_5781: Recovery 30 to 31.5 ft bgs. (3/7)

IMG_5782: Recovery 30 to 31.5 ft bgs. (4/7)

IMG_5783: Recovery 30 to 31.5 ft bgs. (5/7)

IMG_5784: Recovery 30 to 31.5 ft bgs. (6/7)

IMG_5785: Recovery 30 to 31.5 ft bgs. (7/7)

IMG_5786: Recovery 31.5 to 32.5 ft bgs. (1/7)

IMG_5787: Recovery 31.5 to 32.5 ft bgs. (2/7)

IMG_5788: Recovery 31.5 to 32.5 ft bgs. (3/7)

IMG_5789: Recovery 31.5 to 32.5 ft bgs. (4/7)

IMG_5790: Recovery 31.5 to 32.5 ft bgs. (5/7)

IMG_5791: Recovery 31.5 to 32.5 ft bgs. (6/7)

IMG_5792: Recovery 31.5 to 32.5 ft bgs. (7/7)

IMG_5793: Recovery 32.5 to 33.5 ft bgs. (1/7)

IMG_5794: Recovery 32.5 to 33.5 ft bgs. (2/7)

IMG_5795: Recovery 32.5 to 33.5 ft bgs. (3/7)

IMG_5796: Recovery 32.5 to 33.5 ft bgs. (4/7)

IMG_5797: Recovery 32.5 to 33.5 ft bgs. (5/7)

IMG_5798: Recovery 32.5 to 33.5 ft bgs. (6/7)

IMG_5799: Recovery 32.5 to 33.5 ft bgs. (7/7)

IMG_5800: Recovery 33.5 to 35 ft bgs. Bottom of boring. (1/4)

IMG_5801: Recovery 33.5 to 35 ft bgs. Bottom of boring. (2/4)

IMG_5802: Recovery 33.5 to 35 ft bgs. Bottom of boring. (3/4)

IMG_5803: Recovery 33.5 to 35 ft bgs. Bottom of boring. (4/4)

BA-5 BORING LOG AND PHOTOGRAPHIC LOG

SCS ENGINEERS

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-5

Pasco Sanitary Landfill
1901 Dietrich Road
Pasco, Washington

JOB NUMBER: 04209046.06

REMARKS:
All depths as reported by drilling equipment unless otherwise noted.

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
0	0					SM		11:38. Begin drilling at surface with open flight auger tooling. Brown silty sand overlying layer of black woven Geotextile and gray sandy gravel. Dry. (Driller set fall protection casing at surface.) Photos: IMG_5921, IMG_5922, IMG_5923	0
	2					GEOT			
1	3					GP			Site soil backfill to surface. No well casing installed.
	5					GP		11:57. 5-ft bgs. Gray sandy gravel with some cobble and boulder. Dry to moist. Photo: IMG_5924 through IMG_5927	5
	6					GEOM		12:03. 6-ft bgs. Same as above with some Geomembrane fragments in cuttings. Dry. Multiple cleanup passes required to remove loose material. Photos: IMG_5928, IMG_5929	
2	7					GP			Hydrated Bentonite Chip Seal (22 Bags)
	8					SM		12:07. 8-ft bgs. Brown silty gravely sand with minor (<5% by volume) cobble. Moist. Photo: IMG_5931	
	9					GEOT		12:09. 9-ft bgs. Same as above some fragments of Brown woven Geotextile. Moist. Photo: IMG_5932	Site soil backfill.
3	10								

Drilling Company:	**DBM Contractors, Inc.**
Drilling Method:	**IMT AF180**
Logged By:	**Sam Adlington**
Sampling Method:	**24-inch Core Barrel and Auger**

Date Started:	**2/15/17**	Time Started:	**11:40**
Date Ended:	**2/15/17**	Time Ended:	**14:25**
Boring Diameter:	**24-inch**	Total Depth:	**34.0 ft.**

Pasco Sanitary Landfill | **JOB NUMBER: 04209046.06**

Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
10					SM		
11				78.5		12:11. 11-ft bgs. Brown silty gravely sand transitioning to brown very fine grained sand with minimal (<1%) gravel or cobble. Moist. Photo: IMG_5933	Site soil backfill.
12				88	SM	12:13. 12-ft bgs. Same as above. Dense and moist. Steamy. Photo: IMG_5934	
13							
14				86	SM	12:15. 14-ft bgs. Same as above. Photo: IMG_5935	
15				99	SM	12:17. 15-ft bgs. Brown very fine grained sand overlying ~20% black decomposed wood debris and ~20% black decomposed refuse. Moist and steamy. (Driller switched to 5-ft long core barrel tooling.) Photos: IMG_5936, IMG_5937, IMG_5938	Hydrated Bentonite Chip Seal (20 Bags)
16							
16.5–17		BA-5 17'	9.63				
17				96		12:36. 17-ft bgs. Brown silty sand and ~10% brown-black decomposed wood debris and ~10% brown-black refuse, including opaque plastics and textiles. Moist and steamy. Photos: IMG_5939, IMG_5940	
18				118	GEOM SM-REF	12:47. 18-ft bgs. Approximately 50% black decomposed refuse, including opaque plastics, and ~50% brown silty sand mixture. A piece of Geomembrane ~18-inches in diameter was recovered in the cuttings. Moist and steamy. Photos: IMG_5941 through IMG_5944	
19							
20				99	SM-REF	12:59. 20-ft bgs. Brown-black silty sand with ~30% black decomposed wood debris. Moist and steamy. Photo: IMG_5946, IMG_5947	3/4-inch Crushed rock without fines.
21				88		13:08. 21.5-ft bgs. Approximately 50% brown-black wood debris with ~30% brown silty sand and ~20% gray decomposed refuse, including opaque plastics. Moist. Photo: IMG_5948	
22							

Meters: 4 (≈13.1 ft), 5 (≈16.4 ft), 6 (≈19.7 ft)

SCS ENGINEERS

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-5

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (feet)	Depth (meters)	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description
22–23					SM-REF	
23–26.5	7	BA-5 23.5'	4.88	97	SM	13:18. 23.5-ft bgs. Dark gray sandy silty with ~10% gray wood debris and some brown sandy silt. Moist. Photo: IMG_5949
25				88.5		13:25. 25-ft bgs. Gray sandy silty with minor (<5%) decomposed wood and metal debris. Moist and steamy. Photos: IMG_5950, IMG_5951
26.5–30.5	8			115	SM-REF	13:37. 27-ft bgs. Gray sandy silt with ~20% brown decomposed refuse, including opaque plastics, ~20% brown decomposed wood debris, minor (<5%) metal wire, and minimal (<1%) paper scraps. Steamy. Photos: IMG_5952, IMG_5953
28.5				114	SM-REF	13:47. 28.5-ft bgs. Gray-brown silty sand with ~20% brown decomposed wood debris overlying gray sandy silt. Dry. Photos: IMG_5954, IMG_5955
30	9	BA-5 30'	1.56			
30.5				112	SM	13:56. 30.5-ft bgs. Brown silty sand with minor (<5%) cobble overlying layer of gray-brown sandy silty. Dry to moist and steamy. Photos: IMG_5956, IMG_5957
32					ML	14:05. 32-ft bgs. Gray-brown sandy silt with brown silty sand slough. Moist and steamy. (Driller switched to open flight auger tooling.) Photo: IMG_5958
33–34	10				ML	14:13. 34-ft bgs. Brown sandy silt. Dry to moist and steamy. Photo: IMG_5959
34				110		Bottom of boring 34-ft bgs.

Completion Detail

25

3/4-inch Crushed rock without fines.

30

Bottom of boring 34-ft bgs.

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-5

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
	34							Boring terminated due to reaching Touchet Bed soils.	
	35								35
11	36								
	37								
	38								
	39								
12	40								40
	41								
	42								
13	43								
	44								
	45								45
14	46								

Definitions and General Notes
Moisture Conditions:
Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp, but no visible water or other liquids.
Wet: visible free water.

Particle Size Ranges:
Boulder: Greater than 12-inches in largest dimension.
Cobble: Between 3 and 12 inches in largest dimension.
Gravel: Greater than No. 4 Sieve (3/16-inch) and less than 3-inches in largest dimension.

Content Descriptions:
Minor: Less than 5% by volume.
Minimal: Less than 1% by volume.
Some: Scattered or interspersed with cuttings, likely slough.

Abbreviations:
GEOT: Geotextile
GEON: Geonet / Geofabric
GEOG: Geogrid
GEOM: Geomembrane
VQ: Visqueen
REF: Refuse

IMG_5921: Begin drilling and setting fall protection casing at surface. (1/2)

IMG_5922: Begin drilling and setting fall protection casing at surface. (2/2)

IMG_5923: Recovery 0 to 4 feet (ft) below ground surface (bgs.).

IMG_5924: Recovery 4 to 5 ft bgs. Pass No. 1. (1/4)

IMG_5925: Recovery 4 to 5 ft bgs. Pass No. 1. Spread for inspection by Driller's assistant. (2/4)

IMG_5926: Recovery 4 to 5 ft bgs. Pass No. 2. (3/4)

IMG_5927: Recovery 4 to 5 ft bgs. Pass No. 3 (4/4)

IMG_5928: Recovery 5 to 6 ft bgs. Pass No. 1. (1/2)

IMG_5929: Recovery 5 to 6 ft bgs. Pass No. 2. (2/2)

IMG_5930: Recovery 6 to 7 ft bgs.

IMG_5931: Recovery 7 to 8 ft bgs.

IMG_5932: Recovery 8 to 9 ft bgs.

IMG_5933: Recovery 9 to 11 ft bgs.

IMG_5934: Recovery 11 to 12 ft bgs.

IMG_5935: Recovery 12 to 14 ft bgs.

IMG_5936: Recovery 14 to 15 ft bgs. (1/3)

IMG_5937: Recovery 14 to 15 ft bgs. (2/3)

IMG_5938: Recovery 14 to 15 ft bgs. Spread by Driller's assistant for inspection. (3/3)

IMG_5939: Recovery 15 to 17 ft bgs. (1/2)

IMG_5940: Recovery 15 to 17 ft bgs. Driller using rooter to dislodge compacted recovered materials from core barrel. (2/2)

IMG_5941: Recovery 17 to 18 ft bgs. (1/4)

IMG_5942: Recovery 17 to 18 ft bgs. Piece of Geomembrane recovered. (2/4)

IMG_5943: Recovery 17 to 18 ft bgs. Piece of Geomembrane recovered. (3/4)

IMG_5944: Recovery 17 to 18 ft bgs. Piece of Geomembrane recovered. (4/4)

IMG_5946: Recovery 18 to 20 ft bgs. (1/2)

IMG_5947: Recovery 18 to 20 ft bgs. (2/2)

IMG_5948: recovery 20 to 21.5 ft bgs.

IMG_5949: Recovery 21.5 to 23.5 ft bgs.

IMG_5950: Recovery 23.5 to 25 ft bgs. (1/2)

IMG_5951: Recovery 23.5 to 25 ft bgs. (2/2)

IMG_5952: Recovery 25 to 27 ft bgs. (1/2)

IMG_5953: Recovery 25 to 27 ft bgs. (2/2)

IMG_5954: Recovery 27 to 28.5 ft bgs. (1/2)

IMG_5955: Recovery 27 to 28.5 ft bgs. (2/2)

IMG_5956: Recovery 28.5 to 30.5 ft bgs. (1/2)

IMG_5957: Recovery 28.5 to 30.5 ft bgs. (2/2)

IMG_5958: Recovery 30.5 to 32 ft bgs.

IMG_5959: Recovery 32 to 34 ft bgs. Bottom of boring.

BA-6 BORING LOG AND PHOTOGRAPHIC LOG

SCS ENGINEERS

BORING LOG

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-6

Pasco Sanitary Landfill
1901 Dietrich Road
Pasco, Washington

JOB NUMBER: 04209046.06

REMARKS:
All depths as reported by drilling equipment unless otherwise noted.

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
0	0					SM	07:35. Begin drilling at surface with open flight auger tooling. Brown silty sand with minimal (<1% by volume) gravel. Moist. (Driller set fall protection casing at surface.) Photos: IMG_5963, IMG_5964	Site soil backfill to surface. No well casing installed.
1	3						07:38. 3-ft bgs. Brown silty sand with minimal (<1%) gravel. Moist. Photo: IMG_5964	
	4					GEOT / GP	07:40. 4-ft bgs. Layer of black woven Geotextile overlying gray sandy gravel. Moist. Photos: IMG_5965, IMG_5966	
	5						07:42. 5-ft bgs. Gray sandy gravel with some brown silty sand and small fragments of black Geotextile in cuttings. Moist. Photo: IMG_5967	
2	6					GEOT / SM	07:43. 6-ft bgs. Brown-gray silty sandy gravel with some small pieces of Geotextile. Moist. Photo: IMG_5968	Hydrated Bentonite Chip Seal (21 Bags)
	8						07:44. 8-ft bgs. Brown-gray silty sandy gravel with some small pieces of black Geotextile. Moist. Photo: IMG_5969	
3	9						07:45. 9-ft bgs. Same as above with a piece of black woven Geotextile approximately 18-inches in diameter. Moist. Photo: IMG_5970, IMG_5971	Site soil backfill.
	10							

Drilling Company:	**DBM Contractors, Inc.**
Drilling Method:	**IMT AF180**
Logged By:	**Sam Adlington**
Sampling Method:	**24-inch Core Barrel and Auger**
Date Started:	**2/16/17**
Date Ended:	**2/16/17**
Boring Diameter:	**24-inch**
Time Started:	**07:30**
Time Ended:	**09:45**
Total Depth:	**36.0 ft.**

Pasco Sanitary Landfill | **JOB NUMBER: 04209046.06**

Depth (feet)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
10		SM	07:48. 10-ft bgs. Brown-gray silty sandy gravel. Moist. Photo: IMG_5972	
11			07:49. 11-ft bgs. Same as above. Moist. Photo: IMG_5973	Site soil backfill.
12	88.0	SM	07:51. 12-ft bgs. Same as above. Gravel and cobble content increasing with depth. Moist. Photo: IMG_5974	
13		GP		
15	94.0	GEON GEOT	07:54. 15-ft bgs. Lens of gray sandy gravel overlying brown silty sand. Some fragments of Geotextile and Geonet / Geofabric present in cuttings. Dense. Moist and steamy. Photo: IMG_5976	
16		SM	07:55. 16-ft bgs. Same as above. Photo: IMG_5977	
17			07:57. 17-ft bgs. Same as above. Photo: IMG_5978	
18	105	VQ	08:00. 18-ft bgs. Brown silty sand with fragments of white Visqueen in cuttings. Moist and steamy. Photo: IMG_5979	Hydrated Bentonite Chip Seal (22 Bags)
19			08:01. 19-ft bgs. Same as above. Photo: IMG_5980	
20	93	SM	08:03. 20-ft bgs. Brown silty sand with some fragments of Visqueen in cuttings. Moist and steamy. Photo: IMG_5981	3/4-inch Crushed rock without fines.

Depth scale: feet 10–22; meters 4, 5, 6.

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Description	Completion Detail
22				91	SM	08:05. 22-ft bgs. Brown silty sand with minor (<5%) gravel and cobble, and minor (<5%) brown-tan decomposed wood debris on bottom two (2) flights of auger. Moist and steamy. Photos: IMG_5982, IMG_5983, IMG_5984	
23				101		08:05. 23-ft bgs. Brown silty sand with ~20% brown decomposed wood debris and ~10% metal scraps. Moist and steamy. Photos: IMG_5985, IMG_5986, IMG_5987	
26				115	SM	08:29. 26-ft bgs. Dark brown silty sand with ~10% brown decomposed refuse, including opaque plastics, and minor (<5%) cobble. Moist and steamy. Photos: IMG_5988, IMG_5989	
28–28.5	Hand	BA-6 28.5'	13.3	105	REF-SM	08:35. 28.5-ft bgs. Black-brown decomposed wood debris with ~50% brown silty sand. Moist. Photos: IMG_5990, IMG_5991	3/4-inch Crushed rock without fines.
30.5				113.5	ML	08:43. 30.5-ft bgs. Black-brown silty sand with minor (<5%) black-brown decomposed wood debris, and minor (<5%) refuse, including opaque plastics, and some cobble overlying gray dense sandy silt. Dry to moist and steamy. Photos: IMG_5993, IMG_5994	
31.5–32	Hand	BA-6 32'	14.4	115.5	SM	08:55. 32-ft bgs. Dark brown silty sand with minor (<5%) brown decomposed refuse, including opaque plastics, overlying gray dense sandy silty. Moist. Photos: IMG_5995, IMG_5996, IMG_5997	

Depth scale: meters 7, 8, 9, 10; feet 22–34. Completion detail scale: 25, 30.

2405 140th Avenue NE, Suite 107
Bellevue, Washington 98005-1877

BORING NUMBER: BA-6

Pasco Sanitary Landfill

JOB NUMBER: 04209046.06

Depth (meters)	Depth (feet)	Sample Location	Sample Number	TVS Result (%)	Temp. (deg F)	USCS Soil Class.	Graphic Log	Description	Completion Detail
	34				121.5	ML		09:03. 34-ft bgs. Gray dense sandy silt with some brown silty sand. Dry to moist and steamy.	3/4-inch Crushed rock without fines.
11	36				105.5			09:10. 36-ft bgs. Gray sandy silt with three (3) large pieces of plastic (likely slough) and some pieces of concrete recovered in cuttings. Dry to moist. Photos: IMG_5998 through IMG_6001 Bottom of boring 36-ft bgs. Boring terminated due to reaching Touchet Bed soils.	Bottom of boring 36-ft bgs.

<u>**Definitions and General Notes**</u>
Moisture Conditions:
Dry: Absence of moisture, dusty, dry to the touch.
Moist: Damp, but no visible water or other liquids.
Wet: visible free water.

Particle Size Ranges:
Boulder: Greater than 12-inches in largest dimension.
Cobble: Between 3 and 12 inches in largest dimension.
Gravel: Greater than No. 4 Sieve (3/16-inch) and less than 3-inches in largest dimension.

Content Descriptions:
Minor: Less than 5% by volume.
Minimal: Less than 1% by volume.
Some: Scattered or interspersed with cuttings, likely slough.

Abbreviations:
GEOT: Geotextile
GEON: Geonet / Geonet
GEOG: Geogrid
GEOM: Geomembrane
VQ: Visqueen
REF: Refuse

Depth scale: meters 11, 12, 13, 14; feet 34–46.

IMG_5963: Driller setting fall protection casing at surface.

IMG_5964: Recovery 0 to 3 feet (ft) below ground surface (bgs.).

IMG_5965: Recovery 3 to 4 ft bgs. Piece of Geonet recovered on bottom flight of auger. (1/2)

IMG_5966: Recovery 3 to 4 ft bgs. Piece of Geonet recovered on bottom flight of auger. (2/2)

IMG_5967: Recovery 4 to 5 ft bgs. Piece of Geotextile recovered on bottom flight of auger.

IMG_5968: Recovery 5 to 6 ft bgs.

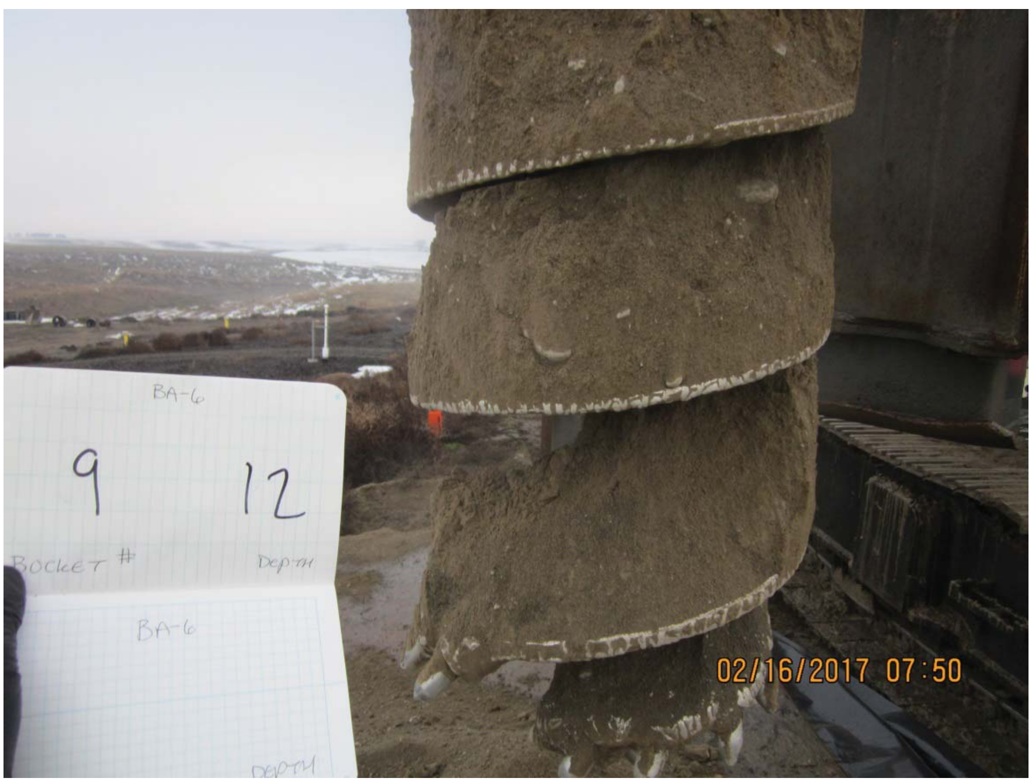
IMG_5969: Recovery 6 to 8 ft bgs.

IMG_5970: Recovery 8 to 9 ft bgs. Piece of Geomembrane recovered on bottom flight of auger. (1/2)

IMG_5971: Recovery 8 to 9 ft bgs. Piece of Geomembrane recovered on bottom flight of auger. (2/2)

IMG_5972: Recovery 9 to 10 ft bgs.

IMG_5973: Recovery 10 to 11 ft bgs.

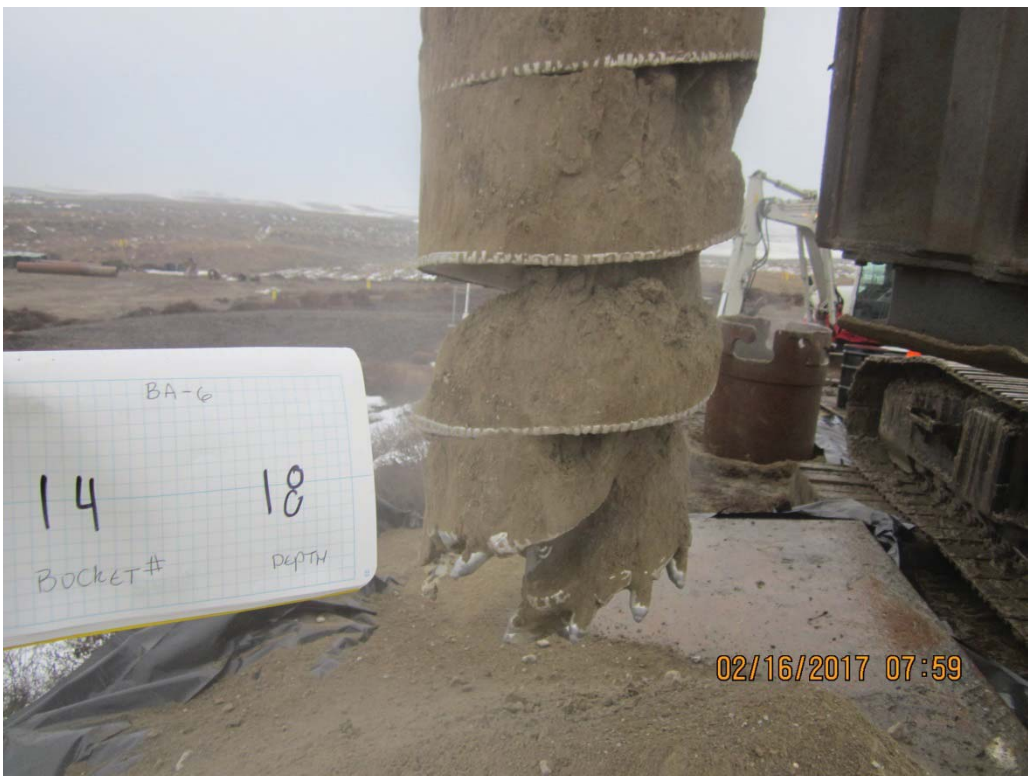


IMG_5974: Recovery 11 to 12 ft bgs.

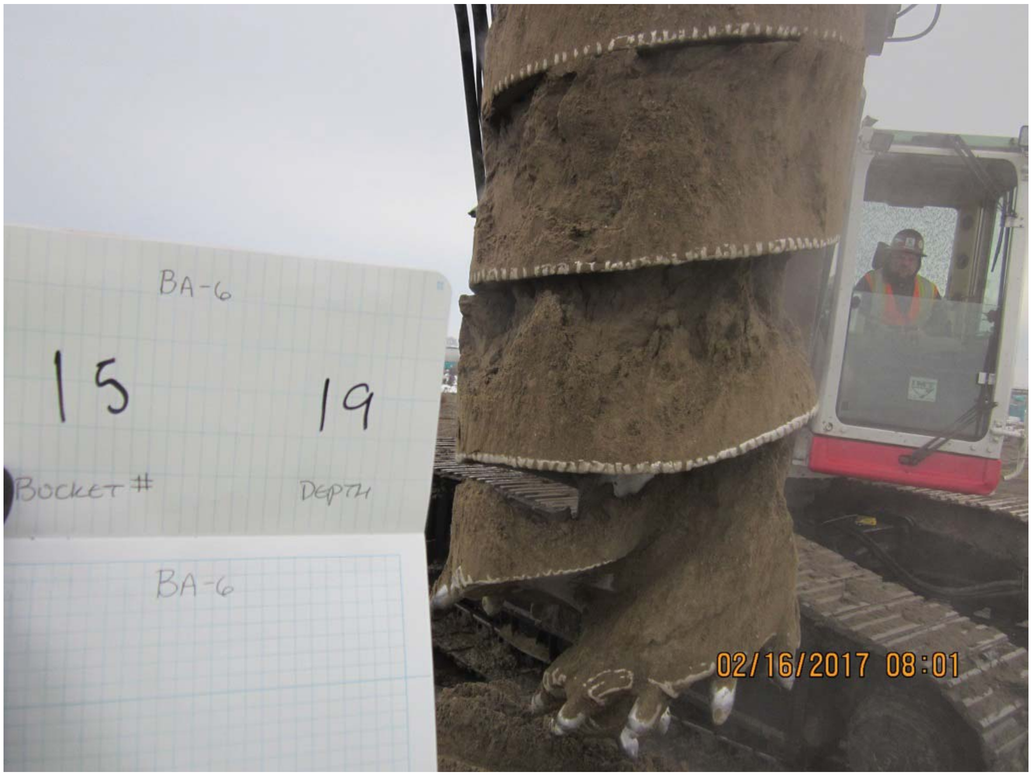
IMG_5976: Recovery 12 to 15 ft bgs. Pieces of Geonet and Geotextile recovered.

IMG_5977: Recovery 15 to 16 ft bgs.

IMG_5978: Recovery 16 to 17 ft bgs. Piece of Geonet recovered.



IMG_5979: Recovery 17 to 18 ft bgs.



IMG_5980: Recovery 18 to 19 ft bgs.

IMG_5981: Recovery 19 to 20 ft bgs. Pieces of Visqueen (white) recovered on auger.

IMG_5982: Recovery 20 to 22 ft bgs. (1/3)

IMG_5983: Recovery 20 to 22 ft bgs. Spread for inspection by Driller's assistant. (2/3)

IMG_5984: Recovery 20 to 22 ft bgs. Spread for inspection by Driller's assistant. (3/3)

IMG_5985: Recovery 22 to 23 ft bgs. (1/3)

IMG_5986: Recovery 22 to 23 ft bgs. Spread for inspection by Driller's assistant. (2/3)

IMG_5987: Recovery 22 to 23 ft bgs. (3/3)

IMG_5988: Recovery 23 to 26 ft bgs. (1/2)

IMG_5989: Recovery 23 to 26 ft bgs. (2/2)

IMG_5990: Recovery 26 to 28.5 ft bgs. Wood debris recovered. (1/3)

IMG_5991: Recovery 26 to 28.5 ft bgs. Wood debris recovered. (2/3)

IMG_5993: Recovery 28.5 to 30.5 ft bgs. (1/2)

IMG_5994: Recovery 28.5 to 30.5 ft bgs. (2/2)

IMG_5995: Recovery 30.5 to 32 ft bgs. (1/3)

IMG_5996: Recovery 30.5 to 32 ft bgs. (2/3)

IMG_5997: Recovery 30.5 to 32 ft bgs. Spread for inspection by Driller's assistant. (3/3)

IMG_5998: Recovery 34 to 36 ft bgs. Bottom of boring. (1/4)

IMG_5999: Recovery 34 to 36 ft bgs. Bottom of boring. (2/4)

IMG_6000: Recovery 34 to 36 ft bgs. Bottom of boring. (3/4)

IMG_6001: Recovery 34 to 36 ft bgs. Bottom of boring. (4/4)

TVS CONTENT IN BORINGS

Pasco Sanitary Landfill
Boring Log Summary

Boring Number	**BA-1**
Boring Diameter	24 inches
Boring Diameter	2 feet
Boring Area	3.14 sf

Upper Depth of Zone (ft-bgs) (1)	Lower Depth of Zone (ft-bgs) (1)	Length of Zone (ft)	Volume of Zone (ft^3)	Refuse and Wood Debris Content (%) (2)	Volume of Mixed Debris in Zone (ft^3) (3)	Sample Number	TVS Result (%)	Volume of TVS from Refuse (ft^3) (4)
0.0	2.0	2.0	6.3	0.0%	0.0			0.0
2.0	5.0	3.0	9.4	0.0%	0.0			0.0
5.0	6.0	1.0	3.1	0.0%	0.0			0.0
6.0	7.0	1.0	3.1	0.0%	0.0			0.0
7.0	8.5	1.5	4.7	0.0%	0.0			0.0
8.5	9.5	1.0	3.1	0.0%	0.0			0.0
9.5	10.5	1.0	3.1	0.0%	0.0			0.0
10.5	11.0	0.5	1.6	0.0%	0.0			0.0
11.0	12.0	1.0	3.1	0.0%	0.0			0.0
12.0	13.0	1.0	3.1	0.0%	0.0			0.0
13.0	14.0	1.0	3.1	0.0%	0.0			0.0
14.0	15.0	1.0	3.1	0.0%	0.0			0.0
15.0	16.0	1.0	3.1	0.0%	0.0			0.0
16.0	17.0	1.0	3.1	0.0%	0.0			0.0
17.0	18.0	1.0	3.1	0.0%	0.0			0.0
18.0	19.0	1.0	3.1	0.0%	0.0			0.0
19.0	20.0	1.0	3.1	10.0%	0.3	BA-1 20'	21.1%	0.1
20.0	21.0	1.0	3.1	30.0%	0.9	BA-1 20'	21.1%	0.2
21.0	22.0	1.0	3.1	30.0%	0.9	BA-1 20'	21.1%	0.2
22.0	23.0	1.0	3.1	35.0%	1.1	BA-1 22'	6.90%	0.1
23.0	24.0	1.0	3.1	20.0%	0.6	BA-1 22'	6.90%	0.0
24.0	25.0	1.0	3.1	20.0%	0.6	BA-1 22'	6.90%	0.0
25.0	26.0	1.0	3.1	40.0%	1.3	BA-1 22'	6.90%	0.1
26.0	27.0	1.0	3.1	51.0%	1.6	BA-1 22'	6.90%	0.1
27.0	28.0	1.0	3.1	55.0%	1.7	BA-1 22'	6.90%	0.1
28.0	29.0	1.0	3.1	30.0%	0.9	BA-1 22'	6.90%	0.1
29.0	29.0	0.0	0.0	5.0%	0.0	BA-1 22'	6.90%	0.0
29.0	31.0	2.0	6.3	1.0%	0.1	BA-1 30'	5.22%	0.0
31.0	32.0	1.0	3.1	5.0%	0.2	BA-1 30'	5.22%	0.0
32.0	33.0	1.0	3.1	10.0%	0.3	BA-1 30'	5.22%	0.0
33.0	35.0	2.0	6.3	10.0%	0.6	BA-1 30'	5.22%	0.0
35.0	36.5	1.5	4.7	5.0%	0.2	BA-1 30'	5.22%	0.0
36.5	37.0	0.5	1.6	1.0%	0.0			0.0
37.0	38.0	1.0	3.1	5.0%	0.2			0.0
38.0				0.0%				
TOTALS		**38.0**	**119.4**		**11.7**			**1.1**

Volume of Boring as Mixed Debris	9.8	%
Volume of Mixed Debris as Total Volatile Solids (TVS)	9.3	%
Volume of Boring as TVS	0.9	%

Notes:

1. Depth as repoted by Driller unless noted otherwise.
2. Values presented as approximations or ranges on boring log (~, <, >) are listed at the maximum of the range or approximation.
3. Calculated by multiplying the volume of the zone by the percentage of mixed debris within the zone.
4. Calculated by multiplying the volume of mixed debris for the zone by the cooresponding TVS sample result.

Pasco Sanitary Landfill
Boring Log Summary

Boring Number	**BA-2**
Boring Diameter	24 inches
Boring Diameter	2 feet
Boring Area	3.14 sf

Upper Depth of Zone (ft-bgs) (1)	Lower Depth of Zone (ft-bgs) (1)	Length of Zone (ft)	Volume of Zone (ft^3)	Refuse and Wood Debris Content (%) (2)	Volume of Mixed Debris in Zone (ft^3) (3)	Sample Number	TVS Result (%)	Volume of TVS from Refuse (ft^3) (4)
0.0	1.0	1.0	3.1	0.0%	0.0			0.0
1.0	2.0	1.0	3.1	0.0%	0.0			0.0
2.0	2.5	0.5	1.6	0.0%	0.0			0.0
2.5	3.0	0.5	1.6	0.0%	0.0			0.0
3.0	5.0	2.0	6.3	0.0%	0.0			0.0
5.0	7.0	2.0	6.3	0.0%	0.0			0.0
7.0	7.5	0.5	1.6	0.0%	0.0			0.0
7.5	8.5	1.0	3.1	0.0%	0.0			0.0
8.5	10.5	2.0	6.3	0.0%	0.0			0.0
10.5	12.0	1.5	4.7	0.0%	0.0			0.0
12.0	13.5	1.5	4.7	0.0%	0.0			0.0
13.5	14.5	1.0	3.1	0.0%	0.0			0.0
14.5	16.0	1.5	4.7	0.0%	0.0			0.0
16.0	17.0	1.0	3.1	0.0%	0.0			0.0
17.0	17.5	0.5	1.6	0.0%	0.0			0.0
17.5	20.5	3.0	9.4	0.0%	0.0			0.0
20.5	22.0	1.5	4.7	0.0%	0.0			0.0
22.0	23.0	1.0	3.1	0.0%	0.0			0.0
23.0	24.5	1.5	4.7	0.0%	0.0			0.0
24.5	26.0	1.5	4.7	0.0%	0.0			0.0
26.0	26.5	0.5	1.6	25.0%	0.4	BA-2 26.3'	8.07%	0.0
26.5	27.5	1.0	3.1	5.0%	0.2	BA-2 26.3'	8.07%	0.0
27.5	28.0	0.5	1.6	5.0%	0.1	BA-2 28'	22.7%	0.0
28.0	30.0	2.0	6.3	5.0%	0.3	BA-2 28'	22.7%	0.1
30.0	31.0	1.0	3.1	5.0%	0.2	BA-2 30'	28.5%	0.0
31.0	33.0	2.0	6.3	5.0%	0.3	BA-2 30'	28.5%	0.1
33.0	34.0	1.0	3.1	1.0%	0.0	BA-2 30'	28.5%	0.0
34.0	35.0	1.0	3.1	0.0%	0.0			0.0
35.0								
TOTALS		**35.0**	**110.0**		**1.4**			**0.3**

Volume of Boring as Mixed Debris	1.3	%
Volume of Mixed Debris as Total Volatile Solids (TVS)	19.2	%
Volume of Boring as TVS	0.3	%

Notes:
1. Depth as repoted by Driller unless noted otherwise.
2. Values presented as approximations or ranges on boring log (~, <, >) are listed at the maximum of the range or approximation.
3. Calculated by multiplying the volume of the zone by the percentage of mixed debris within the zone.
4. Calculated by multiplying the volume of mixed debris for the zone by the cooresponding TVS sample result.

Pasco Sanitary Landfill
Boring Log Summary

Boring Number	**BA-3**
Boring Diameter	24 inches
Boring Diameter	2 feet
Boring Area	3.14 sf

Upper Depth of Zone (ft-bgs) (1)	Lower Depth of Zone (ft-bgs) (1)	Length of Zone (ft)	Volume of Zone (ft^3)	Refuse and Wood Debris Content (%) (2)	Volume of Mixed Debris in Zone (ft^3) (3)	Sample Number	TVS Result (%)	Volume of TVS from Refuse (ft^3) (4)
0.0	2.5	2.5	7.9	0.0%	0.0			0.0
2.5	5.5	3.0	9.4	0.0%	0.0			0.0
5.5	7.0	1.5	4.7	0.0%	0.0			0.0
7.0	8.0	1.0	3.1	0.0%	0.0			0.0
8.0	12.0	4.0	12.6	0.0%	0.0			0.0
12.0	15.0	3.0	9.4	0.0%	0.0			0.0
15.0	16.0	1.0	3.1	0.0%	0.0			0.0
16.0	18.0	2.0	6.3	0.0%	0.0			0.0
18.0	19.5	1.5	4.7	0.0%	0.0			0.0
19.5	21.0	1.5	4.7	0.0%	0.0			0.0
21.0	21.5	0.5	1.6	1.0%	0.0	BA-3 23'	8.08%	0.0
21.5	23.0	1.5	4.7	30.0%	1.4	BA-3 23'	8.08%	0.1
23.0	24.5	1.5	4.7	30.0%	1.4	BA-3 23'	8.08%	0.1
24.5	26.0	1.5	4.7	5.0%	0.2	BA-3 26'	20.2%	0.0
26.0	27.5	1.5	4.7	95.0%	4.5	BA-3 26'	20.2%	0.9
27.5	29.0	1.5	4.7	40.0%	1.9	BA-3 26'	20.2%	0.4
29.0	30.5	1.5	4.7	20.0%	0.9	BA-3 29'	8.17%	0.1
30.5	33.0	2.5	7.9	30.0%	2.4	BA-3 29'	8.17%	0.2
33.0	35.5	2.5	7.9	5.0%	0.4	BA-3 29'	8.17%	0.0
35.5	36.0	0.5	1.6	5.0%	0.1			0.0
36.0				0.0%				
TOTALS		**36.0**	**113.1**		**13.2**			**1.9**

Volume of Boring as Mixed Debris	11.7	%
Volume of Mixed Debris as Total Volatile Solids (TVS)	14.1	%
Volume of Boring as TVS	1.6	%

Notes:

1. Depth as repoted by Driller unless noted otherwise.
2. Values presented as approximations or ranges on boring log (~, <, >) are listed at the maximum of the range or approximation.
3. Calculated by multiplying the volume of the zone by the percentage of mixed debris within the zone.
4. Calculated by multiplying the volume of mixed debris for the zone by the cooresponding TVS sample result.

Pasco Sanitary Landfill
Boring Log Summary

Boring Number	**BA-4**
Boring Diameter	24 inches
Boring Diameter	2 feet
Boring Area	3.14 sf

Upper Depth of Zone (ft-bgs) (1)	Lower Depth of Zone (ft-bgs) (1)	Length of Zone (ft)	Volume of Zone (ft^3)	Refuse and Wood Debris Content (%) (2)	Volume of Mixed Debris in Zone (ft^3) (3)	Sample Number	TVS Result (%)	Volume of TVS from Refuse (ft^3) (4)
0.0	4.5	4.5	14.1	0.0%	0.0			0.0
4.5	5.0	0.5	1.6	0.0%	0.0			0.0
5.0	6.0	1.0	3.1	0.0%	0.0			0.0
6.0	7.0	1.0	3.1	0.0%	0.0			0.0
7.0	8.0	1.0	3.1	0.0%	0.0			0.0
8.0	9.0	1.0	3.1	0.0%	0.0			0.0
9.0	10.0	1.0	3.1	0.0%	0.0			0.0
10.0	11.0	1.0	3.1	0.0%	0.0			0.0
11.0	12.0	1.0	3.1	0.0%	0.0			0.0
12.0	13.0	1.0	3.1	0.0%	0.0			0.0
13.0	14.0	1.0	3.1	0.0%	0.0			0.0
14.0	15.5	1.5	4.7	0.0%	0.0			0.0
15.5	16.5	1.0	3.1	0.0%	0.0			0.0
16.5	17.5	1.0	3.1	0.0%	0.0			0.0
17.5	18.5	1.0	3.1	0.0%	0.0			0.0
18.5	19.5	1.0	3.1	0.0%	0.0			0.0
19.5	20.5	1.0	3.1	0.0%	0.0			0.0
20.5	21.5	1.0	3.1	0.0%	0.0			0.0
21.5	22.5	1.0	3.1	0.0%	0.0			0.0
22.5	23.5	1.0	3.1	0.0%	0.0			0.0
23.5	24.5	1.0	3.1	0.0%	0.0			0.0
24.5	26.0	1.5	4.7	2.0%	0.1	BA-4 35	3.00%	0.0
26.0	28.5	2.5	7.9	2.0%	0.2	BA-4 35	3.00%	0.0
28.5	29.5	1.0	3.1	2.0%	0.1	BA-4 36	16.6%	0.0
29.5	30.0	0.5	1.6	1.0%	0.0	BA-4 39	6.53%	0.0
30.0	31.5	1.5	4.7	1.0%	0.0	BA-4 39	6.53%	0.0
31.5	32.5	1.0	3.1	1.0%	0.0	BA-4 39	6.53%	0.0
32.5	33.5	1.0	3.1	1.0%	0.0	BA-4 39	6.53%	0.0
33.5	35.0	1.5	4.7	1.0%	0.0	BA-4 39	6.53%	0.0
35.0				0.0%				
TOTALS		**35.0**	**110.0**		**0.5**			**0.0**

Volume of Boring as Mixed Debris	0.4	%
Volume of Mixed Debris as Total Volatile Solids (TVS)	6.0	%
Volume of Boring as TVS	0.0	%

Notes:

1. Depth as repoted by Driller unless noted otherwise.
2. Values presented as approximations or ranges on boring log (~, <, >) are listed at the maximum of the range or approximation.
3. Calculated by multiplying the volume of the zone by the percentage of mixed debris within the zone.
4. Calculated by multiplying the volume of mixed debris for the zone by the cooresponding TVS sample result.

Pasco Sanitary Landfill
Boring Log Summary

Boring Number	**BA-5**
Boring Diameter	24 inches
Boring Diameter	2 feet
Boring Area	3.14 sf

Upper Depth of Zone (ft-bgs) (1)	Lower Depth of Zone (ft-bgs) (1)	Length of Zone (ft)	Volume of Zone (ft^3)	Refuse and Wood Debris Content (%) (2)	Volume of Mixed Debris in Zone (ft^3) (3)	Sample Number	TVS Result (%)	Volume of TVS from Refuse (ft^3) (4)
0.0	2.0	2.0	6.3	0.0%	0.0			0.0
2.0	5.0	3.0	9.4	0.0%	0.0			0.0
5.0	6.0	1.0	3.1	0.0%	0.0			0.0
6.0	8.0	2.0	6.3	0.0%	0.0			0.0
8.0	9.0	1.0	3.1	0.0%	0.0			0.0
9.0	11.0	2.0	6.3	0.0%	0.0			0.0
11.0	12.0	1.0	3.1	0.0%	0.0			0.0
12.0	14.0	2.0	6.3	0.0%	0.0			0.0
14.0	15.0	1.0	3.1	0.0%	0.0			0.0
15.0	17.0	2.0	6.3	40.0%	2.5	BA-5 17'	9.63%	0.2
17.0	18.0	1.0	3.1	20.0%	0.6	BA-5 17'	9.63%	0.1
18.0	20.0	2.0	6.3	50.0%	3.1	BA-5 17'	9.63%	0.3
20.0	21.5	1.5	4.7	30.0%	1.4	BA-5 17'	9.63%	0.1
21.5	23.5	2.0	6.3	50.0%	3.1	BA-5 23.5'	4.88%	0.2
23.5	25.0	1.5	4.7	10.0%	0.5	BA-5 23.5'	4.88%	0.0
25.0	27.0	2.0	6.3	5.0%	0.3	BA-5 23.5'	4.88%	0.0
27.0	28.5	1.5	4.7	46.0%	2.2	BA-5 30'	1.56%	0.0
28.5	30.5	2.0	6.3	20.0%	1.3	BA-5 30'	1.56%	0.0
30.5	32.0	1.5	4.7	0.0%	0.0			0.0
32.0	34.0	2.0	6.3	0.0%	0.0			0.0
34.0				0.0%				
TOTALS		**34.0**	**106.8**		**15.0**			**1.0**

Volume of Boring as Mixed Debris	14.1	%
Volume of Mixed Debris as Total Volatile Solids (TVS)	6.6	%
Volume of Boring as TVS	0.9	%

Notes:

1. Depth as repoted by Driller unless noted otherwise.
2. Values presented as approximations or ranges on boring log (~, <, >) are listed at the maximum of the range or approximation.
3. Calculated by multiplying the volume of the zone by the percentage of mixed debris within the zone.
4. Calculated by multiplying the volume of mixed debris for the zone by the cooresponding TVS sample result.

Pasco Sanitary Landfill
Boring Log Summary

Boring Number	**BA-6**
Boring Diameter	24 inches
Boring Diameter	2 feet
Boring Area	3.14 sf

Upper Depth of Zone (ft-bgs) [1]	Lower Depth of Zone (ft-bgs) [1]	Length of Zone (ft)	Volume of Zone (ft^3)	Refuse and Wood Debris Content (%) [2]	Volume of Mixed Debris in Zone (ft^3) [3]	Sample Number	TVS Result (%)	Volume of TVS from Refuse (ft^3) [4]
0.0	3.0	3.0	9.4	0.0%	0.0			0.0
3.0	4.0	1.0	3.1	0.0%	0.0			0.0
4.0	5.0	1.0	3.1	0.0%	0.0			0.0
5.0	6.0	1.0	3.1	0.0%	0.0			0.0
6.0	8.0	2.0	6.3	0.0%	0.0			0.0
8.0	9.0	1.0	3.1	0.0%	0.0			0.0
9.0	10.0	1.0	3.1	0.0%	0.0			0.0
10.0	11.0	1.0	3.1	0.0%	0.0			0.0
11.0	12.0	1.0	3.1	0.0%	0.0			0.0
12.0	15.0	3.0	9.4	0.0%	0.0			0.0
15.0	16.0	1.0	3.1	0.0%	0.0			0.0
16.0	17.0	1.0	3.1	0.0%	0.0			0.0
17.0	18.0	1.0	3.1	0.0%	0.0			0.0
18.0	19.0	1.0	3.1	0.0%	0.0			0.0
19.0	20.0	1.0	3.1	0.0%	0.0			0.0
20.0	22.0	2.0	6.3	0.0%	0.0			0.0
22.0	23.0	1.0	3.1	5.0%	0.2			0.0
23.0	26.0	3.0	9.4	30.0%	2.8	BA-6 28.5'	13.30%	0.4
26.0	28.5	2.5	7.9	10.0%	0.8	BA-6 28.5'	13.30%	0.1
28.5	30.5	2.0	6.3	50.0%	3.1	BA-6 28.5'	13.30%	0.4
30.5	32.0	1.5	4.7	5.0%	0.2	BA-6 32'	14.40%	0.0
32.0	34.0	2.0	6.3	5.0%	0.3	BA-6 32'	14.40%	0.0
34.0	36.0	2.0	6.3	0.0%	0.0			0.0
36.0				0.0%				
TOTALS		**36.0**	**113.1**		**7.5**			**1.0**

Volume of Boring as Mixed Debris	6.6	%
Volume of Mixed Debris as Total Volatile Solids (TVS)	13.1	%
Volume of Boring as TVS	0.9	%

Notes:

1. Depth as repoted by Driller unless noted otherwise.
2. Values presented as approximations or ranges on boring log (~, <, >) are listed at the maximum of the range or approximation.
3. Calculated by multiplying the volume of the zone by the percentage of mixed debris within the zone.
4. Calculated by multiplying the volume of mixed debris for the zone by the cooresponding TVS sample result.

April 24, 2017

ZONE A COMBUSTION EVALUATION REPORT
PASCO SANITARY LANDFILL

Pasco Sanitary Landfill
Pasco, WA

Appendices

Appendix D: Temperature Data

APPENDIX D. TEMPERATURE DATA

Subsurface temperatures are commonly measured at sites using temperature measurement devices such as thermocouples and can be connected to datalogging equipment for continuous readings. For instance, Jafari et al. (2016) used Type T thermocouples attached to a CPVC pipe and installed in boreholes, which were then backfilled with cement bentonite grout. These downhole temperature arrays (DTAs) were installed in a MSW landfill in order to detect elevated temperature increases that are beyond the range of biodegradation. Additionally, subsurface temperatures can be used to detect and quantify biodegradation rates. For instance, the Thermal NSZD technology (ThermalNSZD, 2016), installs Type T thermocouples in subsurface boreholes in both a background (clean) as well as several hydrocarbon-impacted locations. The difference in temperatures between the two locations are then used along with an algorithm to convert to natural source zone depletion (NSZD) rates at a light non-aqueous phase liquid (LNAPL) site. Similarly, other case studies using similar measurement devices have been able to measure and quantify the heat signal from biodegradation (Sweeney and Ririe, 2014; Warren and Bekins, 2015).

Type T thermocouples were installed at various depths at nine different locations throughout Zone A. Insulated with braided 304 or 316 SS for protection from corrosion, the thermocouples had a temperature measurement range of -454 to 700 ºF, and were manufactured to meet ASTM E-230 code requirements with Standard Limits of Error (± 1.0 ºC or 0.75%, whichever is higher). For this project, the temperature monitoring system needs to be able to distinguish between temperatures in the biological reaction range (<176 ºF) and combustion range (357 ºF). Thermocouples can measure temperatures well within this level of error even when considering factors that can affect thermocouple readings such as the factors discussed below. Field checks were performed on the thermocouples prior to installation using a Fluke temperature meter. All thermocouples were plugged in and compared to the actual ambient temperature conditions prior to installation. An ice water and boiling water calibration check was performed on a spare thermocouple of similar construction following the field program to confirm their accuracy.

Factors that can potentially can affect the temperature values include:

i) *Installation-related factors*: Thermocouple wires can bend, break, or crack during installation, which would break the thermocouple probe circuit. A standard volt meter can be used to check if the probe circuit is open or not. In this study, thermocouples with stainless steel sheaths were employed and there were no such breakage issues.

ii) *Variations in subsurface waste material composition:* differences in subsurface waste material composition can affect the thermal conductivity of the subsurface but will not cause errors in the temperature measurements themselves. Temperature measurements in the subsurface have the advantage that the thermal conductivity of different soil types doesn't vary significantly (in general less than a factor of two) compared to the variation in hydraulic conductivity (factor of eight or more orders of magnitude). This is why other landfill in-situ temperature studies have enclosed thermocouples in grout for protection; the grout doesn't affect the temperature signal significantly. As a conservative measure, the design of the thermocouple borings for this project emplaced the thermocouples in a sand pack to allow detection of hot air from potential combustion events to be accounted for in the temperature measurements. This increases the sensitivity of the temperature monitoring system to detect hot gases that could be coming from potential combustion.

iii) Cold junction compensation errors: the connection between the thermocouple and recording instrument plays a role in how well the instrument's cold junction compensation circuit operates. The cold junction compensation in the instrument imposes limits on the measurement. Essentially, the temperature of the cold junction at one end needs to be known in order to extract the sensed temperature from the other end (hot junction), since the recording instrument will likely not exist at the reference temperature of 0 ºC. In this study, the cold junction compensation error was only observed during the handling of the dataloggers and resulted in short-term "spikes" in the data which were subsequently resolved soon after.

iv) Temperature variations in the data logger wellhead box between different download events: this potential variable is mitigated with cold junction compensation that is inherent in all thermocouple recording devices.

v) Offset/gain/drift errors: with long-term use, a thermocouple can progressively become decalibrated or inhomogenous, which can impact measured readings. One main reason for decalibration is that wires can become chemically attached, which impacts mechanical properties of the material and ultimately the temperature readings.

Under normal circumstances, thermocouple drift is a gradual, very slow process. Park (2010) states: *"To achieve long and reliable thermocouple life, the usual strategy is to operate the device comfortably under its maximum temperature, and provide it with the cleanest possible environment in which to work. Enclosures, such as sheaths, protecting tubes, and thermowells are the usual means of controlling the conditions that actually surround the thermoelements themselves."* (Richard M. Park. (2010) Thermocouple Fundamentals, Marlin Mfrg. Corp., Cleveland, Ohio, U.S.A.)

For this project, potential drift problems are mitigated by:

1) Using T-Type thermocouples, this type of thermocouple is known to be moisture resistant and very stable.
2) Using high-end stainless steel sheaths to protect the thermocouple wire.
3) The expected operating conditions in Zone A is well below the maximum operating temperature (700°F) of thermocouples; if temperatures approach the maximum operating temperature then combustion is likely.
4) There are multiple thermocouples at each location; if one thermocouple exhibits unusual behavior it is expected within several months that the next-highest and next-lowest thermocouples can be used to confirm this signal (e.g., see Figure 5.5).

vi) Temperature gradients across the T/C wire: Temperature gradients across the thermocouple wire can introduce errors due to impurities in the metals. This problem is not common enough or serious enough to preclude use of thermocouples for thousands of applications, including measurement of subsurface temperatures. Under expected subsurface conditions, steep gradients (i.e., several hundred degrees F) are not expected to cause any problems where a false negative signal for combustion occurs. In the case of combustion, a steep vertical gradient along the thermocouple wire may be created and cause some error in the absolute temperature that is being measured, but the gradient issue will not show a false negative signal and combustion will be detected. For this project, the use of stainless steel sheathing reduces the impact of steep gradients (Omega.com).

vii) Incorrect use of extensions: in cases where the length of the original thermocouple wire needs to be extended, thermocouple extensions can be used. Errors from thermocouple extensions include: i) mismatch of extension wire to the main thermocouple type; ii) poor connections; or iii) reversing the polarity of the two metal types. In this study, errors resulting from the incorrect use of extensions were mitigated, as described below.

In this study, there were three factors that complicated the temperature data collection and analysis:

1. **Datalogger Spikes:** When the dataloggers were pulled from the enclosures for downloading and then reconnected to the thermocouples in the enclosures, a short-term (a few hours) spike in the temperatures was observed. The manufacturer (Lascar) acknowledged this could happen for two different reasons:
   i) When the logger is plugged into USB, it operates at a higher frequency. This causes some self-heating of a few degrees, which can be seen by the internal thermistor. "The thermistor provides Cold Junction Compensation and should adjust itself to the ambient temperature fairly quickly" (Lascar Electronics, personal communication).
   ii) "When the thermocouple connector is handled, then body temperature will change the measured temperature until the mass of the connector and thermocouple equalize" (Lascar Electronics, personal communication).

   For this report, the datalogger-created temperature spikes in the hours after reinstalling the data loggers were not used to determine the average and maximum temperatures measured in Zone A.

2. **Type K Extensions:** It is common practice to attach thermocouple wire extensions to extend the length of the original thermocouple wire that was purchased. For this project, Type T thermocouples were used, and 18 of the 47 thermocouple installations were installed using extensions. During this work, however, "Type K" extensions from Phase 1 of the Balefill Area project, and five "Type K" extensions from the Phase 2 of the Balefill Area project were used to extend the Type T thermocouple wires being installed. According the manufacturer, installing that particular Type K extension to the Type T wire can potentially result in the datalogger reading two temperature signals, one from the subsurface and one from the junction of the Type K and Type T at the surface. The three extensions from Phase 1 of the Balefill Area project resulted in obviously incorrect temperature signals with a wide diurnal variation where two signals were combined: 1) the subsurface temperature signal; and 2) an air temperature signal being measured by the junction at the surface. This problem affects the data from the TC2-16, TC2-27, and TC6-29 locations; the incorrect data are shown as faded lines in the figures below and in Appendix B but were not used in the temperature analysis. For the five extensions from Phase 2 of the Balefill Area project, no diurnal variations were observed in the signal, and subsequent testing showed this type of extension provided reliable data.

   Table D.1 below summarizes the use of all extensions and thermocouple types at each location and depth, as well as current data quality issues.

Table D.1. *Summary of all extensions and data quality issues.*

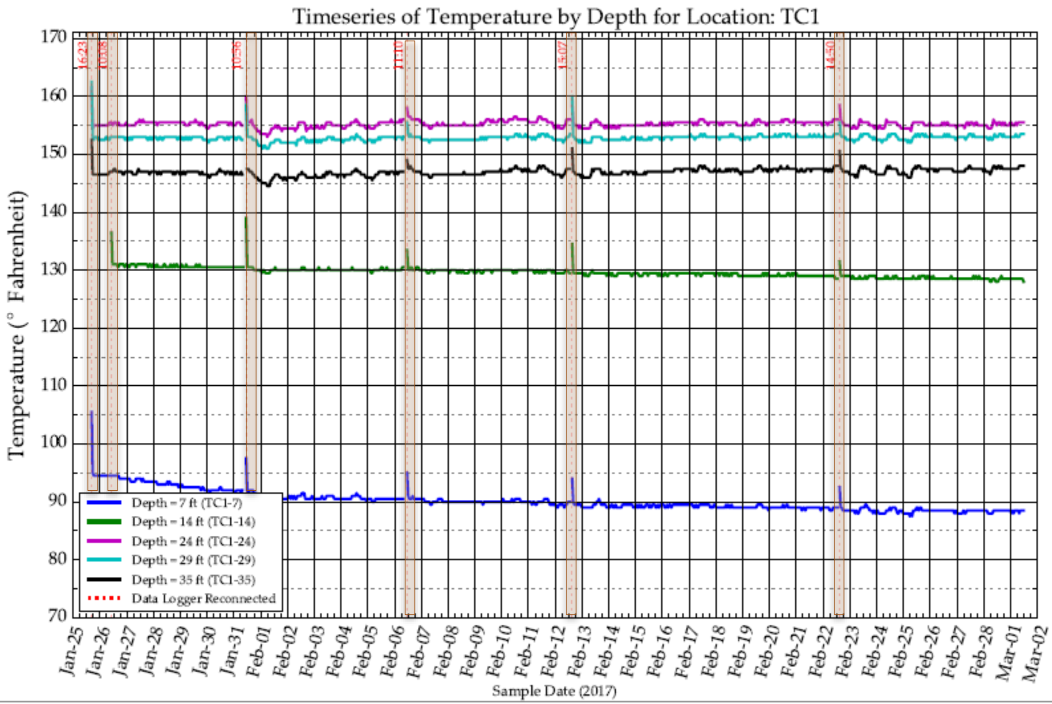
Thermocouple	Extension	Extension Type	Initial Data Quality Issues	Extension Status	Current Quality Issues
TC1-7	Yes	Type K, from Phase 2 of Balefill Area project	None	Removed prior to Six Day Test	None
TC1-14	Yes	Type T	None	In place	None
TC1-24	Yes	Type T	None	In place	None
TC1-29	Yes	Type T	None	In place	None
TC1-35	Yes	Type T	None	In place	None
TC2-8	No	--	None	--	None
TC2-16	Yes	Type K, from Phase 1 of Basefill Area project	High variability with diurnal temperature trends	In place; could not remove	Data invalid
TC2-27	Yes	Type K, from Phase 1 of Basefill Area project	High variability with diurnal temperature trends	Removed prior to Six Day Test	None
TC2-32	Yes	Type T	None	In place	None
TC2-36	Yes	Type K, from Phase 2 of Balefill Area project	None	Removed prior to Six Day Test	None
TC3-8	Yes	Type T	None	In place	None
TC3-16	No	--	None	--	None
TC3-25	No	--	None	--	None
TC3-30	No	--	None	--	None
TC3-37	Yes	Type K, from Phase 2 of Balefill Area project	None	Removed prior to Six Day Test	None
TC4-9	No	--	None	--	None
TC4-14	Yes	Type K, from Phase 2 of Balefill Area project	None	Removed prior to Six Day Test	None
TC4-19	No	--	None	N/A	None
TC4-24	Yes	Type K, from Phase 2 of Balefill Area project	None	Removed prior to Six Day Test	None
TC4-30	No	--	None	--	None
TC5-7	No	--	None	--	None
TC5-12	No	--	None	--	None
TC5-21	No	--	None	--	None
TC5-28	No	--	None	--	None
TC5-33	No	--	None	--	None

Thermocouple	Extension	Extension Type	Initial Data Quality Issues	Extension Status	Current Quality Issues
TC6-12	No	--	None	--	None
TC6-22	No	--	None	--	None
TC6-25	Yes	Type T	None	In place	None
TC6-29	Yes	Type K, from Phase 1 of Balefill Area project	High variability with diurnal temperature trends	Removed prior to Six Day Test	None
TC6-36	No	--	None	--	None
TC7-8	Yes	Type T	None	In place	None
TC7-17	Yes	Type T	None	In place	None
TC7-23	No	--	None	--	None
TC7-26	No	--	None	--	None
TC7-29	No	--	None	--	None
TC7-33	No	--	None	--	None
TC8-13	No	--	None	--	None
TC8-17	Yes	Type T	None	In place	None
TC8-26	No	--	None	--	None
TC8-29	No	--	None	--	None
TC8-32	No	--	None	--	None
TC8-37	No	--	None	--	None
TC9-19	No	--	None	--	None
TC9-25	No	--	None	--	None
TC9-29	No	--	None	--	None
TC9-34	No	--	None	--	None
TC9-39	No	--	None	--	None

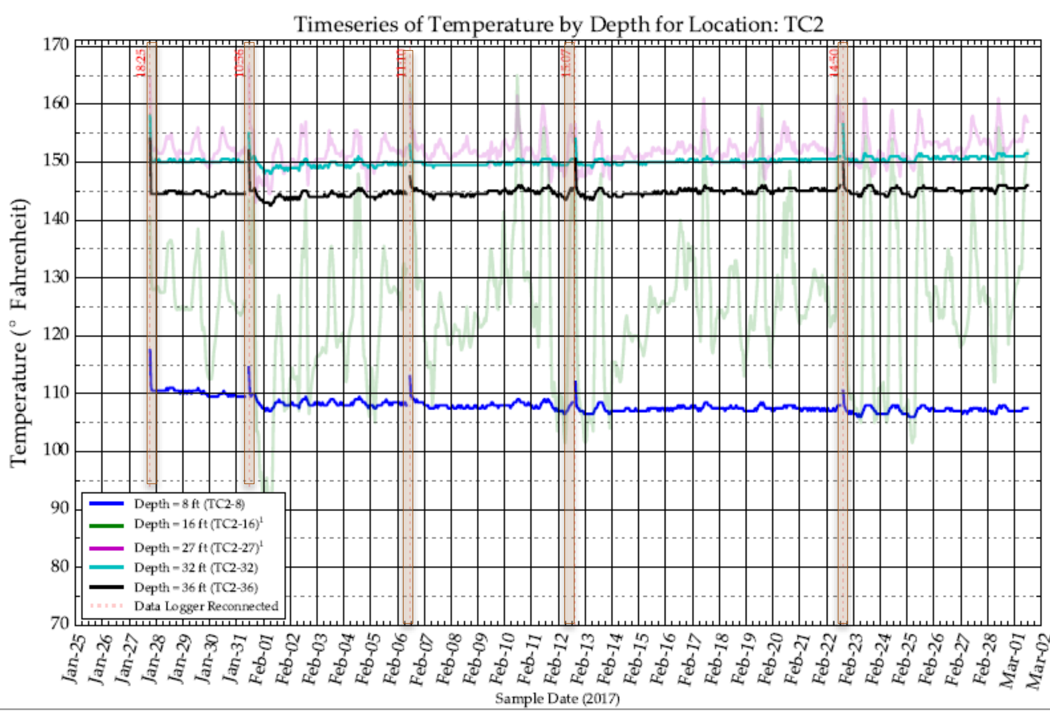
3. **Dataloggers Programmed to Read Type K Thermocouples.** While the Balefill temperature monitoring project used Type K thermocouples, Type T thermocouples were specified for this project due to their higher accuracy and acceptable upper range. However, the dataloggers were also from the Balefill temperature monitoring project but were not reprogrammed to read Type T thermocouples. The manufacturer said this problem was small and would introduce a 1/42 or 2.3% error. To confirm that the data collected before this problem was identified were sound, a “Six Day” test was performed to compare three days of “Type K” datalogger programming to three days of “Type T” datalogger programming. The results, shown in Table D.2, confirm the error is very small, and suggest the data collected during the main test was likely 1 ºF too high.

Table D.2. *Results of Six Day Test. The maximum error was 2.4 ºF overestimate at temperature at the warmest location; the average error was only 0.8% or 1.2 ºF.*

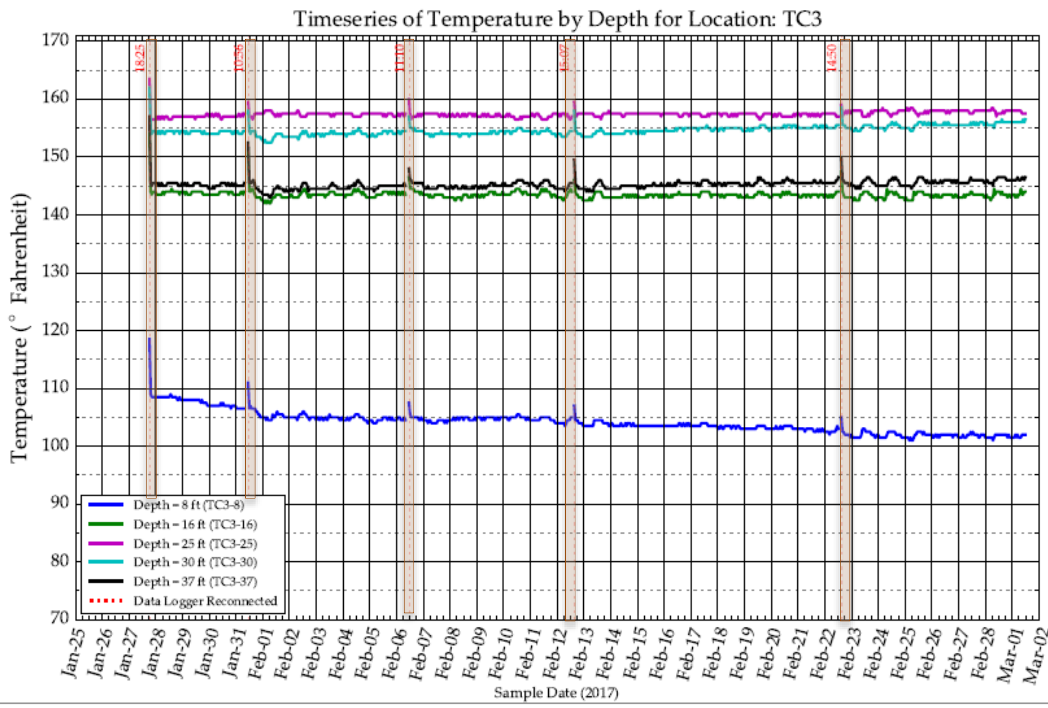
Location	Depth (ft bgs)	Original Data Logger Programming (First Three Days) (ºF)			Correct Data Logger Programming Last Three Days) (ºF)			(Original - Correct) ÷ Correct Programming (%)	Original - Correct Programming (ºF)
		Min	*Max*	*Average*	*Min*	*Max*	*Average*		
TC-1	7	88	89	88	88	89	89	-0.2%	-0.2
	14	126	127	126	125	126	125	0.8%	1.0
	24	154	155	155	152	153	152	1.6%	2.4
	29	153	154	153	150	152	151	1.6%	2.4
	35	148	149	148	146	147	146	1.4%	2.0
TC-2	8	107	108	107	107	108	107	0.3%	0.3
	16	--	--	--	--	--	--		
	27	155	156	155	152	154	153	1.5%	2.3
	32	152	153	153	150	151	150	1.4%	2.1
	36	146	147	146	144	145	145	1.2%	1.8
TC-3	8	100	101	100	100	101	100	0.0%	0.0
	16	143	144	143	141	142	141	1.3%	1.8
	25	158	**160**	159	156	158	157	1.5%	2.3
	30	157	158	158	155	156	155	1.5%	2.4
	37	147	148	147	145	146	145	1.3%	1.9
TC-4	9	89	91	90	89	91	90	0.1%	0.1
	14	108	109	108	107	108	108	0.5%	0.5
	19	120	121	120	119	120	120	0.7%	0.8
	24	123	124	124	122	123	123	0.7%	0.9
	30	121	123	122	120	122	121	0.8%	1.0
TC-5	7	95	96	96	95	96	96	0.1%	0.1
	12	125	126	125	124	125	124	0.9%	1.1
	21	142	143	142	140	141	141	1.1%	1.5
	28	148	149	149	146	148	147	1.4%	2.0
	33	150	150	150	148	148	148	1.3%	1.9
TC-6	12	104	106	105	103	106	105	0.4%	0.4
	22	144	146	145	143	144	143	1.2%	1.7
	25	152	153	152	150	150	150	1.3%	2.0
	29	154	155	154	152	153	152	1.3%	2.0
	36	143	144	143	142	143	142	1.1%	1.5
TC-7	8	76	80	77	76	81	78	-1.0%	-0.8
	17	104	105	104	104	105	104	0.4%	0.4
	23	120	122	121	119	121	120	0.7%	0.9
	26	127	128	128	126	127	127	0.8%	1.0
	29	131	132	132	130	131	130	0.9%	1.2
	33	135	136	135	134	135	134	0.8%	1.1
TC-8	13	99	101	100	99	100	100	0.3%	0.3
	17	114	115	114	114	115	114	0.4%	0.5
	26	138	139	139	137	138	137	1.1%	1.5
	29	140	141	141	138	140	139	1.2%	1.6
	32	140	141	141	138	140	139	1.1%	1.5
	37	136	137	137	135	136	135	1.0%	1.3
TC-9	19	108	109	108	107	108	108	0.5%	0.5
	25	115	116	115	114	115	115	0.6%	0.7
	29	121	122	122	121	122	121	0.6%	0.7
	34	128	129	129	127	128	128	0.8%	1.0
	39	125	126	126	124	125	125	0.7%	0.9
							Average	***0.8%***	***1.2***



Notes:
1. Recorded values when data loggers were not connected to thermocouples are not shown on the plot.
2. The small, periodic uptick in temperature occurs at the time that a datalogger is reconnected to a thermocouple and does not represent a valid temperature measurement.



Notes:
1. Data shown as transparent lines due to non-valid measurements as a result of Type K extensions.
2. Recorded values when data loggers were not connected to thermocouples are not shown on the plot.
3. The small, periodic uptick in temperature occurs at the time that a datalogger is reconnected to a thermocouple and does not represent a valid temperature measurement.



Notes:
1. Recorded values when data loggers were not connected to thermocouples are not shown on the plot.
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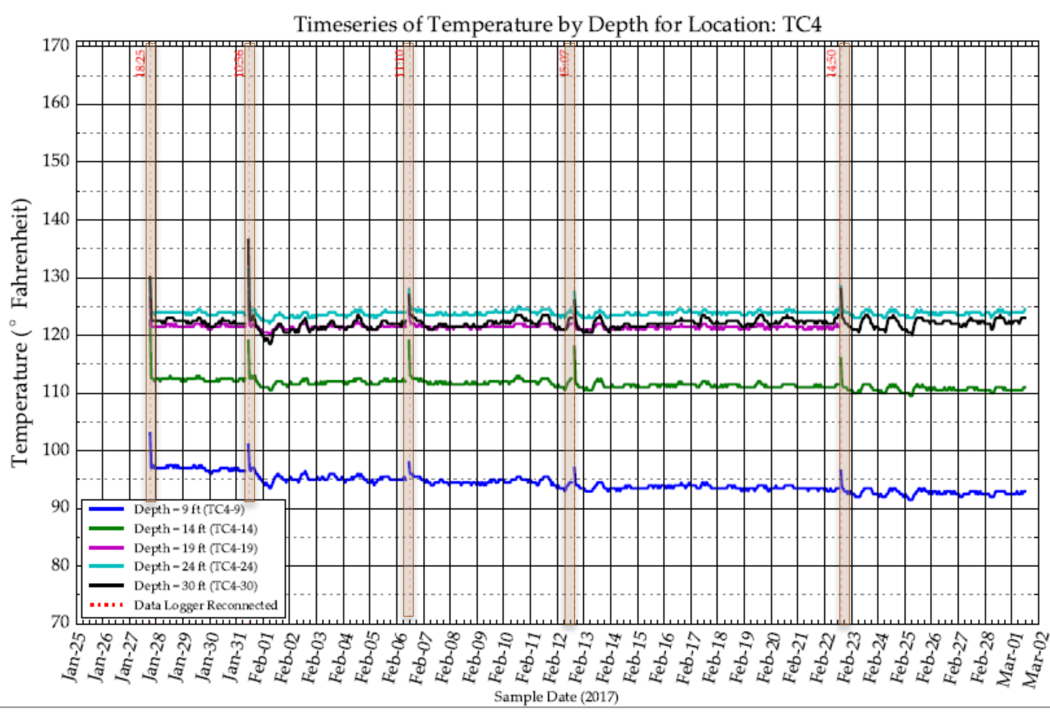

Notes:
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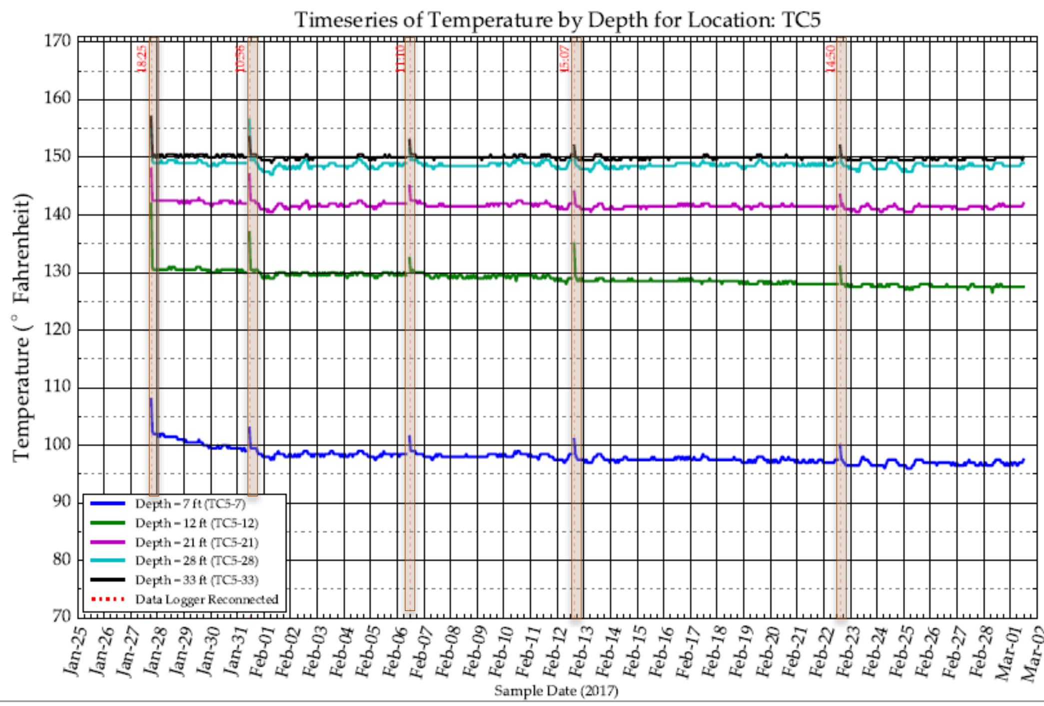

Notes:
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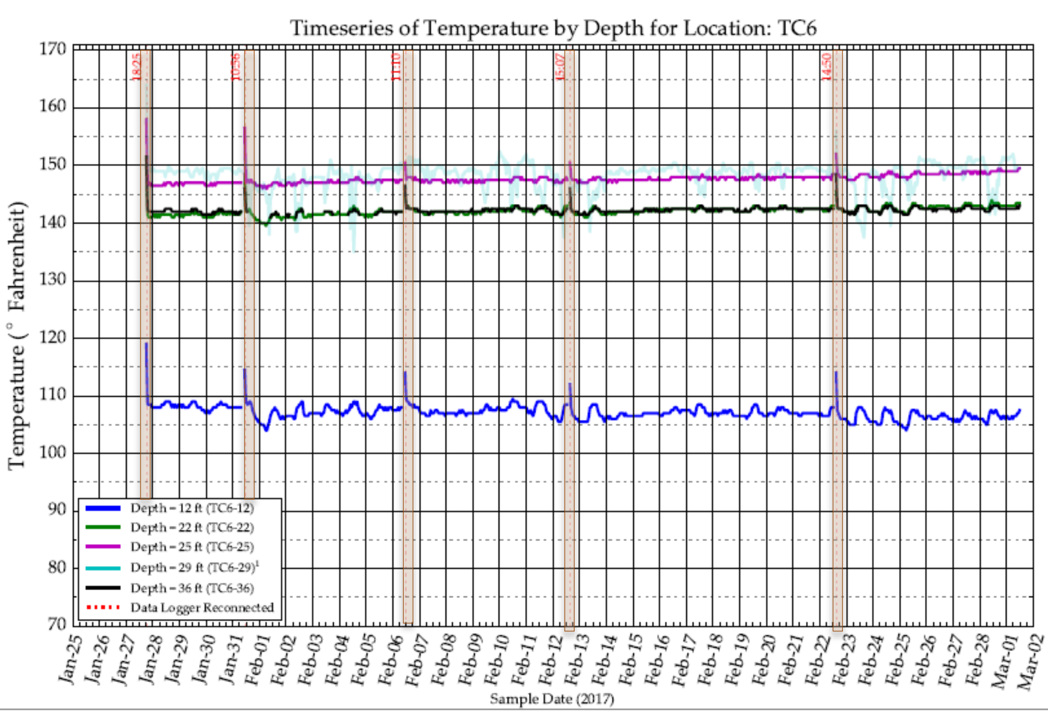
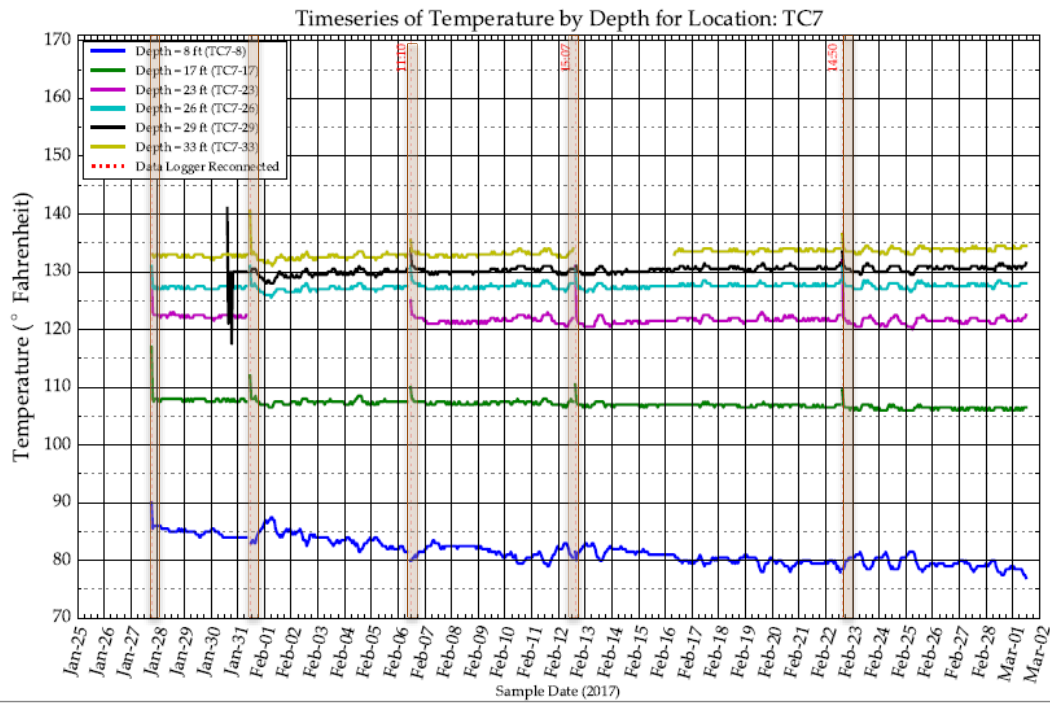
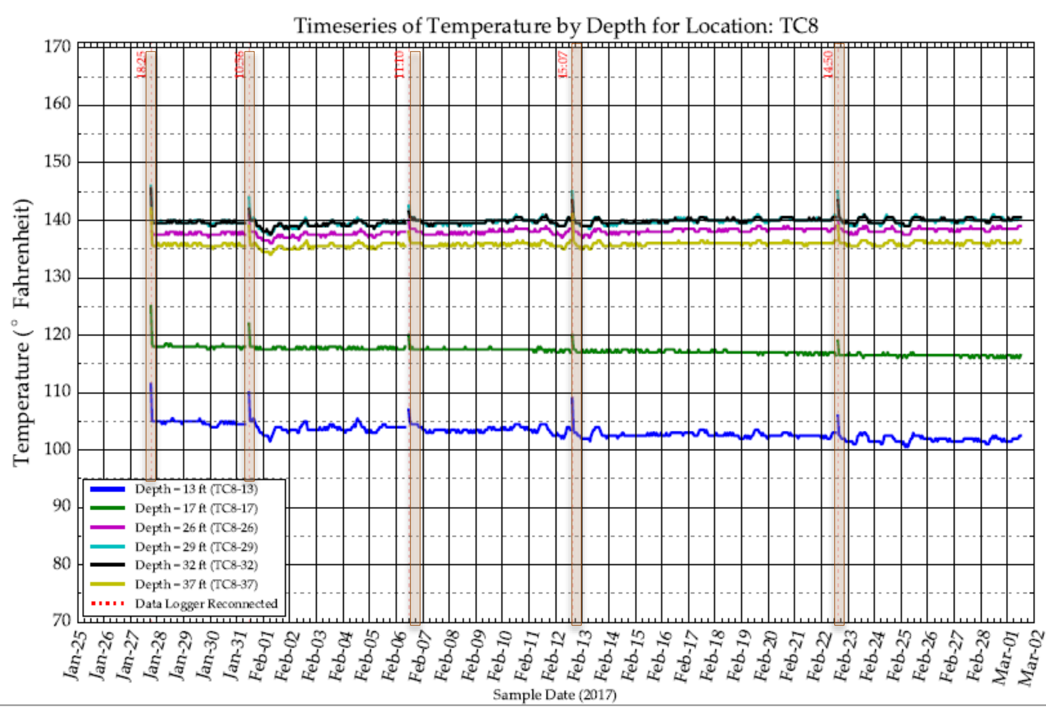


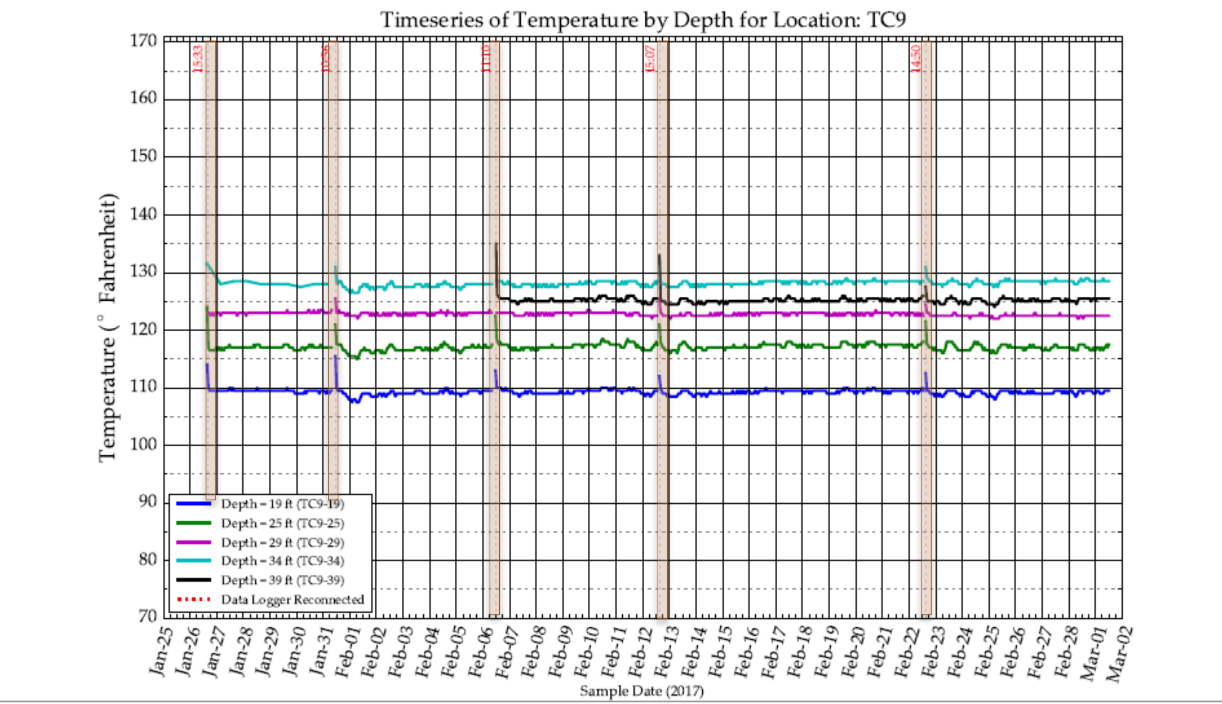
Notes:
1. Data shown as transparent lines due to non-valid measurements as a result of Type K extensions.
2. Recorded values when data loggers were not connected to thermocouples are not shown on the plot.
3. The small, periodic uptick in temperature occurs at the time that a datalogger is reconnected to a thermocouple and does not represent a valid temperature measurement.



Notes:
1. Recorded values when data loggers were not connected to thermocouples are not shown on the plot.
2. The small, periodic uptick in temperature occurs at the time that a datalogger is reconnected to a thermocouple and does not represent a valid temperature measurement.



Notes:
1. Recorded values when data loggers were not connected to thermocouples are not shown on the plot.
2. The small, periodic uptick in temperature occurs at the time that a datalogger is reconnected to a thermocouple and does not represent a valid temperature measurement.



Notes:
1. Recorded values when data loggers were not connected to thermocouples are not shown on the plot.
2. The small, periodic uptick in temperature occurs at the time that a datalogger is reconnected to a thermocouple and does not represent a valid temperature measurement.

April 24, 2017

ZONE A COMBUSTION EVALUATION REPORT
PASCO SANITARY LANDFILL

Pasco Sanitary Landfill
Pasco, WA

Appendices

Appendix E: Carbon Dioxide – Oxygen Ratios Stoichiometry

APPENDIX E. CARBON DIOXIDE – OXYGEN RATIOS STOICHIOMETRY

Complete combustion/oxidation of a fuel (e.g., hydrocarbon) in the presence of air (i.e., O_2) results in water (H_2O) and CO_2. The relationship between the O_2 consumed and CO_2 generated during the combustion/oxidation of a fuel, assuming steady state conditions and no biomass accumulation, can therefore, represent the typical behavior of that particular fuel during the combustion/oxidation process. This CO_2 to O_2 relationship can be determined by 1) first, stoichiometrically balancing the process, 2) then, calculating the slope of the CO_2 generated to the O_2 consumed, and 3) finally, estimating the regression line representing the combustion/oxidation process.

Generating regression lines representing the combustion/oxidation processes for various fuels can assist in determining which fuel the observed conditions at a particular site are more representative of. For Zone A, the fuels of interest include toluene, methane, 2-butanone, municipal solid waste (MSW), paper, and wood. Development of the combustion/oxidation regression line for each of these fuels is described below.

<u>Toluene</u>

The stoichiometric relation for the complete oxidation/combustion of toluene (C_7H_8) is:

$C_7H_8 + 9O_2 \rightarrow 7CO_2 + 4H_2O$ (1)

Based on Equation 1, slope of the CO_2/O_2 relationship for toluene is -7/9[1]. That is, every mole of C_7H_8 that is oxidized/combusted requires 9 moles of O_2 and generates 7 moles of CO_2 and 4 moles of water. Because moles are directly proportional to concentration (i.e., concentration = moles per volume), concentration data can be used to estimate the regression line based on the slope calculated above. Therefore, as shown on Figure 7.1, the toluene regression line extends from x = 20.9% and y = 0 to x = 0 and y = 16.3%[2].

<u>Methane</u>

For methane (CH_4), the stoichiometric relation for complete oxidation/combustion is:

$CH_4 + 2O_2 \rightarrow CO_2 + 2H_2O$ (2)

This yields a CO_2/O_2 slope for methane of -½ and a regression line that extends from x = 20.9% and y = 0 to x = 0 and y = 10.5% (Figure 7.1).

<u>2-Butanone</u>

For 2-butanone (C_4H_8O), the stoichiometric relation for the oxidation/combustion is:

$C_4H_8O + 5.5O_2 \rightarrow 4CO_2 + 4H_2O$ (3)

[1] The minus sign signifies decreasing O_2 content with increasing CO_2 content and vice versa.
[2] The y-intercept is calculated using the equation for a straight line: $y = mx+c$, where y = y-value, m = slope, x = x-value, and c = y-intercept. Rearranging the equation for c gives, $c = y-mx$. For toluene, m = -7/9. Therefore, when x = 20.92% (on a mole basis, air can be considered as comprised of ~20.92% O_2 and ~79.08% nitrogen) and y =0% then c = 16.27%.

The CO_2/O_2 slope for 2-butanone is -4/5.5 giving a regression line that extends from x = 20.9% and y = 0 to x = 0 and y = 15.21% (Figure 7.1).

Municipal Solid Waste

Assuming that the MSW in Zone A is a mix of organic waste, then the formula $C_6H_{10}O_4$ (Themelis et al., 2002) can be used to approximate it. Consequently, the stoichiometric relation for complete combustion/oxidation is:

$C_6H_{10}O_4 + 6.5O_2 \rightarrow 6CO_2 + 5H_2O$ (4)

This yields a CO_2/O_2 slope for MSW of -6/6.5 and a regression line that extends from x = 20.9% and y = 0 to x = 0 and y = 19.3% (Figure 7.1).

Paper

The formula $C_6H_{10}O_5$ can be used to represent paper assuming that it is comprised mainly of cellulose. Therefore, the stoichiometric relation for complete combustion/oxidation is:

$C_6H_{10}O_5 + 6O_2 \rightarrow 6CO_2 + 5H_2O$ (5)

This yields a CO_2/O_2 slope for paper of -1 and a regression line that extends from x = 20.9% and y = 0 to x = 0 and y = 20.9% (Figure 7.1).

Wood

Assuming that the wood buried in Zone A can be expressed as lignin using the formula $C_{31}H_{34}O_{11}$, the stoichiometric relation for complete combustion/oxidation is:

$C_{31}H_{34}O_{11} + 34O_2 \rightarrow 31CO_2 + 17H_2O$ (6)

For wood, the CO_2/O_2 slope is -31/34, giving a regression line that extends from x = 20.9% and y = 0 to x = 0 and y = 19.1%.

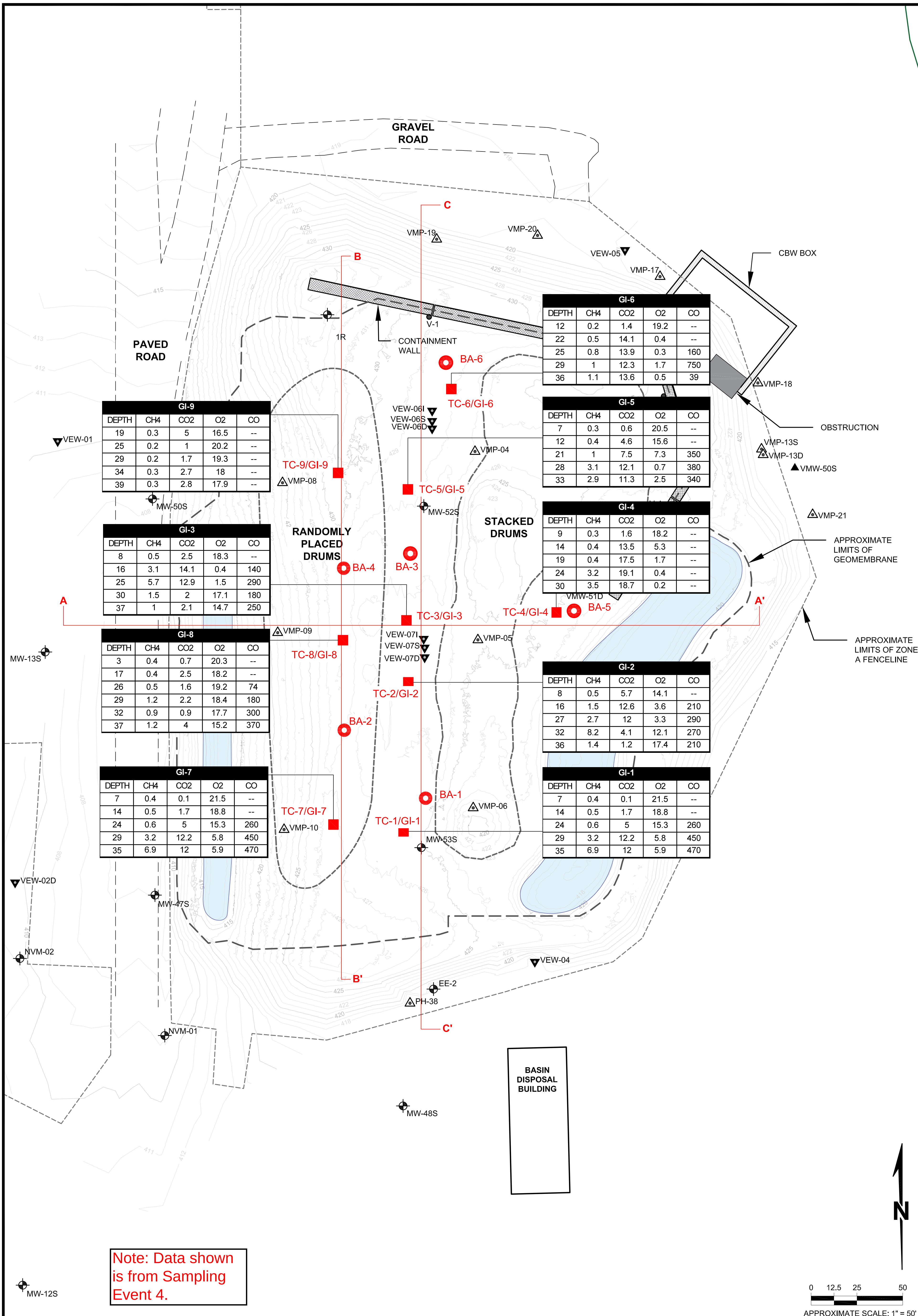
April 24, 2017

ZONE A COMBUSTION EVALUATION REPORT
PASCO SANITARY LANDFILL

Pasco Sanitary Landfill
Pasco, WA

Appendices

Appendix F: Soil Gas Analytical Data



GI-6

DEPTH	CH4	CO2	O2	CO
12	0.2	1.4	19.2	--
22	0.5	14.1	0.4	--
25	0.8	13.9	0.3	160
29	1	12.3	1.7	750
36	1.1	13.6	0.5	39

GI-9

DEPTH	CH4	CO2	O2	CO
19	0.3	5	16.5	--
25	0.2	1	20.2	--
29	0.2	1.7	19.3	--
34	0.3	2.7	18	--
39	0.3	2.8	17.9	--

GI-5

DEPTH	CH4	CO2	O2	CO
7	0.3	0.6	20.5	--
12	0.4	4.6	15.6	--
21	1	7.5	7.3	350
28	3.1	12.1	0.7	380
33	2.9	11.3	2.5	340

GI-3

DEPTH	CH4	CO2	O2	CO
8	0.5	2.5	18.3	--
16	3.1	14.1	0.4	140
25	5.7	12.9	1.5	290
30	1.5	2	17.1	180
37	1	2.1	14.7	250

GI-4

DEPTH	CH4	CO2	O2	CO
9	0.3	1.6	18.2	--
14	0.4	13.5	5.3	--
19	0.4	17.5	1.7	--
24	3.2	19.1	0.4	--
30	3.5	18.7	0.2	--

GI-8

DEPTH	CH4	CO2	O2	CO
3	0.4	0.7	20.3	--
17	0.4	2.5	18.2	--
26	0.5	1.6	19.2	74
29	1.2	2.2	18.4	180
32	0.9	0.9	17.7	300
37	1.2	4	15.2	370

GI-2

DEPTH	CH4	CO2	O2	CO
8	0.5	5.7	14.1	--
16	1.5	12.6	3.6	210
27	2.7	12	3.3	290
32	8.2	4.1	12.1	270
36	1.4	1.2	17.4	210

GI-7

DEPTH	CH4	CO2	O2	CO
7	0.4	0.1	21.5	--
14	0.5	1.7	18.8	--
24	0.6	5	15.3	260
29	3.2	12.2	5.8	450
35	6.9	12	5.9	470

GI-1

DEPTH	CH4	CO2	O2	CO
7	0.4	0.1	21.5	--
14	0.5	1.7	18.8	--
24	0.6	5	15.3	260
29	3.2	12.2	5.8	450
35	6.9	12	5.9	470

Note: Data shown is from Sampling Event 4.

NOTES

- EB-1 — EXPLORATORY BORING LOCATION
- MW-53S — MONITORING WELL LOCATION
- VMP-17 — VACUUM MONITORING PROBE LOCATION
- TC-1/GI-1 — THERMOCOUPLE AND GAS MONITORING LOCATIONS
- BA-1 — BUCKET-AUGER BORINGS

A — A' CROSS SECTION LOCATION

- CH4 — METHANE (PERCENTAGE)
- CO2 — CARBON DIOXIDE (PERCENTAGE)
- O2 — OXYGEN (PERCENTAGE)
- CO — LAB CARBON MONOXIDE (PARTS PER MILLION)
- -- — <100 BY METER

ENVIRONMENTAL PARTNERS INC

THERMOCOUPLE/GAS MONITORING AND BUCKET-AUGER BORING LOCATIONS

PROJECT	03916.0
PREPARED FOR	IWAG GROUP III PASCO LANDFILL
LOCATION	1901 DIETRICH ROAD PASCO, WASHINGTON

FIGURE	DRAWN BY	REVIEWED BY	DATE
3.1	VPB	ARM	4/20/17

Table F.1

Soil Gas Analytical Data

Sampling Location	Sample Date	Field Data CH_4 (%)	CO_2 (%)	O_2 (%)	CO_2/O_2 (-)	CO (ppmV)	LEL (%)	PID (ppm)	Laboratory CO ppmV	Hydrogen ppmV	Nitrogen ppmV	Temperature Min °F	Max °F
Sampling Event 1													
GI1-7	2/8/2017	0.9	0.2	22.7	0.0	17	18	605				90	92
GI1-14	2/8/2017						0	0				129.5	130.5
GI1-24	2/8/2017	0.6	11.4	8.9	1.3	886	12	4016	11	<1,000	779,000	153	156
GI1-29	2/8/2017	2.2	13.6	4.4	3.1	693	44	3123	11	<1,000	779,000	151	153.5
GI1-35	2/8/2017	1.9	12.6	6.2	2.0	731	38	3807	93	<1,000	785,000	144.5	147.5
GI2-8	2/8/2017	0.3	7.4	12.4	0.6	3	6	340				107	110
GI2-16	2/8/2017	1.1	13.4	1.8	7.4	372	22	2189	270	<1,000	850,000	85.5	148
GI2-27	2/8/2017	3.0	11.4	3.3	3.4	533	60	2156	400*	<1,000	85,500	143	157
GI2-32	2/8/2017	7.3	10.4	3.1	3.4	1277	100	2535	**930**	6,350	865,000	148	151
GI2-36	2/8/2017	2.5	3.6	14.2	0.3	726	50	2661	750	4,620	837,000	142.5	145.5
GI3-8	2/7/2017	0.8	3.3	17.8	0.2	48	16	0				104	107
GI3-16	2/7/2017	2.6	14.8	0.0		304	52	0	78	4,130	842,000	142	144.5
GI3-25	2/7/2017	5.2	14.3	0.0		493	100	0	250	3,890	849,000	156.5	158
GI3-30	2/7/2017	5.3	13.7	0.2	68.5	694	100	0	440	3,810	853,000	152.5	155
GI3-37	2/7/2017	3.3	13.2	0.3	44.0	865	66	0	580	2,990	860,000	143	146
GI4-9	2/7/2017	0.0	3.7	17.2	0.2	0	0	152				93.5	97
GI4-14	2/7/2017	0.0	1.4	20.5	0.1	0	0	107				110.5	113
GI4-19	2/7/2017	0.3	5.1	16.9	0.3	0	6	115				120	122.5
GI4-24	2/7/2017	1.2	6.3	16.1	0.4	6	24	276				122	124.5
GI4-30	2/7/2017	1.1	5.5	16.9	0.3	1	22	125				118.5	123.5
GI5-7	2/7/2017	0.5	1.0	21.2	0.0	11	10	0				97.5	99.5
GI5-12	2/7/2017	0.5	6.3	14.8	0.4	20	10	0				129	130.5
GI5-21	2/7/2017	2.4	13.3	0.0		349	48	0	250	3,820	856,000	140.5	142.5
GI5-28	2/7/2017	5.2	13.9	0.0		427	100	0	230	5,040	848,000	147	150
GI5-33	2/7/2017	4.6	14.0	0.0		403	92	0	210	4,040	848,000	149	150.5
GI6-12	2/7/2017	0.2	0.9	21.7	0.0	0	4	15				104	109
GI6-22	2/7/2017	0.8	14.3	0.0		59	16	396				139.5	143
GI6-25	2/7/2017	0.7	13.4	0.0		298	14	0	230	4,720	852,000	146	148
GI6-29	2/7/2017	1.2	12.8	0.5	25.6	849	24	0	700	3,420	860,000	135	151
GI6-36	2/7/2017	1.9	13.8	0.0		118	38	0	18	4,020	850,000	3.5	142.5
GI7-8	2/8/2017	0.7	1.3	20.7	0.1	0	14	0				81.5	87.5
GI7-17	2/8/2017	0.4	3.5	17.7	0.2	0	8	0				106.5	108.5
GI7-23	2/8/2017	0.4	5.1	14.6	0.3	64	8	0				6.5	46.5
GI7-26	2/8/2017	0.6	3.0	14.1	0.2	183	12	2810	80	<1,000	801,000	125.5	128
GI7-29	2/8/2017	0.9	6.4	12.5	0.5	487	18	2402	200	<1,000	797,000	128	131
GI7-33	2/8/2017	0.9	3.4	12.1	0.3	543	18	2036	250	<1,000	811,000	131	133.5
GI8-13	2/8/2017	0.3	1.0	20.7	0.0	0	6	334				101.5	105.5
GI8-17	2/8/2017						0	0				117.5	118
GI8-26	2/8/2017	0.5	2.4	18.2	0.1	164	10	1184	95	<1,000	791,000	136	138.5
GI8-29	2/8/2017	1.5	3.7	16.9	0.2	462	30	3365	57	<1,000	781,000	137.5	140.5
GI8-32	2/8/2017	0.9	1.8	17.8	0.1	419	18	1536	150	<1,000	788,000	137.5	140
GI8-37	2/8/2017	1.4	4.8	13.1	0.4	765	28	1595	380	<1,000	803,000	134	136.5
GI9-19	2/8/2017	0.3	5.2	15.9	0.3	3	6	897				107.5	110
GI9-25	2/8/2017	0.2	2.0	18.9	0.1	4	4	623				115	118
GI9-29	2/8/2017	0.2	2.0	18.5	0.1	16	4	596				122	123.5
GI9-34	2/8/2017	0.3	3.1	17.3	0.2	19	6	798				126.5	128.5
GI9-39	2/8/2017	0.3	3.3	17.4	0.2	22	6	926				2.5	47

	LEL	PID	CO	Hydrogen	Nitrogen	Min	Max
Average	27	888	266	4,238	794,604	118	127
Median	16	276	220	4,030	839,500	128	131
Min	0	0	11	2,990	85,500	3	47
Max	100	4016	930	6,350	865,000	157	158

Notes

* Sample collected on 2/8/17 was analyzed on 2/10/17 with concentration of 400 ppmv and on 2/27/17 with a concentration of 380 ppmv.

**Sample collected on 2/15/17 was analyzed on 2/16/17 with concentration of 5.2 ppmv and on 2/27/17 with a concentration of 5.4 ppmv.

1. CH4 Measurement may also include TNMO in vapor stream.
2. Temperature reported for the day sample was collected.
3. Samples associated with field issues are shown in gray.
4. Definitions:

CH_4 = Methane. CO = Carbon monoxide. CO_2 = Carbon dioxide. LEL = Lowest explosive limit.

O_2 = Oxygen. PID = Photoionization detector. ppmv = Parts per million volume.

Table F.1

Soil Gas Analytical Data

Sampling Location	Sample Date	Field Data CH_4 (%)	CO_2 (%)	O_2 (%)	CO_2/O_2 (-)	CO (ppmV)	LEL (%)	PID (ppm)	Laboratory CO ppmV	Hydrogen ppmV	Nitrogen ppmV	Temperature Min °F	Max °F
Sampling Event 2													
GI1-7	2/14/2017	0.3	0.2	21.3	0.0	0	6	341				89	91
GI1-14	2/14/2017	0.7	1.5	20.1	0.1	12	14	284				129.5	130.5
GI1-24	2/14/2017	0.7	8.9	11.4	0.8	783	14	287	<5.0	<1,000	778,000	154.5	156.5
GI1-29	2/14/2017	2.3	12.8	5.3	2.4	729	46	210	<5.0	<1,000	778,000	152	153.5
GI1-35	2/14/2017	3.6	12.4	5.7	2.2	830	72	296	25	<1,000	780,000	146	148
GI2-8	2/15/2017	0.3	5.7	15.8	0.4	0	6	318				106.5	109.5
GI2-16	2/15/2017	1.9	13.5	1.2	11.3	187	38	459				101.5	165
GI2-27	2/15/2017	3.5	13.7	0.3	45.7	159	70	264	5.2**	<1,000	778,000	146.5	161.5
GI2-32	2/15/2017	1.4	2.5	15	0.2	322	28	272				149	150.5
GI2-36	2/15/2017	0.6	0.5	19.9	0.0	252	12	257	14	<1,000	780,000	143.5	146
GI3-8	2/14/2017	0.5	2.7	19	0.1	0	10	427				103.5	105.5
GI3-16	2/14/2017	2.1	14.6	0.3	48.7	296	42	990	<5.0	<1,000	778,000	142.5	144.5
GI3-25	2/14/2017	4.5	15.2	0.3	50.7	661	90	264	<5.0	<1,000	779,000	156.5	157.5
GI3-30	2/14/2017	3.2	2.4	16.3	0.1	387	64	214	<5.0	<1,000	778,000	153.5	155
GI3-37	2/14/2017	1.1	1.8	11.7	0.2	652	22	170	<5.0	<1,000	778,000	144	146
GI4-9	2/14/2017	0.3	3.3	18.7	0.2	5	6	392				93	96
GI4-14	2/14/2017	0.5	16.5	2.7	6.1	7	10	305				110.5	113
GI4-19	2/14/2017	0.5	17.8	1.1	16.2	7	10	313				121	122
GI4-24	2/14/2017	4.2	20.2	0.1	202.0	26	84	391				123	125
GI4-30	2/14/2017	4.2	19.8	0.2	99.0	28	84	453				121	123.5
GI5-7	2/14/2017	0.5	0.8	21.1	0.0	0	10	578				97	99
GI5-12	2/14/2017	0.4	5.5	15.4	0.4	4	8	418				128	130.5
GI5-21	2/14/2017	1.5	13.3	0.3	44.3	365	30	3571	120	2,430	827,000	141	142.5
GI5-28	2/14/2017	3.6	12.9	0.2	64.5	530	72	3375	<5.0	<1,000	779,000	148	150
GI5-33	2/14/2017	4	13.6	0.3	45.3	239	80	699	<5.0	<1,000	778,000	149.5	150.5
GI6-12	2/14/2017	0.3	1.8	19.8	0.1	7	6	318				105.5	109.5
GI6-22	2/14/2017	0.6	14.1	0.3	47.0	66	12	1071				141	143
GI6-25	2/14/2017	0.7	14	0.4	35.0	354	14	1215	<5.0	<1,000	778,000	147	148
GI6-29	2/14/2017	1	13.3	0.7	19.0	757	20	639	280	1,300	802,000	142	152.5
GI6-36	2/14/2017	1.2	13.7	0.3	45.7	156	24	426	7.1	<1,000	781,000	141.5	143
GI7-8	2/15/2017	0.3	1.3	20.8	0.1	1	6	392				79	83.5
GI7-17	2/15/2017	0.3	3.4	18	0.2	3	6	320				106.5	108
GI7-23	2/15/2017	0.2	4.7	15.7	0.3	42	4	322				120.5	123
GI7-26	2/15/2017	0.7	2.8	15.3	0.2	209	14	434	39	<1,000	789,000	126.5	128.5
GI7-29	2/15/2017	1	6	13.1	0.5	523	20	435	57	<1,000	783,000	129.5	131
GI7-33	2/15/2017	0.4	0.3	21.1	0.0	121	8	298	<5.0	<1,000	778,000	132.5	134
GI8-13	2/15/2017	0.2	1	20.7	0.0	3	4	334				102	104.5
GI8-17	2/15/2017	0.2	2.6	18.5	0.1	4	4	558				117	118
GI8-26	2/15/2017	0.6	2	18.3	0.1	205	12	364	12	<1,000	782,000	137	139
GI8-29	2/15/2017	2.8	2.9	17.2	0.2	501	56	564	61	<1,000	781,000	139	141
GI8-32	2/15/2017	1	1	19.1	0.1	343	20	868	100	<1,000	785,000	139	141
GI8-37	2/15/2017	0.9	3.7	13.6	0.3	638	18	822	320	<1,000	803,000	135	136.5
GI9-19	2/14/2017	0.3	5.3	18.4	0.3	9	6	794				108.5	110
GI9-25	2/14/2017	0.2	1.5	20.6	0.1	10	4	743				116.5	118.5
GI9-29	2/14/2017	0.2	1.8	20.1	0.1	27	4	721				122	123.5
GI9-34	2/14/2017	0.3	3	18.8	0.2	31	6	665				36.5	128.5
GI9-39	2/14/2017	0.3	3	18.5	0.2	33	6	780				124.5	126

Notes

* Sample collected on 2/8/17 was analyzed on 2/10/17 with concentration of 400 ppmv and on 2/27/17 with a concentration of 380 ppmv.

**Sample collected on 2/15/17 was analyzed on 2/16/17 with concentration of 5.2 ppmv and on 2/27/17 with a concentration of 5.4 ppmv.

1. CH4 Measurement may also include TNMO in vapor stream.
2. Temperature reported for the day sample was collected.
3. Samples associated with field issues are shown in gray.
4. Definitions:

CH_4 = Methane. CO = Carbon monoxide. CO_2 = Carbon dioxide. LEL = Lowest explosive limit.

O_2 = Oxygen. PID = Photoionization detector. ppmv = Parts per million volume.

Table F.1
Soil Gas Analytical Data

Sampling Location	Sample Date	Field Data							Laboratory			Temperature	
		CH_4 (%)	CO_2 (%)	O_2 (%)	CO_2/O_2 (-)	CO (ppmV)	LEL (%)	PID (ppm)	CO ppmV	Hydrogen ppmV	Nitrogen ppmV	Min °F	Max °F
Sampling Event 3													
GI1-7	2/22/2017	0.4	0.2	20.9	0.0	0	8	1732				88.5	90.5
GI1-14	2/22/2017	0.3	3.1	16.7	0.2	0	6	1499				128.5	130
GI1-24	2/22/2017	0.6	5.6	14.5	0.4	562	12	1657	330	<1,000	791,000	154.5	156
GI1-29	2/22/2017	2.8	12.3	5.8	2.1	788	56	4954	440	<1,000	812,000	152	153.5
GI1-35	2/22/2017	5.7	12.2	5.7	2.1	865	100	6057	490	<1,000	812,000	146	148
GI2-8	2/21/2017	0.5	5.8	15.1	0.4	3	10	2415				106.5	108.5
GI2-16	2/21/2017	1.3	13.6	2.1	6.5	323	26	4801	180	<1,000	843,000	101.5	160
GI2-27	2/21/2017	2.9	12.4	2.0	6.2	542	58	9999	300	<1,000	845,000	147	161.5
GI2-32	2/21/2017	3.4	4.3	11.4	0.4	495	68	7845	290	1,860	832,000	149	151
GI2-36	2/21/2017	1.9	1.3	17.4	0.1	425	38	4761	190	1,950	798,000	143.5	146
GI3-8	2/22/2017	0.4	0.4	20.8	0.0	0	8	2950				102	104.5
GI3-16	2/22/2017	2.6	14.4	0.3	48.0	516	52	5003	120	4,210	842,000	142.5	144
GI3-25	2/22/2017	3.2	13.7	0.3	45.7	661	64	4771	270	3,320	847,000	156.5	158
GI3-30	2/22/2017	1.7	2.8	14.4	0.2	473	34	4721	230	1,480	813,000	153.5	155.5
GI3-37	2/22/2017	1.2	3.7	10.8	0.3	715	24	3960	340	1,330	826,000	144	146.5
GI4-9	2/22/2017	0.3	1.5	20.3	0.1	0	6	886				93	94.5
GI4-14	2/22/2017	0.4	14.2	6.2	2.3	1	8	712				110.5	112.5
GI4-19	2/22/2017	0.4	17.3	2.3	7.5	3	8	554				120.5	122
GI4-24	2/22/2017	2.7	19.0	1.1	17.3	20	54	683				123	124.5
GI4-30	2/22/2017	2.9	18.9	0.5	37.8	36	58	761				120.5	123.5
GI5-7	2/22/2017	0.3	0.8	19.9	0.0	1	6	1941				97	98.5
GI5-12	2/22/2017	0.3	4.6	15.5	0.3	4	6	1669				128	129
GI5-21	2/22/2017	1.3	8.4	5.7	1.5	409	26	3386	240	2,190	842,000	140.5	142
GI5-28	2/22/2017	3.0	13.0	0.3	43.3	602	60	4432	230	4,540	850,000	147.5	149.5
GI5-33	2/22/2017	2.6	13.2	0.3	44.0	567	52	4548	220	3,500	849,000	149.5	150.5
GI6-12	2/22/2017	0.3	1.3	19.5	0.1	3	6	411				105.5	108.5
GI6-22	2/22/2017	0.5	13.9	0.4	34.8	72	10	3249				141	143
GI6-25	2/22/2017	0.8	13.5	0.4	33.8	387	16	3611	160	3,910	844,000	147	148.5
GI6-29	2/22/2017	1.0	12.3	1.6	7.7	1146	20	3521	**780**	2,430	846,000	138.5	150.5
GI6-36	2/22/2017	0.9	13.4	0.5	26.8	207	18	3953	42	3,290	849,000	141.5	143
GI7-8	2/21/2017	0.4	1.5	20.4	0.1	0	8	0				78	83
GI7-17	2/21/2017	0.3	3.5	17.6	0.2	1	6	192				106.5	107.5
GI7-23	2/21/2017	0.3	4.8	15.1	0.3	52	6	543				120.5	123
GI7-26	2/21/2017	0.5	2.9	14.8	0.2	167	10	1139	120	<1,000	818,000	126.5	128.5
GI7-29	2/21/2017	0.8	5.8	12.7	0.5	477	16	2844	340	<1,000	812,000	129.5	131.5
GI7-33	2/21/2017	0.9	3.1	14.2	0.2	449	18	2262	270	<1,000	815,000	21	134
GI8-13	2/21/2017	0.3	0.7	21.4	0.0	3	6	919					
GI8-17	2/21/2017	0.3	2.6	18.8	0.1	10	6	562				116.5	117.5
GI8-26	2/21/2017	0.5	1.9	19.4	0.1	130	10	1329	81	<1,000	786,000	137	139
GI8-29	2/21/2017	0.9	2.8	18.6	0.2	271	18	3797	200	<1,000	787,000	138.5	141
GI8-32	2/21/2017	1.0	1.2	18.0	0.1	423	20	3910	300	<1,000	805,000	139	140.5
GI8-37	2/21/2017	1.2	4.7	14.5	0.3	633	24	4186	400	<1,000	804,000	135	136.5
GI9-19	2/22/2017	0.3	5.3	16.0	0.3	3	6	377				108.5	110
GI9-25	2/22/2017	0.3	1.5	19.6	0.1	8	6	309				116	118
GI9-29	2/22/2017	0.3	1.8	19.1	0.1	19	6	382				122	123.5
GI9-34	2/22/2017	0.3	2.7	18.1	0.1	20	6	525				127.5	129
GI9-39	2/22/2017	0.3	2.9	18.2	0.2	21	6	687				129.5	131.5
	Average	1.2	6.8	11.7	7.9	266	23	2668	273	2,834	823,667	125	131
	Median	0.6	4.6	14.5	0.3	130	12	2262	255	2,860	822,000	129	133
	Min	0.3	0.2	0.3	0.0	0	6	0	42	1,330	786,000	21	83
	Max	5.7	19.0	21.4	48.0	1146	100	9999	780	4,540	850,000	157	162

Notes

* Sample collected on 2/8/17 was analyzed on 2/10/17 with concentration of 400 ppmv and on 2/27/17 with a concentration of 380 ppmv.

**Sample collected on 2/15/17 was analyzed on 2/16/17 with concentration of 5.2 ppmv and on 2/27/17 with a concentration of 5.4 ppmv.

1. CH4 Measurement may also include TNMO in vapor stream.
2. Temperature reported for the day sample was collected.
3. Samples associated with field issues are shown in gray.
4. Definitions:

CH_4 = Methane. CO = Carbon monoxide. CO_2 = Carbon dioxide. LEL = Lowest explosive limit.
O_2 = Oxygen. PID = Photoionization detector. ppmv = Parts per million volume.

Table F.1
Soil Gas Analytical Data

Sampling Location	Sample Date	Field Data CH_4 (%)	CO_2 (%)	O_2 (%)	CO_2/O_2 (-)	CO (ppmV)	LEL (%)	PID (ppm)	Laboratory CO ppmV	Hydrogen ppmV	Nitrogen ppmV	Temperature Min °F	Max °F
Sampling Event 4													
GI1-7	2/28/2017	0.4	0.1	21.5	0.0	2	8	2176				87.5	89.5
GI1-14	2/28/2017	0.5	1.7	18.8	0.1	3	10	1905				128	129
GI1-24	2/28/2017	0.6	5	15.3	0.3	492	12	1793	260	<1,000	790,000	154	156
GI1-29	2/28/2017	3.2	12.2	5.8	2.1	850	64	4528	450	<1,000	812,000	152	153.5
GI1-35	2/28/2017	6.9	12	5.9	2.0	923	100	4166	470	<1,000	812,000	146	148
GI2-8	3/1/2017	0.5	5.7	14.1	0.4	10	10	1632				106	108
GI2-16	3/1/2017	1.5	12.6	3.6	3.5	371	30	4332	210	<1,000	834,000	101.5	156
GI2-27	3/1/2017	2.7	12	3.3	3.6	507	54	4963	290	<1,000	841,000	147.5	161
GI2-32	3/1/2017	8.2	4.1	12.1	0.3	444	100	4502	270	1,550	826,000	150	151.5
GI2-36	3/1/2017	1.4	1.2	17.4	0.1	401	28	4262	210	1,720	800,000	144	146
GI3-8	2/28/2017	0.5	2.5	18.3	0.1	0	10	1603				101	103
GI3-16	2/28/2017	3.1	14.1	0.4	35.3	619	62	4565	140	4,000	841,000	142.5	144.5
GI3-25	2/28/2017	5.7	12.9	1.5	8.6	720	100	4345	290	2,860	847,000	157	158.5
GI3-30	2/28/2017	1.5	2	17.1	0.1	362	30	4286	180	1,280	804,000	154.5	156.5
GI3-37	2/28/2017	1	2.1	14.7	0.1	572	20	3551	250	1,210	814,000	144.5	146.5
GI4-9	2/28/2017	0.3	1.6	18.2	0.1	0	6	2491				91.5	93.5
GI4-14	2/28/2017	0.4	13.5	5.3	2.5	1	8	1992				109.5	111.5
GI4-19	2/28/2017	0.4	17.5	1.7	10.3	1	8	1572				31	103.5
GI4-24	2/28/2017	3.2	19.1	0.4	47.8	27	64	807				123	124.5
GI4-30	2/28/2017	3.5	18.7	0.2	93.5	38	70	1022				120	123.5
GI5-7	2/28/2017	0.3	0.6	20.5	0.0	0	6	1428				96	98
GI5-12	2/28/2017	0.4	4.6	15.6	0.3	3	8	1409				126.5	128
GI5-21	2/28/2017	1	7.5	7.3	1.0	563	20	3571	350	1,930	844,000	140.5	142
GI5-28	2/28/2017	3.1	12.1	0.7	17.3	896	62	4515	380	4,080	857,000	147.5	149.5
GI5-33	2/28/2017	2.9	11.3	2.5	4.5	744	58	4621	340	3,520	854,000	149.5	150
GI6-12	2/28/2017	0.2	1.4	19.2	0.1	4	4	496				104	108
GI6-22	2/28/2017	0.5	14.1	0.4	35.3	87	10	2671				141.5	144
GI6-25	2/28/2017	0.8	13.9	0.3	46.3	507	16	3103	160	4,010	840,000	147.5	149.5
GI6-29	2/28/2017	1	12.3	1.7	7.2	1231	20	3222	**750**	2,420	846,000	137.5	152
GI6-36	2/28/2017	1.1	13.6	0.5	27.2	284	22	3485	39	3,320	845,000	141.5	143
GI7-8	3/1/2017	0.3	1.3	19.8	0.1	0	6	865				77.5	81.5
GI7-17	3/1/2017	0.3	3.5	17	0.2	0	6	757				106	107
GI7-23	3/1/2017	0.3	4.5	15.4	0.3	37	6	1065				120	122.5
GI7-26	3/1/2017	0.6	2.9	15.1	0.2	147	12	1874	120	<1,000	810,000	126.5	128.5
GI7-29	3/1/2017	1	5.6	13.6	0.4	387	20	3149	300	<1,000	801,000	129.5	131.5
GI7-33	3/1/2017	0.8	3.4	13.1	0.3	418	16	2269	300	<1,000	824,000	133	134.5
GI8-13	3/1/2017	0.4	0.7	20.3	0.0	5	8	785				100.5	103
GI8-17	3/1/2017	0.4	2.5	18.2	0.1	6	8	653				116	117
GI8-26	3/1/2017	0.5	1.6	19.2	0.1	99	10	1525	74	<1,000	784,000	137.5	139
GI8-29	3/1/2017	1.2	2.2	18.4	0.1	237	24	3538	180	<1,000	787,000	139	141
GI8-32	3/1/2017	0.9	0.9	17.7	0.1	387	18	3149	300	<1,000	806,000	139	141
GI8-37	3/1/2017	1.2	4	15.2	0.3	560	24	4159	370	<1,000	801,000	135.5	136.5
GI9-19	2/28/2017	0.3	5	16.5	0.3	6	6	1215				108	109.5
GI9-25	2/28/2017	0.2	1	20.2	0.0	8	4	923				116	118
GI9-29	2/28/2017	0.2	1.7	19.3	0.1	23	4	900				122	123
GI9-34	2/28/2017	0.3	2.7	18	0.2	24	6	1068				127.5	129
GI9-39	2/28/2017	0.3	2.8	17.9	0.2	25	6	1070				124	126
	Average	**1.4**	**6.6**	**11.9**	**7.5**	**277**	**26**	**2510**	**278**	**2,658**	**821,667**	**125**	**130**
	Median	**0.6**	**4.1**	**15.2**	**0.3**	**99**	**12**	**2176**	**280**	**2,640**	**819,000**	**128**	**132**
	Min	**0.2**	**0.1**	**0.2**	**0.0**	**0**	**4**	**496**	**39**	**1,210**	**784,000**	**31**	**82**
	Max	**8.2**	**19.1**	**21.5**	**93.5**	**1231**	**100**	**4963**	**750**	**4,080**	**857,000**	**157**	**161**

Notes

* Sample collected on 2/8/17 was analyzed on 2/10/17 with concentration of 400 ppmv and on 2/27/17 with a concentration of 380 ppmv.

**Sample collected on 2/15/17 was analyzed on 2/16/17 with concentration of 5.2 ppmv and on 2/27/17 with a concentration of 5.4 ppmv.

1. CH4 Measurement may also include TNMO in vapor stream.
2. Temperature reported for the day sample was collected.
3. Samples associated with field issues are shown in gray.
4. Definitions:

CH_4 = Methane. CO = Carbon monoxide. CO_2 = Carbon dioxide. LEL = Lowest explosive limit.

O_2 = Oxygen. PID = Photoionization detector. ppmv = Parts per million volume.

Table F.1
Soil Gas Analytical Data

Sampling Location	Average Sample Date	Average Field Data CH_4 (%)	CO_2 (%)	O_2 (%)	CO_2/O_2 (-)	CO (ppmV)	LEL (%)	PID (ppm)	Average Laboratory CO ppmV	Hydrogen ppmV	Nitrogen ppmV	Average Temperature Min °F	Max °F
Averages of Sampling Events 3 and 4													
GI1-7	2/25/2017	0.4	0.2	21.2	0.0	1	8	1954				88	90
GI1-14	2/25/2017	0.4	2.4	17.75	0.1	2	8	1702				128.25	129.5
GI1-24	2/25/2017	0.6	5.3	14.9	0.4	527	12	1725	295		790,500	154.25	156
GI1-29	2/25/2017	3.0	12.3	5.8	2.1	819	60	4741	445		812,000	152	153.5
GI1-35	2/25/2017	6.3	12.1	5.8	2.1	894	100	5112	480		812,000	146	148
GI2-8	2/25/2017	0.5	5.8	14.6	0.4	7	10	2024				106.25	108.25
GI2-16	2/25/2017	1.4	13.1	2.9	5.0	347	28	4567	195		838,500	101.5	158
GI2-27	2/25/2017	2.8	12.2	2.7	4.9	525	56	7481	295		843,000	147.25	161.25
GI2-32	2/25/2017	5.8	4.2	11.8	0.4	470	84	6174	**280**	1,705	829,000	149.5	151.25
GI2-36	2/25/2017	1.7	1.3	17.4	0.1	413	33	4512	200	1,835	799,000	143.75	146
GI3-8	2/25/2017	0.5	1.5	19.6	0.1	0	9	2277				101.5	103.75
GI3-16	2/25/2017	2.9	14.3	0.4	41.6	568	57	4784	130	4,105	841,500	142.5	144.25
GI3-25	2/25/2017	4.5	13.3	0.9	27.1	691	82	4558	280	3,090	847,000	156.75	158.25
GI3-30	2/25/2017	1.6	2.4	15.8	0.2	418	32	4504	205	1,380	808,500	154	156
GI3-37	2/25/2017	1.1	2.9	12.8	0.2	644	22	3756	295	1,270	820,000	144.25	146.5
GI4-9	2/25/2017	0.3	1.6	19.3	0.1	0	6	1689				92.25	94
GI4-14	2/25/2017	0.4	13.9	5.8	2.4	1	8	1352				110	112
GI4-19	2/25/2017	0.4	17.4	2.0	8.9	2	8	1063				75.75	112.75
GI4-24	2/25/2017	3.0	19.1	0.8	32.5	24	59	745				123	124.5
GI4-30	2/25/2017	3.2	18.8	0.4	65.7	37	64	892				120.25	123.5
GI5-7	2/25/2017	0.3	0.7	20.2	0.0	1	6	1685				96.5	98.25
GI5-12	2/25/2017	0.4	4.6	15.6	0.3	4	7	1539				127.25	128.5
GI5-21	2/25/2017	1.2	8.0	6.5	1.3	486	23	3479	295	2,060	843,000	140.5	142
GI5-28	2/25/2017	3.1	12.6	0.5	30.3	749	61	4474	305	4,310	853,500	147.5	149.5
GI5-33	2/25/2017	2.8	12.3	1.4	24.3	656	55	4585	280	3,510	851,500	149.5	150.25
GI6-12	2/25/2017	0.3	1.4	19.4	0.1	4	5	454				104.75	108.25
GI6-22	2/25/2017	0.5	14.0	0.4	35.0	80	10	2960				141.25	143.5
GI6-25	2/25/2017	0.8	13.7	0.4	40.0	447	16	3357	160	3,960	842,000	147.25	149
GI6-29	2/25/2017	1.0	12.3	1.7	7.5	1189	20	3372	765	2,425	846,000	138	151.25
GI6-36	2/25/2017	1.0	13.5	0.5	27.0	246	20	3719	40.5	3,305	847,000	141.5	143
GI7-8	2/25/2017	0.4	1.4	20.1	0.1	0	7	433				77.75	82.25
GI7-17	2/25/2017	0.3	3.5	17.3	0.2	1	6	475				106.25	107.25
GI7-23	2/25/2017	0.3	4.7	15.3	0.3	45	6	804				120.25	122.75
GI7-26	2/25/2017	0.6	2.9	15.0	0.2	157	11	1507	120		814,000	126.5	128.5
GI7-29	2/25/2017	0.9	5.7	13.2	0.4	432	18	2997	320		806,500	129.5	131.5
GI7-33	2/25/2017	0.9	3.3	13.7	0.2	434	17	2266	285		819,500	77	134.25
GI8-13	2/25/2017	0.4	0.7	20.9	0.0	4	7	852				100.5	103
GI8-17	2/25/2017	0.35	2.55	18.5	0.1	8	7	608				116.25	117.25
GI8-26	2/25/2017	0.5	1.8	19.3	0.1	115	10	1427	77.5		785,000	137.25	139
GI8-29	2/25/2017	1.1	2.5	18.5	0.1	254	21	3668	190		787,000	138.75	141
GI8-32	2/25/2017	1.0	1.1	17.9	0.1	405	19	3530	300		805,500	139	140.75
GI8-37	2/25/2017	1.2	4.4	14.9	0.3	597	24	4173	385		802,500	135.25	136.5
GI9-19	2/25/2017	0.3	5.2	16.3	0.3	5	6	796				108.25	109.75
GI9-25	2/25/2017	0.3	1.3	19.9	0.1	8	5	616				116	118
GI9-29	2/25/2017	0.3	1.8	19.2	0.1	21	5	641				122	123.25
GI9-34	2/25/2017	0.3	2.7	18.1	0.1	22	6	797				127.5	129
GI9-39	2/25/2017	0.3	2.9	18.1	0.2	23	6	879				126.75	128.75

Notes

* Sample collected on 2/8/17 was analyzed on 2/10/17 with concentration of 400 ppmv and on 2/27/17 with a concentration of 380 ppmv.

**Sample collected on 2/15/17 was analyzed on 2/16/17 with concentration of 5.2 ppmv and on 2/27/17 with a concentration of 5.4 ppmv.

1. CH4 Measurement may also include TNMO in vapor stream.
2. Temperature reported for the day sample was collected.
3. Samples associated with field issues are shown in gray.
4. Definitions:

CH_4 = Methane. CO = Carbon monoxide. CO_2 = Carbon dioxide. LEL = Lowest explosive limit.

O_2 = Oxygen. PID = Photoionization detector. ppmv = Parts per million volume.

Table F.1
Soil Gas Analytical Data

Sampling Location	Sample Date	Laboratory CO ppmV	Laboratory Hydrogen ppmV	Laboratory Nitrogen ppmV
Sampling Event 1 - Duplicates				
Dup1-020717 (GI5-21)	2/7/2017	240	3850	856000
Dup2-020717 (GI3-37)	2/7/2017	620	2980	860000
Dup1-020817 (GI2-36)	2/8/2017	850	4660	837000
Dup2-020817 (GI8-26)	2/8/2017	96	<1,000	791000
Sampling Event 2 - Duplicates				
Dup1-021417 (GI6-25)	2/14/2017	<5.0	<1,000	778,000
Dup2-021417 (GI1-29)	2/14/2017	<5.0	<1,000	778,000
Dup1-021517 (GI7-26)	2/15/2017	32	<1,000	787,000
Dup2-021517 (GI2-32)	2/15/2017	8.2	<1,000	780,000
Sampling Event 3 - Duplicates				
Dup1-022117 (GI7-26)	2/21/2017	120	<1,000	818,000
Dup2-022117 (GI2-16)	2/21/2017	180	<1,000	842,000
Dup1-022217 (GI1-24)	2/22/2017	330	<1,000	791,000
Dup2-022217 (GI5-33)	2/22/2017	230	3,790	848,000
Sampling Event 4 - Duplicates				
Dup1-022817 (GI6-36)	2/28/2017	41	3,380	845,000
Dup2-022817 (GI3-25)	2/28/2017	290	2,980	847,000
Dup1-030117 (GI8-37)	3/1/2017	370	<1,000	801,000
Dup2-030117 (GI2-27)	3/1/2017	310	<1,000	842,000

Notes

* Sample collected on 2/8/17 was analyzed on 2/10/17 with concentration of 400 ppmv and on 2/27/17 with a concentration of 380 ppmv.

**Sample collected on 2/15/17 was analyzed on 2/16/17 with concentration of 5.2 ppmv and on 2/27/17 with a concentration of 5.4 ppmv.

1. CH4 Measurement may also include TNMO in vapor stream.

4. Definitions:

CH_4 = Methane. CO = Carbon monoxide. CO_2 = Carbon dioxide.

O_2 = Oxygen. ppmv = parts per million volume.

April 24, 2017

ZONE A COMBUSTION EVALUATION REPORT
PASCO SANITARY LANDFILL

Pasco Sanitary Landfill
Pasco, WA

Appendices

Appendix G: Autoignition Test VOC Data

Table G.1. GI Data from March 29, 2017
Pasco Sanitary Landfill

	Field Data									Laboratory Data				
Location	Pressure (in w.c.)	Sample Time	Temp (ºF)	PID (ppmV)	CH_4 (%)	CO_2 (%)	O_2 (%)	CO (ppmV)	LEL (%)	CO (ppmV)	Hydrogen (ppmV)	Nitrogen (ppmV)	Total VOCs (µg/L)	Carbon Disulfide (µg/L)
GI1-35	-0.63	1,230	146	9,999	7	11.5	6.1	1214	100	760	<0.10	816,000	18,413	1.4
GI2-27	-2.51	1,219	153	9,999	3	12.8	1.8	597	56	310	<0.10	846,000	14,118	0.3
GI2-32	-1.08	1,223	150.5	9,999	5	4.2	10.3	841	100	490	0.272	840,000	18,474	0.36
GI3-25	-0.91	1,208	156.5	5,153	7	13.4	0.3	795	100	480	0.311	852,000	17,452	ND
GI4-30	-0.76	1,138	122	768	3	18.8	0.2	15	60	6.4	<0.10	789,000	3,349	ND
GI5-28	-0.99	1,200	147	4,794	4	12.2	0.2	930	72	670	0.385	862,000	11,907	0.46
GI6-29	-0.77	1,150	152	3,079	1	13.3	0.9	1416	20	1,200	0.308	846,000	6,869	1.4
GI8-37	-0.71	1,240	135.5	4,894	1	3.2	14.7	1002	20	610	<0.10	810,000	7,868	0.35

Notes

1. Temperature measurements were collected from the corresponding TC at the time of sample collection. For example the thermocouple in the TC1-35 location was used for the temperature measurement in GI1-35. Data loggers were used to collect the temperature data. The data loggers were programmed for type T thermocouples and set to collect a temperature measurement every 15 minutes during the day.
2. Each GI was purged for 2 minutes before collecting data and Tedlar bag samples. One Tedlar bag went to ALS Everett for VOC 8260 analysis and the other Tedlar bag sample was shipped to ALS Simi Valley for CO, H2, and N2 analysis.
3. Definitions:

CH_4 = Methane. CO = Carbon monoxide. CO_2 = Carbon dioxide. LEL = Lowest explosive limit.

O_2 = Oxygen. PID = Photoionization detector. ppmv = Parts per million volume. µg/L = Micrograms per liter

in w.c = Inch water column.

April 5, 2017

Mr. Thom Morin
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

Dear Mr. Morin,

On March 30th, 2 samples were received by our laboratory and assigned our laboratory project number EV17030262. The project was identified as your 03916.3 Task 2.2. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030262 EV17030262-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:23:00 PM
CLIENT SAMPLE ID	GI2-32-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	**7.9**	0.20	1	UG/L	04/01/2017	DLC
Vinyl Chloride	SW-846 8260C	**1.3**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	**12**	0.20	1	UG/L	04/01/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	**0.25**	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**1400**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	**0.36**	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**3200**	1200	500	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**3.4**	0.20	1	UG/L	04/01/2017	DLC
Methylene Chloride	SW-846 8260C	**46**	5.0	10	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	**0.87**	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloroethane	SW-846 8260C	**64**	2.0	10	UG/L	04/01/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**2600**	500	500	UG/L	03/31/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	**13**	0.20	1	UG/L	04/01/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	**0.77**	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	**9.8**	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**3.5**	0.20	1	UG/L	04/01/2017	DLC
Benzene	SW-846 8260C	**7.9**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**930**	100	500	UG/L	03/31/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**2400**	500	500	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**3800**	200	1000	UG/L	03/31/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030262 EV17030262-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:23:00 PM
CLIENT SAMPLE ID	GI2-32-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**51**	2.0	10	UG/L	04/01/2017	DLC
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**1.5**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**880**	100	500	UG/L	03/31/2017	DLC
m-&p-Xylenes	SW-846 8260C	**2300**	200	500	UG/L	03/31/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**550**	100	500	UG/L	03/31/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropylbenzene	SW-846 8260C	**16**	0.20	1	UG/L	04/01/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Propylbenzene	SW-846 8260C	**46**	2.0	10	UG/L	04/01/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	**50**	2.0	10	UG/L	04/01/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	**73**	2.0	10	UG/L	04/01/2017	DLC
sec-Butylbenzene	SW-846 8260C	**1.1**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**0.95**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	**0.30**	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**0.87**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**2.3**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 500X Dilution	SW-846 8260C	**102**	03/31/2017	DLC
1,2-Dichloroethane-d4 1000X Dilution	SW-846 8260C	**106**	03/31/2017	DLC
1,2-Dichloroethane-d4 10X Dilution	SW-846 8260C	**92.1**	04/01/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE:	4/5/2017
		ALS JOB#:	EV17030262
		ALS SAMPLE#:	EV17030262-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:23:00 PM
CLIENT SAMPLE ID	GI2-32-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	SW-846 8260C	**101**	04/01/2017	DLC
Toluene-d8 500X Dilution	SW-846 8260C	**91.6**	03/31/2017	DLC
Toluene-d8 1000X Dilution	SW-846 8260C	**98.4**	03/31/2017	DLC
Toluene-d8 10X Dilution	SW-846 8260C	**84.4**	04/01/2017	DLC
Toluene-d8	SW-846 8260C	**91.7**	04/01/2017	DLC
4-Bromofluorobenzene 500X Dilution	SW-846 8260C	**99.0**	03/31/2017	DLC
4-Bromofluorobenzene 1000X Dilution	SW-846 8260C	**101**	03/31/2017	DLC
4-Bromofluorobenzene 10X Dilution	SW-846 8260C	**95.5**	04/01/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**74.9**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030262 EV17030262-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:08:00 PM
CLIENT SAMPLE ID	GI3-25-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	**16**	0.20	1	UG/L	04/01/2017	DLC
Vinyl Chloride	SW-846 8260C	**0.80**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	**0.22**	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	**32**	2.0	10	UG/L	04/01/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**1400**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**1700**	1200	500	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**2.5**	0.20	1	UG/L	04/01/2017	DLC
Methylene Chloride	SW-846 8260C	**32**	5.0	10	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	**0.59**	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloroethane	SW-846 8260C	**40**	2.0	10	UG/L	04/01/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**2300**	500	500	UG/L	03/31/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	**37**	2.0	10	UG/L	04/01/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	**0.54**	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	**0.62**	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**29**	2.0	10	UG/L	04/01/2017	DLC
Benzene	SW-846 8260C	**9.9**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**480**	20	100	UG/L	03/30/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**1100**	500	500	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**5400**	100	500	UG/L	03/31/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030262 EV17030262-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:08:00 PM
CLIENT SAMPLE ID	GI3-25-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**15**	0.20	1	UG/L	04/01/2017	DLC
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**1.1**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**1000**	20	100	UG/L	03/30/2017	DLC
m-&p-Xylenes	SW-846 8260C	**3000**	40	100	UG/L	03/30/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**710**	20	100	UG/L	03/30/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropylbenzene	SW-846 8260C	**11**	0.20	1	UG/L	04/01/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Propylbenzene	SW-846 8260C	**33**	2.0	10	UG/L	04/01/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	**38**	2.0	10	UG/L	04/01/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	**58**	2.0	10	UG/L	04/01/2017	DLC
sec-Butylbenzene	SW-846 8260C	**1.2**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**1.1**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	**0.24**	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**0.86**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**1.4**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 100X Dilution	SW-846 8260C	**107**	03/30/2017	DLC
1,2-Dichloroethane-d4 500X Dilution	SW-846 8260C	**99.5**	03/31/2017	DLC
1,2-Dichloroethane-d4 10X Dilution	SW-846 8260C	**89.7**	04/01/2017	DLC
1,2-Dichloroethane-d4	SW-846 8260C	**98.5**	04/01/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE:	4/5/2017
		ALS JOB#:	EV17030262
		ALS SAMPLE#:	EV17030262-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:08:00 PM
CLIENT SAMPLE ID	GI3-25-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8 100X Dilution	SW-846 8260C	**88.3**	03/30/2017	DLC
Toluene-d8 500X Dilution	SW-846 8260C	**98.0**	03/31/2017	DLC
Toluene-d8 10X Dilution	SW-846 8260C	**83.4**	04/01/2017	DLC
Toluene-d8	SW-846 8260C	**95.4**	04/01/2017	DLC
4-Bromofluorobenzene 100X Dilution	SW-846 8260C	**97.0**	03/30/2017	DLC
4-Bromofluorobenzene 500X Dilution	SW-846 8260C	**99.9**	03/31/2017	DLC
4-Bromofluorobenzene 10X Dilution	SW-846 8260C	**95.8**	04/01/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**79.2**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030262 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3 Task 2.2		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Vinyl Chloride	SW-846 8260C	U	UG/L	0.020	03/30/2017	DLC
Bromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethanol	SW-846 8260C	U	UG/L	20	03/30/2017	DLC
Carbon Disulfide	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Acetone	SW-846 8260C	U	UG/L	2.5	03/30/2017	DLC
1,1-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methylene Chloride	SW-846 8260C	U	UG/L	0.50	03/30/2017	DLC
Acrylonitrile	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropyl Ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Benzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromodichloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Toluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Hexanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC

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ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030262 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3 Task 2.2		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

1,3-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Tetrachloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
m-&p-Xylenes	SW-846 8260C	U	UG/L	0.40	03/30/2017	DLC
Styrene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
o-Xylene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromoform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Propylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
sec-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Isopropyltoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Naphthalene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030262 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3 Task 2.2		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 114939 - Air by SW-846 8260C

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	SW-846 8260C	**89.2**			75	135	03/30/2017	DLC
1,1-Dichloroethene - BSD	SW-846 8260C	**90.2**	**1**		75	135	03/30/2017	DLC
Benzene - BS	SW-846 8260C	**90.4**			75.1	135	03/30/2017	DLC
Benzene - BSD	SW-846 8260C	**92.0**	**2**		75.1	135	03/30/2017	DLC
Trichloroethene - BS	SW-846 8260C	**87.6**			80.8	136	03/30/2017	DLC
Trichloroethene - BSD	SW-846 8260C	**89.8**	**3**		80.8	136	03/30/2017	DLC
Toluene - BS	SW-846 8260C	**96.7**			67.3	128.9	03/30/2017	DLC
Toluene - BSD	SW-846 8260C	**98.9**	**2**		67.3	128.9	03/30/2017	DLC
Chlorobenzene - BS	SW-846 8260C	**100**			73.7	130	03/30/2017	DLC
Chlorobenzene - BSD	SW-846 8260C	**101**	**1**		73.7	130	03/30/2017	DLC

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

6

ALS Laboratory Group
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
(206) 292-9059 Seattle
(425) 356-2626 Fax
http://www.alsenviro.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV17030262

Date 03/29/17 Page 1 Of 1

PROJECT ID: 03916.3 Task 2.2
REPORT TO COMPANY: epi
PROJECT MANAGER: Thom Morin
ADDRESS: 1180 NW Maple St, Suite 310
Issaquah, WA 98027
PHONE: 425 395-0010 FAX:
P.O. NUMBER: 03916.3 Task 2.2 E-MAIL: Thomm@epi-wa.com
INVOICE TO COMPANY: IWAG Group III
ATTENTION: PBS
ADDRESS: 400 Bradley Blvd, Suite 300
Richland, WA 99352

ANALYSIS REQUESTED / OTHER (Specify)

	SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1	GI2-32-032917	03/29/17	1223	Air	1							X									1	
2	GI3-25-032917	03/29/17	1208	Air	2							X									1	
3.																						
4.																						
5.																						
6.																						
7.																						
8.																						
9.																						
10.																						

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):
1. Relinquished By: E.J. epi, 03/29/17, 1630 hrs
Received By: Shipped Fed Ex 7787 6655 4838, 03/29/17, 1630 hrs
2. Relinquished By:
Received By: Shawn Roban ALS 3/30/17 9:45 am

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 (Standard) | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 (Standard) | 3 | 1 | SAME DAY

OTHER:
Specify:

* Turnaround request less than standard may incur Rush Charges

LABORATORY COPY

April 5, 2017

Mr. Thom Morin
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

Dear Mr. Morin,

On March 30th, 2 samples were received by our laboratory and assigned our laboratory project number EV17030263. The project was identified as your 03916.3 Task 2.2. The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030263 EV17030263-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:30:00 PM
CLIENT SAMPLE ID	GI1-35-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	**1.6**	0.20	1	UG/L	04/01/2017	DLC
Vinyl Chloride	SW-846 8260C	**0.89**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	**3.4**	0.20	1	UG/L	04/01/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**1200**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	**1.4**	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**3400**	1200	500	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**9.9**	0.20	1	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	**2.2**	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**1700**	500	500	UG/L	03/31/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	**0.69**	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	**1.4**	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**3.9**	0.20	1	UG/L	04/01/2017	DLC
Benzene	SW-846 8260C	**10**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**1500**	100	500	UG/L	03/31/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**1700**	500	500	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**6100**	100	500	UG/L	03/31/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**270**	100	500	UG/L	03/31/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030263 EV17030263-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:30:00 PM
CLIENT SAMPLE ID	GI1-35-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**1.6**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**570**	100	500	UG/L	03/31/2017	DLC
m-&p-Xylenes	SW-846 8260C	**1600**	200	500	UG/L	03/31/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**330**	100	500	UG/L	03/31/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
sec-Butylbenzene	SW-846 8260C	**1.3**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**0.98**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	**0.31**	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**0.91**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**2.5**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 500X Dilution	SW-846 8260C	**103**	03/31/2017	DLC
1,2-Dichloroethane-d4	SW-846 8260C	**101**	04/01/2017	DLC
Toluene-d8 500X Dilution	SW-846 8260C	**96.5**	03/31/2017	DLC
Toluene-d8	SW-846 8260C	**97.1**	04/01/2017	DLC
4-Bromofluorobenzene 500X Dilution	SW-846 8260C	**101**	03/31/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**73.8**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030263 EV17030263-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:19:00 PM
CLIENT SAMPLE ID	GI2-27-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	**3.0**	0.20	1	UG/L	04/01/2017	DLC
Vinyl Chloride	SW-846 8260C	**0.56**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	**9.3**	0.20	1	UG/L	04/01/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**160**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	**0.26**	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**3600**	1200	500	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**3.3**	0.20	1	UG/L	04/01/2017	DLC
Methylene Chloride	SW-846 8260C	**38 E**	0.50	1	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	**0.37**	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloroethane	SW-846 8260C	**40**	2.0	10	UG/L	03/31/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**1600**	500	500	UG/L	03/31/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	**8.1**	0.20	1	UG/L	04/01/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	**1.0**	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	**14**	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**4.1**	0.20	1	UG/L	04/01/2017	DLC
Benzene	SW-846 8260C	**8.4**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**370**	100	500	UG/L	03/31/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**1300**	500	500	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**4600**	100	500	UG/L	03/31/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030263 EV17030263-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:19:00 PM
CLIENT SAMPLE ID	GI2-27-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**26**	2.0	10	UG/L	03/31/2017	DLC
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**0.96**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**530**	100	500	UG/L	03/31/2017	DLC
m-&p-Xylenes	SW-846 8260C	**1400**	200	500	UG/L	03/31/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**330**	100	500	UG/L	03/31/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropylbenzene	SW-846 8260C	**10**	0.20	1	UG/L	04/01/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Propylbenzene	SW-846 8260C	**16**	0.20	1	UG/L	04/01/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	**31**	2.0	10	UG/L	03/31/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	**48**	2.0	10	UG/L	03/31/2017	DLC
sec-Butylbenzene	SW-846 8260C	**0.87**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**0.78**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	**0.23**	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**0.65**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**1.5**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 10X Dilution	SW-846 8260C	**99.1**	03/31/2017	DLC
1,2-Dichloroethane-d4 500X Dilution	SW-846 8260C	**103**	03/31/2017	DLC
1,2-Dichloroethane-d4	SW-846 8260C	**91.4**	04/01/2017	DLC
Toluene-d8 10X Dilution	SW-846 8260C	**85.0**	03/31/2017	DLC

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030263 EV17030263-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3 Task 2.2	COLLECTION DATE:	3/29/2017 12:19:00 PM
CLIENT SAMPLE ID	GI2-27-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8 500X Dilution	SW-846 8260C	**96.3**	03/31/2017	DLC
Toluene-d8	SW-846 8260C	**88.5**	04/01/2017	DLC
4-Bromofluorobenzene 10X Dilution	SW-846 8260C	**95.5**	03/31/2017	DLC
4-Bromofluorobenzene 500X Dilution	SW-846 8260C	**103**	03/31/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**81.1**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
E - Reported result is an estimate because it exceeds the calibration range.

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE:	4/5/2017
		ALS SDG#:	EV17030263
		WDOE ACCREDITATION:	C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3 Task 2.2		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Vinyl Chloride	SW-846 8260C	U	UG/L	0.020	03/30/2017	DLC
Bromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethanol	SW-846 8260C	U	UG/L	20	03/30/2017	DLC
Carbon Disulfide	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Acetone	SW-846 8260C	U	UG/L	2.5	03/30/2017	DLC
1,1-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methylene Chloride	SW-846 8260C	U	UG/L	0.50	03/30/2017	DLC
Acrylonitrile	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropyl Ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Benzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromodichloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Toluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Hexanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030263 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3 Task 2.2		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

1,3-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Tetrachloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
m-&p-Xylenes	SW-846 8260C	U	UG/L	0.40	03/30/2017	DLC
Styrene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
o-Xylene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromoform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Propylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
sec-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Isopropyltoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Naphthalene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027		DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030263 C601
CLIENT CONTACT:	Thom Morin			
CLIENT PROJECT:	03916.3 Task 2.2			

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 114939 - Air by SW-846 8260C

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	SW-846 8260C	**89.2**			75	135	03/30/2017	DLC
1,1-Dichloroethene - BSD	SW-846 8260C	**90.2**	**1**		75	135	03/30/2017	DLC
Benzene - BS	SW-846 8260C	**90.4**			75.1	135	03/30/2017	DLC
Benzene - BSD	SW-846 8260C	**92.0**	**2**		75.1	135	03/30/2017	DLC
Trichloroethene - BS	SW-846 8260C	**87.6**			80.8	136	03/30/2017	DLC
Trichloroethene - BSD	SW-846 8260C	**89.8**	**3**		80.8	136	03/30/2017	DLC
Toluene - BS	SW-846 8260C	**96.7**			67.3	128.9	03/30/2017	DLC
Toluene - BSD	SW-846 8260C	**98.9**	**2**		67.3	128.9	03/30/2017	DLC
Chlorobenzene - BS	SW-846 8260C	**100**			73.7	130	03/30/2017	DLC
Chlorobenzene - BSD	SW-846 8260C	**101**	**1**		73.7	130	03/30/2017	DLC

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

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ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV17030263

Date 03/29/17 Page 1 Of 1

PROJECT ID:	03916.3 Task 2.2
REPORT TO COMPANY:	epi
PROJECT MANAGER:	Thom Morin
ADDRESS:	1180 NW Maple St. Suite 310 Issaquah, WA 98027
PHONE:	425 395-0010
FAX:	
P.O. #:	03916.3 Task 2.2
E-MAIL:	
INVOICE TO COMPANY:	IWAG III
ATTENTION:	PBS
ADDRESS:	400 Bradley Blvd, Suite 300 Richland, WA 99352

ANALYSIS REQUESTED / OTHER (Specify)

#	SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER							NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1	GI1-35-032917	03/29/17	1230	Air	1							X																1	
2	GI2-27-032917	03/29/17	1219	Air	2							X																1	
3.																													
4.																													
5.																													
6.																													
7.																													
8.																													
9.																													
10.																													

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: GJ, epi, 03/29/17, 1630 hrs
   Received By: Shipped FedEx 7787 6655 2879, 03/29/17, 1630 hrs
2. Relinquished By: Shawn Robina AIS 3/30/17 9:45am
   Received By:

TURNAROUND REQUESTED in Business Days*

Organic, Metals & Inorganic Analysis: 10 (Standard) | 5 | 3 | 2 | 1 | SAME DAY

Fuels & Hydrocarbon Analysis: 5 (Standard) | 3 | 1 | SAME DAY

OTHER:

Specify:

April 5, 2017

Mr. Thom Morin
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

Dear Mr. Morin,

On March 30th, 2 samples were received by our laboratory and assigned our laboratory project number EV17030264. The project was identified as your 03916.3 . The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030264 EV17030264-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 11:38:00 AM
CLIENT SAMPLE ID	GI4-30-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	**0.27**	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Vinyl Chloride	SW-846 8260C	**0.75**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**67**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**450**	250	100	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**0.26**	0.20	1	UG/L	04/01/2017	DLC
Methylene Chloride	SW-846 8260C	**3.4**	0.50	1	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	**0.20**	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloroethane	SW-846 8260C	**2.6**	0.20	1	UG/L	04/01/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**260**	100	100	UG/L	03/31/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	**4.4**	0.20	1	UG/L	04/01/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	**0.33**	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**0.87**	0.20	1	UG/L	04/01/2017	DLC
Benzene	SW-846 8260C	**3.6**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**32**	2.0	10	UG/L	03/31/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**330**	100	100	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**930**	20	100	UG/L	03/31/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030264 EV17030264-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 11:38:00 AM
CLIENT SAMPLE ID	GI4-30-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**5.8**	0.20	1	UG/L	04/01/2017	DLC
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**0.40**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**130**	2.0	10	UG/L	03/31/2017	DLC
m-&p-Xylenes	SW-846 8260C	**990**	40	100	UG/L	03/31/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**49**	2.0	10	UG/L	03/31/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropylbenzene	SW-846 8260C	**6.2**	0.20	1	UG/L	04/01/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Propylbenzene	SW-846 8260C	**13**	0.20	1	UG/L	04/01/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	**25**	2.0	10	UG/L	03/31/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	**40**	2.0	10	UG/L	03/31/2017	DLC
sec-Butylbenzene	SW-846 8260C	**0.90**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**0.90**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**0.62**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**1.0**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 10X Dilution	SW-846 8260C	**102**	03/31/2017	DLC
1,2-Dichloroethane-d4 100X Dilution	SW-846 8260C	**107**	03/31/2017	DLC
1,2-Dichloroethane-d4	SW-846 8260C	**93.3**	04/01/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030264 EV17030264-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 11:38:00 AM
CLIENT SAMPLE ID	GI4-30-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8 10X Dilution	SW-846 8260C	**87.4**	03/31/2017	DLC
Toluene-d8 100X Dilution	SW-846 8260C	**94.4**	03/31/2017	DLC
Toluene-d8	SW-846 8260C	**87.9**	04/01/2017	DLC
4-Bromofluorobenzene 10X Dilution	SW-846 8260C	**94.4**	03/31/2017	DLC
4-Bromofluorobenzene 100X Dilution	SW-846 8260C	**101**	03/31/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**84.2**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030264 EV17030264-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 12:00:00 PM
CLIENT SAMPLE ID	GI5-28-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	**7.8**	0.20	1	UG/L	04/01/2017	DLC
Vinyl Chloride	SW-846 8260C	**0.67**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	**44**	2.0	10	UG/L	03/31/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	**0.23**	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**880**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	**0.46**	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**1000**	110	500	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**2.1**	0.20	1	UG/L	04/01/2017	DLC
Methylene Chloride	SW-846 8260C	**35 E**	0.50	1	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	**1.0**	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloroethane	SW-846 8260C	**38**	2.0	10	UG/L	03/31/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**1300**	500	500	UG/L	03/31/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	**29**	2.0	10	UG/L	03/31/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	**0.78**	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**41**	2.0	10	UG/L	03/31/2017	DLC
Benzene	SW-846 8260C	**14**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**580**	100	500	UG/L	03/31/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**1000**	500	500	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**5500**	100	500	UG/L	03/31/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030264 EV17030264-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 12:00:00 PM
CLIENT SAMPLE ID	GI5-28-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**25**	2.0	10	UG/L	03/31/2017	DLC
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**0.77**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**330**	100	500	UG/L	03/31/2017	DLC
m-&p-Xylenes	SW-846 8260C	**840**	200	500	UG/L	03/31/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**200**	100	500	UG/L	03/31/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropylbenzene	SW-846 8260C	**6.1**	0.20	1	UG/L	04/01/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Propylbenzene	SW-846 8260C	**11**	0.20	1	UG/L	04/01/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	**14**	0.20	1	UG/L	04/01/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	**38**	2.0	10	UG/L	03/31/2017	DLC
sec-Butylbenzene	SW-846 8260C	**0.78**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**0.70**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**0.51**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**1.0**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 500X Dilution	SW-846 8260C	**99.9**	03/31/2017	DLC
1,2-Dichloroethane-d4 10X Dilution	SW-846 8260C	**98.2**	03/31/2017	DLC
1,2-Dichloroethane-d4	SW-846 8260C	**93.0**	04/01/2017	DLC
Toluene-d8 500X Dilution	SW-846 8260C	**96.9**	03/31/2017	DLC

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE:	4/5/2017
		ALS JOB#:	EV17030264
		ALS SAMPLE#:	EV17030264-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 12:00:00 PM
CLIENT SAMPLE ID	GI5-28-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8 10X Dilution	SW-846 8260C	**98.5**	03/31/2017	DLC
Toluene-d8	SW-846 8260C	**89.9**	04/01/2017	DLC
4-Bromofluorobenzene 500X Dilution	SW-846 8260C	**102**	03/31/2017	DLC
4-Bromofluorobenzene 10X Dilution	SW-846 8260C	**94.6**	03/31/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**79.3**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.
E - Reported result is an estimate because it exceeds the calibration range.

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030264 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Vinyl Chloride	SW-846 8260C	U	UG/L	0.020	03/30/2017	DLC
Bromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethanol	SW-846 8260C	U	UG/L	20	03/30/2017	DLC
Carbon Disulfide	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Acetone	SW-846 8260C	U	UG/L	2.5	03/30/2017	DLC
1,1-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methylene Chloride	SW-846 8260C	U	UG/L	0.50	03/30/2017	DLC
Acrylonitrile	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropyl Ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Benzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromodichloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Toluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Hexanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC

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ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030264 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

1,3-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Tetrachloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
m-&p-Xylenes	SW-846 8260C	U	UG/L	0.40	03/30/2017	DLC
Styrene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
o-Xylene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromoform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Propylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
sec-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Isopropyltoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Naphthalene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030264 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3		

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 114939 - Air by SW-846 8260C

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	SW-846 8260C	**89.2**			75	135	03/30/2017	DLC
1,1-Dichloroethene - BSD	SW-846 8260C	**90.2**	**1**		75	135	03/30/2017	DLC
Benzene - BS	SW-846 8260C	**90.4**			75.1	135	03/30/2017	DLC
Benzene - BSD	SW-846 8260C	**92.0**	**2**		75.1	135	03/30/2017	DLC
Trichloroethene - BS	SW-846 8260C	**87.6**			80.8	136	03/30/2017	DLC
Trichloroethene - BSD	SW-846 8260C	**89.8**	**3**		80.8	136	03/30/2017	DLC
Toluene - BS	SW-846 8260C	**96.7**			67.3	128.9	03/30/2017	DLC
Toluene - BSD	SW-846 8260C	**98.9**	**2**		67.3	128.9	03/30/2017	DLC
Chlorobenzene - BS	SW-846 8260C	**100**			73.7	130	03/30/2017	DLC
Chlorobenzene - BSD	SW-846 8260C	**101**	**1**		73.7	130	03/30/2017	DLC

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

7

ALS Laboratory Group
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
(206) 292-9059 Seattle
(425) 356-2626 Fax
http://www.alsenviro.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only): EV17030264

Date 03/29/17 Page 1 Of 1

PROJECT ID: 03916.3
REPORT TO COMPANY: epi
PROJECT MANAGER: Thom Morin
ADDRESS: 1180 NW Maple St, Suite 310 Issaquah, WA 98027
PHONE: 425 395-0010 FAX:
P.O. NUMBER: 03916.3 Task 2.2 E-MAIL: Thomm@epi-wa.com
INVOICE TO COMPANY: IWAG Group III
ATTENTION: PBS
ADDRESS: 400 Bradley Blvd, Suite 300 Richland, WA 99352

ANALYSIS REQUESTED

	SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐	OTHER (Specify)	NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1.	GI4-30-032917	03/29/17	1138	Air	1							X										1	
2.	GI5-28-032917	03/29/17	1200	Air	2							X										1	
3.																							
4.																							
5.																							
6.																							
7.																							
8.																							
9.																							
10.																							

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):
1. Relinquished By: EJ, epi, 03/29/17, 1630hrs
Received By: Shipped Fed Ex 7787 6655 1585, 03/29/17, 1630hrs
2. Relinquished By:
Received By: Shawn Roberson ALS 3/30/17 9:45am

TURNAROUND REQUESTED in Business Days*

Organic, ~~Metals~~ & Inorganic Analysis
10 (Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis
5 (Standard) 3 1 SAME DAY

OTHER:
Specify:

* Turnaround request less than standard may incur Rush Charges

LABORATORY COPY

April 5, 2017

Mr. Thom Morin
Environmental Partners, Inc.
1180 NW Maple St, Suite 310
Issaquah, WA 98027

Dear Mr. Morin,

On March 30th, 2 samples were received by our laboratory and assigned our laboratory project number EV17030265. The project was identified as your 03916.3 . The sample identification and requested analyses are outlined on the attached chain of custody record.

No abnormalities or nonconformances were observed during the analyses of the project samples.

Please do not hesitate to call me if you have any questions or if I can be of further assistance.

Sincerely,

ALS Laboratory Group

Rick Bagan
Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030265 EV17030265-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 11:50:00 AM
CLIENT SAMPLE ID	GI6-29-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	**31**	2.0	10	UG/L	03/31/2017	DLC
Vinyl Chloride	SW-846 8260C	**0.21**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	**0.50**	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	**9.4**	0.20	1	UG/L	04/01/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**110**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	**1.4**	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**1100**	250	100	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**0.55**	0.20	1	UG/L	04/01/2017	DLC
Methylene Chloride	SW-846 8260C	**7.4**	0.50	1	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloroethane	SW-846 8260C	**5.7**	0.20	1	UG/L	04/01/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**440**	100	100	UG/L	03/31/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	**2.8**	0.20	1	UG/L	04/01/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	**0.76**	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**4.8**	0.20	1	UG/L	04/01/2017	DLC
Benzene	SW-846 8260C	**8.7**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**45**	2.0	10	UG/L	03/31/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**660**	100	100	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**1300**	40	200	UG/L	04/01/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030265 EV17030265-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 11:50:00 AM
CLIENT SAMPLE ID	GI6-29-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**10**	0.20	1	UG/L	04/01/2017	DLC
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**1.0**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**570**	20	100	UG/L	03/31/2017	DLC
m-&p-Xylenes	SW-846 8260C	**1900**	40	100	UG/L	03/31/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**580**	20	100	UG/L	03/31/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropylbenzene	SW-846 8260C	**7.2**	0.20	1	UG/L	04/01/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Propylbenzene	SW-846 8260C	**13**	0.20	1	UG/L	04/01/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	**20**	2.0	10	UG/L	03/31/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	**35**	2.0	10	UG/L	03/31/2017	DLC
sec-Butylbenzene	SW-846 8260C	**0.94**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**0.96**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	**0.28**	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**0.77**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**1.3**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 10X Dilution	SW-846 8260C	**104**	03/31/2017	DLC
1,2-Dichloroethane-d4 100X Dilution	SW-846 8260C	**107**	03/31/2017	DLC
1,2-Dichloroethane-d4 200X Dilution	SW-846 8260C	**99.9**	04/01/2017	DLC

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030265 EV17030265-01
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 11:50:00 AM
CLIENT SAMPLE ID	GI6-29-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4	SW-846 8260C	**90.7**	04/01/2017	DLC
Toluene-d8 10X Dilution	SW-846 8260C	**90.5**	03/31/2017	DLC
Toluene-d8 100X Dilution	SW-846 8260C	**94.2**	03/31/2017	DLC
Toluene-d8 200X Dilution	SW-846 8260C	**97.1**	04/01/2017	DLC
Toluene-d8	SW-846 8260C	**88.6**	04/01/2017	DLC
4-Bromofluorobenzene 10X Dilution	SW-846 8260C	**86.8**	03/31/2017	DLC
4-Bromofluorobenzene 100X Dilution	SW-846 8260C	**97.6**	03/31/2017	DLC
4-Bromofluorobenzene 200X Dilution	SW-846 8260C	**97.0**	04/01/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**73.8**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030265 EV17030265-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 12:40:00 PM
CLIENT SAMPLE ID	GI8-37-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloromethane	SW-846 8260C	**21**	2.0	10	UG/L	03/31/2017	DLC
Vinyl Chloride	SW-846 8260C	**0.17**	0.020	1	UG/L	04/01/2017	DLC
Bromomethane	SW-846 8260C	**0.33**	0.20	1	UG/L	04/01/2017	DLC
Chloroethane	SW-846 8260C	**26**	2.0	10	UG/L	03/31/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethanol	SW-846 8260C	**200**	20	1	UG/L	04/01/2017	DLC
Carbon Disulfide	SW-846 8260C	**0.35**	0.20	1	UG/L	04/01/2017	DLC
Acetone	SW-846 8260C	**230**	22	100	UG/L	03/31/2017	DLC
1,1-Dichloroethene	SW-846 8260C	**0.43**	0.20	1	UG/L	04/01/2017	DLC
Methylene Chloride	SW-846 8260C	**10**	0.50	1	UG/L	04/01/2017	DLC
Acrylonitrile	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropyl Ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloroethane	SW-846 8260C	**6.9**	0.20	1	UG/L	04/01/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	**150**	100	100	UG/L	03/31/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	**2.3**	0.20	1	UG/L	04/01/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chloroform	SW-846 8260C	**0.83**	0.20	1	UG/L	04/01/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	**0.32**	0.20	1	UG/L	04/01/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloroethane	SW-846 8260C	**1.9**	0.20	1	UG/L	04/01/2017	DLC
Benzene	SW-846 8260C	**9.4**	0.20	1	UG/L	04/01/2017	DLC
Trichloroethene	SW-846 8260C	**120**	2.0	10	UG/L	03/31/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Dibromomethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromodichloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	**1100**	100	100	UG/L	03/31/2017	DLC
Toluene	SW-846 8260C	**2100**	40	200	UG/L	03/31/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
2-Hexanone	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030265 EV17030265-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 12:40:00 PM
CLIENT SAMPLE ID	GI8-37-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

ANALYTE	METHOD	RESULTS	REPORTING LIMITS	DILUTION FACTOR	UNITS	ANALYSIS DATE	ANALYSIS BY
1,3-Dichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Tetrachloroethene	SW-846 8260C	**53**	2.0	10	UG/L	03/31/2017	DLC
Dibromochloromethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Chlorobenzene	SW-846 8260C	**2.0**	0.20	1	UG/L	04/01/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Ethylbenzene	SW-846 8260C	**1300**	20	100	UG/L	03/31/2017	DLC
m-&p-Xylenes	SW-846 8260C	**1100**	80	200	UG/L	03/31/2017	DLC
Styrene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
o-Xylene	SW-846 8260C	**1300**	20	100	UG/L	03/31/2017	DLC
Bromoform	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Isopropylbenzene	SW-846 8260C	**14**	2.0	10	UG/L	03/31/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Bromobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
n-Propylbenzene	SW-846 8260C	**26**	2.0	10	UG/L	03/31/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	**33**	2.0	10	UG/L	03/31/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	**52**	2.0	10	UG/L	03/31/2017	DLC
sec-Butylbenzene	SW-846 8260C	**1.9**	0.20	1	UG/L	04/01/2017	DLC
4-Isopropyltoluene	SW-846 8260C	**1.4**	0.20	1	UG/L	04/01/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	**0.33**	0.20	1	UG/L	04/01/2017	DLC
n-Butylbenzene	SW-846 8260C	**1.4**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	**2.9**	0.20	1	UG/L	04/01/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	1.0	1	UG/L	04/01/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
Naphthalene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	0.20	1	UG/L	04/01/2017	DLC

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
1,2-Dichloroethane-d4 200X Dilution	SW-846 8260C	**104**	03/31/2017	DLC
1,2-Dichloroethane-d4 10X Dilution	SW-846 8260C	**99.3**	03/31/2017	DLC
1,2-Dichloroethane-d4 100X Dilution	SW-846 8260C	**104**	03/31/2017	DLC
1,2-Dichloroethane-d4	SW-846 8260C	**98.0**	04/01/2017	DLC

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS JOB#: ALS SAMPLE#:	4/5/2017 EV17030265 EV17030265-02
CLIENT CONTACT:	Thom Morin	DATE RECEIVED:	03/30/2017
CLIENT PROJECT:	03916.3	COLLECTION DATE:	3/29/2017 12:40:00 PM
CLIENT SAMPLE ID	GI8-37-032917	WDOE ACCREDITATION:	C601

SAMPLE DATA RESULTS

SURROGATE	METHOD	%REC	ANALYSIS DATE	ANALYSIS BY
Toluene-d8 200X Dilution	SW-846 8260C	**97.5**	03/31/2017	DLC
Toluene-d8 10X Dilution	SW-846 8260C	**86.5**	03/31/2017	DLC
Toluene-d8 100X Dilution	SW-846 8260C	**91.1**	03/31/2017	DLC
Toluene-d8	SW-846 8260C	**94.2**	04/01/2017	DLC
4-Bromofluorobenzene 200X Dilution	SW-846 8260C	**102**	03/31/2017	DLC
4-Bromofluorobenzene 10X Dilution	SW-846 8260C	**109**	03/31/2017	DLC
4-Bromofluorobenzene 100X Dilution	SW-846 8260C	**98.3**	03/31/2017	DLC
4-Bromofluorobenzene	SW-846 8260C	**59.3**	04/01/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030265 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

ANALYTE	METHOD	RESULTS	UNITS	REPORTING LIMITS	ANALYSIS DATE	ANALYSIS BY
Dichlorodifluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Vinyl Chloride	SW-846 8260C	U	UG/L	0.020	03/30/2017	DLC
Bromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Carbon Tetrachloride	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichlorofluoromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethanol	SW-846 8260C	U	UG/L	20	03/30/2017	DLC
Carbon Disulfide	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Acetone	SW-846 8260C	U	UG/L	2.5	03/30/2017	DLC
1,1-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methylene Chloride	SW-846 8260C	U	UG/L	0.50	03/30/2017	DLC
Acrylonitrile	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Methyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropyl Ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethyl tert-butyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Methyl Ethyl Ketone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
cis-1,2-Dichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chloroform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Benzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Trichloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Amyl methyl ether	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butyl Alcohol	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromomethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromodichloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
trans-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Methyl-2-pentanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
Toluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
cis-1,3-Dichloropropene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2-Trichloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Hexanone	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC

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CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027	DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030265 C601
CLIENT CONTACT:	Thom Morin		
CLIENT PROJECT:	03916.3		

LABORATORY BLANK RESULTS

MB-033017A - Batch 114939 - Air by SW-846 8260C

1,3-Dichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Tetrachloroethene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Dibromochloromethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromoethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Chlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,1,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Ethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
m-&p-Xylenes	SW-846 8260C	U	UG/L	0.40	03/30/2017	DLC
Styrene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
o-Xylene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromoform	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Isopropylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,1,2,2-Tetrachloroethane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichloropropane	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Bromobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Propylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
2-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3,5-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Chlorotoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
tert-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,4-Trimethylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
sec-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
4-Isopropyltoluene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,3-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,4-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
n-Butylbenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2-Dibromo-3-chloropropane	SW-846 8260C	U	UG/L	1.0	03/30/2017	DLC
1,2,4-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Hexachlorobutadiene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
Naphthalene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC
1,2,3-Trichlorobenzene	SW-846 8260C	U	UG/L	0.20	03/30/2017	DLC

U - Analyte analyzed for but not detected at level above reporting limit.

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

ALS Environmental

CERTIFICATE OF ANALYSIS

CLIENT:	Environmental Partners, Inc. 1180 NW Maple St, Suite 310 Issaquah, WA 98027		DATE: ALS SDG#: WDOE ACCREDITATION:	4/5/2017 EV17030265 C601
CLIENT CONTACT:	Thom Morin			
CLIENT PROJECT:	03916.3			

LABORATORY CONTROL SAMPLE RESULTS

ALS Test Batch ID: 114939 - Air by SW-846 8260C

SPIKED COMPOUND	METHOD	%REC	RPD	QUAL	LIMITS MIN	LIMITS MAX	ANALYSIS DATE	ANALYSIS BY
1,1-Dichloroethene - BS	SW-846 8260C	**89.2**			75	135	03/30/2017	DLC
1,1-Dichloroethene - BSD	SW-846 8260C	**90.2**	**1**		75	135	03/30/2017	DLC
Benzene - BS	SW-846 8260C	**90.4**			75.1	135	03/30/2017	DLC
Benzene - BSD	SW-846 8260C	**92.0**	**2**		75.1	135	03/30/2017	DLC
Trichloroethene - BS	SW-846 8260C	**87.6**			80.8	136	03/30/2017	DLC
Trichloroethene - BSD	SW-846 8260C	**89.8**	**3**		80.8	136	03/30/2017	DLC
Toluene - BS	SW-846 8260C	**96.7**			67.3	128.9	03/30/2017	DLC
Toluene - BSD	SW-846 8260C	**98.9**	**2**		67.3	128.9	03/30/2017	DLC
Chlorobenzene - BS	SW-846 8260C	**100**			73.7	130	03/30/2017	DLC
Chlorobenzene - BSD	SW-846 8260C	**101**	**1**		73.7	130	03/30/2017	DLC

APPROVED BY

Laboratory Director

ADDRESS 8620 Holly Drive, Suite 100, Everett, WA 9820 | PHONE 425-356-2600 | FAX 425-356-2626
ALS Group USA, Corp dba ALS Environmental

8

ALS Environmental
8620 Holly Drive, Suite 100
Everett, WA 98208
Phone (425) 356-2600
Fax (425) 356-2626
http://www.alsglobal.com

Chain Of Custody/ Laboratory Analysis Request

ALS Job# (Laboratory Use Only) EV17030265

Date 03/29/17 Page 1 Of 1

PROJECT ID: 03916.3
REPORT TO COMPANY: epi
PROJECT MANAGER: Thom Morin
ADDRESS: 1180 NW Maple St, Suite 310
Issaquah, WA 98027
PHONE: 425 395-0010 FAX:
P.O. #: 03916.3 Task 2.7 E-MAIL: Thomm@epi-wa.com
INVOICE TO COMPANY: IWAG III
ATTENTION: PBS
ADDRESS: 400 Bradley Blvd. Suite 300
Richland, WA 99352

ANALYSIS REQUESTED / OTHER (Specify)

SAMPLE I.D.	DATE	TIME	TYPE	LAB#	NWTPH-HCID	NWTPH-DX	NWTPH-GX	BTEX by EPA-8021	MTBE by EPA-8021 ☐ EPA-8260 ☐	Halogenated Volatiles by EPA 8260	Volatile Organic Compounds by EPA 8260	EDB / EDC by EPA 8260 SIM (water)	EDB / EDC by EPA 8260 (soil)	Semivolatile Organic Compounds by EPA 8270	Polycyclic Aromatic Hydrocarbons (PAH) by EPA-8270 SIM ☐	PCB ☐ Pesticides ☐ by EPA 8081/8082	Metals-MTCA-5 ☐ RCRA-8 ☐ Pri Pol ☐ TAL ☐	Metals Other (Specify)	TCLP-Metals ☐ VOA ☐ Semi-Vol ☐ Pest ☐ Herbs ☐								NUMBER OF CONTAINERS	RECEIVED IN GOOD CONDITION?
1. GI6-29-032917	03/29/17	1150	Air	1							X																1	
2. GI8-37-032917	03/29/17	1240	Air	2							X																1	
3.																												
4.																												
5.																												
6.																												
7.																												
8.																												
9.																												
10.																												

SPECIAL INSTRUCTIONS

SIGNATURES (Name, Company, Date, Time):

1. Relinquished By: GJ, epi, 03/29/17, 1630 hrs
   Received By: Shipped Fed Ex 7787 6655 4128, 03/29/17 1630 hrs
2. Relinquished By:
   Received By: [signature] ALS 3/30/17 10:40

TURNAROUND REQUESTED in Business Days*

Organic, ~~Metals~~ & Inorganic Analysis: 10 (Standard) 5 3 2 1 SAME DAY

Fuels & Hydrocarbon Analysis: 5 (Standard) 3 1 SAME DAY

OTHER:
Specify:

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

April 6, 2017

Thom Morin
Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, WA 98027

RE: Pasco Landfill / 03916.3

Dear Thom:

Enclosed are the results of the samples submitted to our laboratory on March 30, 2017. For your reference, these analyses have been assigned our service request number P1701517.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 2:51 pm, 04/06/17

Kate Kaneko
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: Environmental Partners, Inc.
Project: Pasco Landfill / 03916.3

Service Request No: P1701517

CASE NARRATIVE

The samples were received intact under chain of custody on March 30, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Carbon Monoxide Analysis

The samples were analyzed for carbon monoxide according to modified EPA Method 25C. The analyses included a single sample injection (method modification) analyzed by gas chromatography using flame ionization detection/total combustion analysis. This method is not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Fixed Gases Analysis

The samples were also analyzed for fixed gases (hydrogen and nitrogen) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Environmental Partners, Inc.
Service Request: P1701517
Project ID: Pasco Landfill / 03916.3

Date Received: 3/30/2017
Time Received: 09:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	3C Modified - Fxd Gases Bag	25C Modified - TGNMO+ 1X Bag
GI1-35-032917	P1701517-001	Air	3/29/2017	12:30	X	X
GI2-27-032917	P1701517-002	Air	3/29/2017	12:19	X	X

ALS

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. P1701517

ALS Contact: Kate Kaneko

Company Name & Address (Reporting Information): ~~PBS 400 Bradley Blvd, Suite 308 Richland WA 99352~~ epi 1180 NW Maple St Suite 310 Issaquah, WA 98027

Project Name: Pasco Landfill

Project Number: ~~64180.017.0003~~ 039163

Project Manager: ~~Mary M. McElheron~~ Thom Mo Vin

P.O. # / Billing Information: IWAG Group III c/o PBS 400 Bradley Blvd Suite 300 Richland WA 99352

Phone: ~~509-492-6593~~ 425 Fax: 395-0010

Email Address for Result Reporting: ~~mary.mcelheron@pbsusa.com~~ Thom@epi-wa.com

Sampler (Print & Sign): Eric Jensen 509 554-1247

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: CO	Analysis Method: N_2 H_2	Comments e.g. Actual Preservative or specific instructions
GI1-35-032917	1	03/29/17	1230					0.5L	X	X	
GI2-27-032917	2	03/29/17	1219					0.5L	X	X	

Report Tier Levels - please select
Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	03/29/17	1630 hrs			
Shipped FedEx 7797 6654 4620	03/29/17	1630 hrs	[signature]	3/30/17	0945

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Environmental Partners, Inc. Work order: P1701517
Project: Pasco Landfill / 03916.3
Sample(s) received on: 3/30/17 Date opened: 3/30/17 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

#	Question	Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? ______ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1701517-001.01	1.0 L Tedlar Bag					
P1701517-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers):
Sent in exemption shippers.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Project ID: **Pasco Landfill / 03916.3**
ALS Project ID: P1701517

Carbon Monoxide

Test Code: EPA Method 25C Modified
Instrument ID: HP5890 II/GC1/FID/TCA
Analyst: Mike Conejo
Sampling Media: 1.0 L Tedlar Bag(s)
Test Notes:

Date(s) Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	**Result ppmV**	MRL ppmV	Data Qualifier
GI1-35-032917	P1701517-001	0.50	**760**	5.0	
GI2-27-032917	P1701517-002	0.50	**310**	5.0	
Method Blank	P170331-MB	0.50	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

Client: **Environmental Partners, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1701517
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P170331-LCS

Test Code: EPA Method 25C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/FID/TCA Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/31/17
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
Carbon Monoxide	1,000	**999**	**100**	85-118	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI1-35-032917**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701517
ALS Sample ID: P1701517-001

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	**Compound**	**Result** **%, v/v**	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	**Nitrogen**	**81.6**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI2-27-032917**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701517
ALS Sample ID: P1701517-002

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	**Compound**	**Result %, v/v**	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	**Nitrogen**	**84.6**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Environmental Partners, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701517
ALS Sample ID: P170331-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Environmental Partners, Inc.**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701517
ALS Sample ID: P170331-LCS

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/31/17
Volume(s) Analyzed: NA ml(s)

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	**39,800**	**100**	94-105	
7727-37-9	Nitrogen	50,000	**51,500**	**103**	89-113	

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

April 6, 2017

Thom Morin
Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, WA 98027

RE: Pasco Landfill / 03916.3

Dear Thom:

Enclosed are the results of the samples submitted to our laboratory on March 30, 2017. For your reference, these analyses have been assigned our service request number P1701518.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 2:52 pm, 04/06/17

Kate Kaneko
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: Environmental Partners, Inc.
Project: Pasco Landfill / 03916.3

Service Request No: P1701518

CASE NARRATIVE

The samples were received intact under chain of custody on March 30, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Carbon Monoxide Analysis

The samples were analyzed for carbon monoxide according to modified EPA Method 25C. The analyses included a single sample injection (method modification) analyzed by gas chromatography using flame ionization detection/total combustion analysis. This method is not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Fixed Gases Analysis

The samples were also analyzed for fixed gases (hydrogen and nitrogen) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Environmental Partners, Inc.

Service Request: P1701518

Project ID: Pasco Landfill / 03916.3

Date Received: 3/30/2017

Time Received: 09:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	3C Modified - Fxd Gases Bag	25C Modified - TGNMO+ 1X Bag
GI2-32-032917	P1701518-001	Air	3/29/2017	12:23	X	X
GI3-25-032917	P1701518-002	Air	3/29/2017	12:08	X	X

2

Air - Chain of Custody Record & Analytical Service Request

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. P1701518

ALS Contact: Kate Kaneko

Company Name & Address (Reporting Information): ~~PBS 400 Bradley Blvd, Suite 308 Richland WA 99352~~ epi 1180 NW Maple st. Suite, 310 Issaquah, WA 98027

Project Name: Pasco Landfill

Project Number: ~~6480.017.0003~~ 03916.3

Project Manager: ~~Mary McElhevon~~ Thom Morin

P.O. # / Billing Information: IWAG Group III c/o PBS 400 Bradley Blvd Suite 300 Richland WA 99352

Phone: ~~509-492-6593~~ 425

Fax: 395-0010

Email Address for Result Reporting: Thomm@epi-wa.com ~~mary.mcelhevon@pbsusa.com~~

Sampler (Print & Sign): Eric Jensen 509 554-1247

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: CO	Analysis Method: N_2 H_2	Comments e.g. Actual Preservative or specific instructions
GI2-32-032917	1	03/29/17	1223					0.5L	X	X	
GI3-25-032917	2	03/29/17	1208					0.5L	X	X	

Report Tier Levels - please select
Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: ______ Units: ______

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	03/29/17	1630 hrs			
Shipped Fed Ex 7787 6654 5535	03/29/17	1630 hrs	[signature]	3/30/17	0945

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Environmental Partners, Inc. Work order: P1701518
Project: Pasco Landfill
Sample(s) received on: 3/30/17 Date opened: 3/30/17 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

#	Question	Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1701518-001.01	1.0 L Tedlar Bag					
P1701518-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Environmental Partners, Inc.**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701518

Carbon Monoxide

Test Code: EPA Method 25C Modified
Instrument ID: HP5890 II/GC1/FID/TCA
Analyst: Mike Conejo
Sampling Media: 1.0 L Tedlar Bag(s)
Test Notes:

Date(s) Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	**Result ppmV**	MRL ppmV	Data Qualifier
GI2-32-032917	P1701518-001	0.50	**490**	5.0	
GI3-25-032917	P1701518-002	0.50	**480**	5.0	
Method Blank	P170331-MB	0.50	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Environmental Partners, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1701518
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P170331-LCS

Test Code: EPA Method 25C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/FID/TCA Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/31/17
Sampling Media: 1.0 L Tedlar Bag Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
Carbon Monoxide	1,000	**999**	**100**	85-118	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI2-32-032917** ALS Project ID: P1701518
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P1701518-001

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	**Hydrogen**	**0.272**	0.10	
7727-37-9	**Nitrogen**	**84.0**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI3-25-032917**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701518
ALS Sample ID: P1701518-002

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	**Hydrogen**	**0.311**	0.10	
7727-37-9	**Nitrogen**	**85.2**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Environmental Partners, Inc.**
Client Sample ID: **Method Blank**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701518
ALS Sample ID: P170331-MB

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	**Compound**	**Result %, v/v**	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Environmental Partners, Inc.**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701518
ALS Sample ID: P170331-LCS

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/31/17
Volume(s) Analyzed: NA ml(s)

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	**39,800**	**100**	94-105	
7727-37-9	Nitrogen	50,000	**51,500**	**103**	89-113	

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

April 6, 2017

Thom Morin
Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, WA 98027

RE: Pasco Landfill / 03916.3

Dear Thom:

Enclosed are the results of the samples submitted to our laboratory on March 30, 2017. For your reference, these analyses have been assigned our service request number P1701519.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 2:52 pm, 04/06/17

Kate Kaneko
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: Environmental Partners, Inc. Service Request No: P1701519
Project: Pasco Landfill / 03916.3

CASE NARRATIVE

The samples were received intact under chain of custody on March 30, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Carbon Monoxide Analysis

The samples were analyzed for carbon monoxide according to modified EPA Method 25C. The analyses included a single sample injection (method modification) analyzed by gas chromatography using flame ionization detection/total combustion analysis. This method is not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Fixed Gases Analysis

The samples were also analyzed for fixed gases (hydrogen and nitrogen) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
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ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Environmental Partners, Inc. Service Request: P1701519
Project ID: Pasco Landfill / 03916.3

Date Received: 3/30/2017
Time Received: 09:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	3C Modified - Fxd Gases Bag	25C Modified - TGNMO+ 1X Bag
GI6-29-032917	P1701519-001	Air	3/29/2017	11:50	X	X
GI8-37-032917	P1701519-002	Air	3/29/2017	12:40	X	X

4

Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

ALS
2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle: 1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. P1700519

ALS Contact: Kate Kaneko

Company Name & Address (Reporting Information): ~~PBS 400 Bradley Blvd, Suite 300 Richland WA 99352~~ epi 1180 NW maple st Suite 310 Issaquah WA 98027

Project Name: Pasco Landfill

Project Number: ~~64180.017.0003~~ 039163

Project Manager: ~~Mary McElheron~~ Thom Morin

Phone: ~~509-492-6593~~ 425 395-0010

Fax:

P.O. # / Billing Information: IWAG Group III c/o PBS 400 Bradley Blvd Suite 300 Richland WA 99352

Email Address for Result Reporting: ~~mary.mcelheron@pbsusa.com~~ Thomm@epi-wa.com

Sampler (Print & Sign): Eric Jensen 509 554-1247

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: CO	Analysis Method: N_2 H_2	Comments e.g. Actual Preservative or specific instructions
GI6-29-032917	1	03/29/17	1150					0.5L	X	X	
GI8-37-032917	2	03/29/17	1240					0.5L	X	X	

Report Tier Levels - please select
Tier I - Results (Default if not specified) ____
Tier II (Results + QC Summaries) ____
Tier III (Results + QC & Calibration Summaries) ____
Tier IV (Data Validation Package) 10% Surcharge ____

EDD required Yes / No
Type: ____ Units: ____

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time:
[signature]	03/29/17	1630 hrs			
Shipped FedEx 7787 6654 1768	03/29/17	1630 hrs	[signature]	3/30/17	0945

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Environmental Partners, Inc. Work order: P1701519
Project: Pasco Landfill / 03916.3
Sample(s) received on: 3/30/17 Date opened: 3/30/17 by: KKELPE

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

#	Question	Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? ____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1701519-001.01	1.0 L Tedlar Bag					
P1701519-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers):
Sent in exemption shipper.

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Page 1 of 1

Client: **Environmental Partners, Inc.**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701519

Carbon Monoxide

Test Code: EPA Method 25C Modified
Instrument ID: HP5890 II/GC1/FID/TCA
Analyst: Mike Conejo
Sampling Media: 1.0 L Tedlar Bag(s)
Test Notes:

Date(s) Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	**Result ppmV**	MRL ppmV	Data Qualifier
GI6-29-032917	P1701519-001	0.50	**1,200**	5.0	
GI8-37-032917	P1701519-002	0.50	**610**	5.0	
Method Blank	P170331-MB	0.50	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Environmental Partners, Inc.**
Client Sample ID: **Lab Control Sample** ALS Project ID: P1701519
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P170331-LCS

Test Code: EPA Method 25C Modified | Date Collected: NA
Instrument ID: HP5890 II/GC1/FID/TCA | Date Received: NA
Analyst: Mike Conejo | Date Analyzed: 3/31/17
Sampling Media: 1.0 L Tedlar Bag | Volume(s) Analyzed: NA ml(s)
Test Notes:

Compound	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
Carbon Monoxide	1,000	**999**	**100**	85-118	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI6-29-032917** ALS Project ID: P1701519
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P1701519-001

Test Code: EPA Method 3C Modified Date Collected: 3/29/17
Instrument ID: HP5890 II/GC1/TCD Date Received: 3/30/17
Analyst: Mike Conejo Date Analyzed: 3/31/17
Sample Type: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	**Hydrogen**	**0.308**	0.10	
7727-37-9	**Nitrogen**	**84.6**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS
Page 1 of 1

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI8-37-032917** ALS Project ID: P1701519
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P1701519-002

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	**Nitrogen**	**81.0**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1701519
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P170331-MB

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/31/17
Sample Type: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client: **Environmental Partners, Inc.**
Client Sample ID: **Lab Control Sample**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701519
ALS Sample ID: P170331-LCS

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: NA
Date Received: NA
Date Analyzed: 3/31/17
Volume(s) Analyzed: NA ml(s)

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	**39,800**	**100**	94-105	
7727-37-9	Nitrogen	50,000	**51,500**	**103**	89-113	

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

LABORATORY REPORT

April 6, 2017

Thom Morin
Environmental Partners, Inc.
1180 NW Maple Street, Suite 310
Issaquah, WA 98027

RE: Pasco Landfill / 03916.3

Dear Thom:

Enclosed are the results of the samples submitted to our laboratory on March 30, 2017. For your reference, these analyses have been assigned our service request number P1701520.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

ALS | Environmental

Kate Kaneko
By Kate Kaneko at 2:52 pm, 04/06/17

Kate Kaneko
Project Manager

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

Client: Environmental Partners, Inc. Service Request No: P1701520
Project: Pasco Landfill / 03916.3

CASE NARRATIVE

The samples were received intact under chain of custody on March 30, 2017 and were stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the samples at the time of sample receipt.

Carbon Monoxide Analysis

The samples were analyzed for carbon monoxide according to modified EPA Method 25C. The analyses included a single sample injection (method modification) analyzed by gas chromatography using flame ionization detection/total combustion analysis. This method is not included on the laboratory's NELAP or DoD-ELAP scope of accreditation.

Fixed Gases Analysis

The samples were also analyzed for fixed gases (hydrogen and nitrogen) according to modified EPA Method 3C (single injection) using a gas chromatograph equipped with a thermal conductivity detector (TCD). This procedure is described in laboratory SOP VOA-EPA3C. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.

2655 Park Center Dr., Suite A
Simi Valley, CA 93065
T: +1 805 526 7161
F: +1 805 526 7270
www.alsglobal.com

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Arizona DHS	http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home	AZ0694
Florida DOH (NELAP)	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E871020
Louisiana DEQ (NELAP)	http://www.deq.louisiana.gov/portal/DIVISIONS/PublicParticipationandPermitSupport/LouisianaLaboratoryAccreditationProgram.aspx	05071
Maine DHHS	http://www.maine.gov/dhhs/mecdc/environmental-health/water/dwp-services/labcert/labcert.htm	2016036
Minnesota DOH (NELAP)	http://www.health.state.mn.us/accreditation	1177034
New Jersey DEP (NELAP)	http://www.nj.gov/dep/oqa/	CA009
New York DOH (NELAP)	http://www.wadsworth.org/labcert/elap/elap.html	11221
Oregon PHD (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	4068-004
Pennsylvania DEP	http://www.depweb.state.pa.us/labs	68-03307 (Registration)
PJLA (DoD ELAP)	http://www.pjlabs.com/search-accredited-labs	65818 (Testing)
Texas CEQ (NELAP)	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704413-16-7
Utah DOH (NELAP)	http://health.utah.gov/lab/environmental-lab-certification/	CA016272016-6
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C946

Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at www.alsglobal.com, or at the accreditation body's website.

Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.

ALS ENVIRONMENTAL

DETAIL SUMMARY REPORT

Client: Environmental Partners, Inc.

Service Request: P1701520

Project ID: Pasco Landfill / 03916.3

Date Received: 3/30/2017

Time Received: 09:45

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	3C Modified - Fxd Gases Bag	25C Modified - TGNMO+ 1X Bag
GI4-30-032917	P1701520-001	Air	3/29/2017	11:38	X	X
GI5-28-032917	P1701520-002	Air	3/29/2017	12:00	X	X

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Air - Chain of Custody Record & Analytical Service Request

Page 1 of 1

2655 Park Center Drive, Suite A
Simi Valley, California 93065
Phone (805) 526-7161
Fax (805) 526-7270

Requested Turnaround Time in Business Days (Surcharges) please circle
1 Day (100%) 2 Day (75%) 3 Day (50%) 4 Day (35%) 5 Day (25%) 10 Day-Standard

ALS Project No. P1701520

ALS Contact: Kate Kaneko

Company Name & Address (Reporting Information): ~~PBS 400 Bradley Blvd, Suite 308 Richland WA 99352~~ epi 1190 NW Maple St, Suite 310 Issaquah, WA 98027

Project Manager: ~~Mary McElheron~~ Thom Morin

Phone: ~~509-492-6593~~ 425 395-0010
Fax:

Email Address for Result Reporting: ~~mary.mcelheron@pbsusa.com~~ Thomm@epi-wa.com

Project Name: Pasco Landfill

Project Number: ~~64180.017.0008~~ 03916.3

P.O. # / Billing Information: IWAG Group III c/o PBS 400 Bradley Blvd Suite 300 Richland WA 99352

Sampler (Print & Sign): Eric Jensen 509 554-1247

Client Sample ID	Laboratory ID Number	Date Collected	Time Collected	Canister ID (Bar code # - AC, SC, etc.)	Flow Controller ID (Bar code # - FC #)	Canister Start Pressure "Hg	Canister End Pressure "Hg/psig	Sample Volume	Analysis Method: CO	Analysis Method: N_2 H_2	Comments e.g. Actual Preservative or specific instructions
GI4-30-032917	1	03/29/17	1138					0.5L	X	X	
GI5-28-032917	2	03/29/17	1200					0.5L	X	X	

Report Tier Levels - please select
Tier I - Results (Default if not specified) ____ Tier III (Results + QC & Calibration Summaries) ____
Tier II (Results + QC Summaries) ____ Tier IV (Data Validation Package) 10% Surcharge ____

EDD required (Yes) / No
Type: ________ Units: ________

Chain of Custody Seal: (Circle)
INTACT BROKEN ABSENT

Project Requirements (MRLs, QAPP)

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Date:	Time
[signature]	03/29/17	1630 hrs			
Shipped Fed Ex 7787 6654 6380	03/29/17	1630 hrs	[signature]	3/30/17	0945

Cooler / Blank Temperature ____ °C

ALS Environmental
Sample Acceptance Check Form

Client: Environmental Partners, Inc. Work order: P1701520
Project: Pasco Landfill / 03916.3
Sample(s) received on: 3/30/17 Date opened: 3/30/17 by: ADAVID

Note: This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

		Yes	No	N/A
1	Were **sample containers** properly marked with client sample ID?	☒	☐	☐
2	Did **sample containers** arrive in good condition?	☒	☐	☐
3	Were **chain-of-custody** papers used and filled out?	☒	☐	☐
4	Did **sample container labels** and/or tags agree with custody papers?	☒	☐	☐
5	Was **sample volume** received adequate for analysis?	☒	☐	☐
6	Are samples within specified holding times?	☒	☐	☐
7	Was proper **temperature** (thermal preservation) of cooler at receipt adhered to?	☐	☐	☒
8	Were **custody seals** on outside of cooler/Box/Container?	☐	☒	☐
	Location of seal(s)? ____ Sealing Lid?	☐	☐	☒
	Were signature and date included?	☐	☐	☒
	Were seals intact?	☐	☐	☒
9	Do containers have appropriate **preservation**, according to method/SOP or Client specified information?	☐	☐	☒
	Is there a client indication that the submitted samples are **pH** preserved?	☐	☐	☒
	Were **VOA vials** checked for presence/absence of air bubbles?	☐	☐	☒
	Does the client/method/SOP require that the analyst check the sample pH and if necessary alter it?	☐	☐	☒
10	**Tubes:** Are the tubes capped and intact?	☐	☐	☒
11	**Badges:** Are the badges properly capped and intact?	☐	☐	☒
	Are dual bed badges separated and individually capped and intact?	☐	☐	☒

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P1701520-001.01	1.0 L Tedlar Bag					
P1701520-002.01	1.0 L Tedlar Bag					

Explain any discrepancies: (include lab sample ID numbers):

RSK - MEEPP, HCL (pH<2); RSK - CO2, (pH 5-8); Sulfur (pH>4)

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Project ID: **Pasco Landfill / 03916.3** ALS Project ID: P1701520

Carbon Monoxide

Test Code: EPA Method 25C Modified
Instrument ID: HP5890 II/GC1/FID/TCA — Date(s) Collected: 3/29/17
Analyst: Mike Conejo — Date Received: 3/30/17
Sampling Media: 1.0 L Tedlar Bag(s) — Date Analyzed: 3/31/17
Test Notes:

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	**Result ppmV**	MRL ppmV	Data Qualifier
GI4-30-032917	P1701520-001	0.50	**6.4**	5.0	
GI5-28-032917	P1701520-002	0.50	**670**	5.0	
Method Blank	P170331-MB	0.50	ND	5.0	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client:	**Environmental Partners, Inc.**		
Client Sample ID:	**Lab Control Sample**	ALS Project ID:	P1701520
Client Project ID:	**Pasco Landfill / 03916.3**	ALS Sample ID:	P170331-LCS

Test Code:	EPA Method 25C Modified	Date Collected:	NA
Instrument ID:	HP5890 II/GC1/FID/TCA	Date Received:	NA
Analyst:	Mike Conejo	Date Analyzed:	3/31/17
Sampling Media:	1.0 L Tedlar Bag	Volume(s) Analyzed:	NA ml(s)
Test Notes:			

Compound	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
Carbon Monoxide	1,000	**999**	**100**	85-118	

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI4-30-032917** ALS Project ID: P1701520
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P1701520-001

Test Code: EPA Method 3C Modified Date Collected: 3/29/17
Instrument ID: HP5890 II/GC1/TCD Date Received: 3/30/17
Analyst: Mike Conejo Date Analyzed: 3/31/17
Sample Type: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	**Nitrogen**	**78.9**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **GI5-28-032917**
Client Project ID: **Pasco Landfill / 03916.3**

ALS Project ID: P1701520
ALS Sample ID: P1701520-002

Test Code: EPA Method 3C Modified
Instrument ID: HP5890 II/GC1/TCD
Analyst: Mike Conejo
Sample Type: 1.0 L Tedlar Bag
Test Notes:

Date Collected: 3/29/17
Date Received: 3/30/17
Date Analyzed: 3/31/17
Volume(s) Analyzed: 0.10 ml(s)

CAS #	**Compound**	**Result %, v/v**	MRL %, v/v	Data Qualifier
1333-74-0	**Hydrogen**	**0.385**	0.10	
7727-37-9	**Nitrogen**	**86.2**	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

RESULTS OF ANALYSIS

Client: **Environmental Partners, Inc.**
Client Sample ID: **Method Blank** ALS Project ID: P1701520
Client Project ID: **Pasco Landfill / 03916.3** ALS Sample ID: P170331-MB

Test Code: EPA Method 3C Modified Date Collected: NA
Instrument ID: HP5890 II/GC1/TCD Date Received: NA
Analyst: Mike Conejo Date Analyzed: 3/31/17
Sample Type: 1.0 L Tedlar Bag Volume(s) Analyzed: 0.10 ml(s)
Test Notes:

CAS #	Compound	Result %, v/v	MRL %, v/v	Data Qualifier
1333-74-0	Hydrogen	ND	0.10	
7727-37-9	Nitrogen	ND	0.10	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.
MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

ALS ENVIRONMENTAL

LABORATORY CONTROL SAMPLE SUMMARY

Client:	**Environmental Partners, Inc.**		
Client Sample ID:	**Lab Control Sample**	ALS Project ID:	P1701520
Client Project ID:	**Pasco Landfill / 03916.3**	ALS Sample ID:	P170331-LCS

Test Code:	EPA Method 3C Modified	Date Collected:	NA
Instrument ID:	HP5890 II/GC1/TCD	Date Received:	NA
Analyst:	Mike Conejo	Date Analyzed:	3/31/17
Sample Type:	1.0 L Tedlar Bag	Volume(s) Analyzed:	NA ml(s)
Test Notes:			

CAS #	**Compound**	Spike Amount ppmV	**Result ppmV**	**% Recovery**	ALS Acceptance Limits	Data Qualifier
1333-74-0	Hydrogen	40,000	**39,800**	**100**	94-105	
7727-37-9	Nitrogen	50,000	**51,500**	**103**	89-113	