ENVIRONMENTAL AND GEOTECHNICAL SITE EVALUATION
EAST AND WEST WATERFRONT PARKING LOTS
NEWBURYPORT, MASSACHUSETTS
GZA PROJECT NUMBER 18.0171593.00



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EXECUTIVE SUMMARY

ENVIRONMENTAL SUMMARY

Twenty test borings were drilled in the East and West Lots on the Newburyport Waterfront park parcels to evaluate Environmental and Geotechnical conditions for three proposed commercial and residential buildings. Laboratory analyses were performed on select soil and groundwater samples for oil and hazardous materials (OHM) to both characterize the Site conditions and to develop premium disposal costs for any contaminated soils that may be excavated during construction of the buildings and underground parking. In the groundwater samples analyzed from two monitoring wells installed on the property, no chemicals analyzed were detected above laboratory detection limits. Soil analytical results are discussed in the following paragraphs.

Environmental Site Issues

In the West Lot, concentrations of select petroleum-related compounds and metals exceeded their respective Massachusetts Department of Environmental Protection (MassDEP) Reportable Concentrations. The soils samples were all taken from within the first ten feet of soil, and are therefore indicative of the condition of the urban fill layer. The petroleum-related exceedances, restricted to a small area of the property near Merrimac Street, are required to be reported to MassDEP within 120 days. Based on the current investigation, the source of the petroleum is either a former "filling station" historically occupying the property near Merrimac Street or from two other former filling stations that operated across the street as recently as the 1960s.

Concentrations of various Polynuclear Aromatic Hydrocarbons (PAHs), arsenic, chromium, and lead were also detected in several samples on the West Parking lot exceeding MassDEP Reportable Concentrations. According to MassDEP regulations, the presence of coal, coal ash or wood ash in urban fill allows for detections of PAHs and metals to be classified as "background," and thus exempt from the reporting requirements. Coal was historically stored on the West Lot, and coal and wood cinders were observed in several shallow soil samples. Thus, these exceedances of the Reportable Concentrations can be considered as "background." and are not reportable to MassDEP.

Select soil samples with high metal detections were further analyzed for toxicity characterization and were found to be below the EPA Toxicity Characteristic Threshold, indicating that the soils to be excavated are not considered hazardous for disposal. Based on the widely spaced results, it is likely that the metals concentrations are a result of historic coal storage, past industrial operations on the property, and historic land filling with soils of unknown origin.

The East Lot is included in the waste site listed as RTN 3-15445, which currently has a Class B-2 RAO issued in November 2011. An Activity and Use Limitation (AUL) is currently in effect for the Site, but the AUL is based on Site usage as a park. The current plans for the East Lot include residential and commercial development, and the Method 3 Risk Characterization on which the current AUL is based must be re-evaluated to take into account the different Site usage.

All concentrations of contaminants encountered in this investigation are similar to the Contaminants of Concern (COC) identified by Weston & Sampson in earlier investigations. Therefore, no additional reporting requirements or changes to the RAO in effect for the East lot are required. Concentrations of compounds did not exceed their respective MassDEP regulatory standards, with the exception of concentrations of VOCs and Metals. The soils samples were all taken from within the first ten feet of soil, and are indicative of the condition of the urban fill layer.

Disposal Parameters

Samples from the West Lot were analyzed for select disposal criteria in order to characterize soils for potential future disposal. Using a total average excavation depth of 12-feet from the existing ground surface on both the East and West lots, as currently planned, approximately 10,800 cubic yards (in place volume) of material will be required to be excavated for the installation of the sublevel parking beneath the buildings. According to applicable disposal criteria, combined with the other environmental analytical data, approximately 9,000 yds^3 are within MassDEP parameters to be disposed within an Unlined in-state Landfill, approximately 200 yds^3 are within MassDEP parameters to be disposed within an in-state Lined Landfill, and approximately 200 yds^3 are required to be disposed in a landfill capable of accommodating soils exceeding the MassDEP Lined Landfill parameters, most likely an out of state landfill. These quantities can be reduced significantly if the soils are reused on site to raise grades for flood protection and overall site grading. It should be noted standard disposal sampling practices should be employed during construction, and the disposal estimates herein could vary dramatically from actual disposal quantities. It is assumed that approximately 1,500 yds^3 of excavated rock will be reused locally or disposed locally, and is not included in the preceding estimates.

GEOTECHNICAL SUMMARY

The primary geotechnical issues that could have a premium cost impact on the design and construction of the proposed building are:

- The presence of unsuitable urban fill;
- The proposed construction of a subsurface parking structure;
- The presence of presumed bedrock at depths ranging from 8 to 32 feet bgs;
- The high groundwater table; and
- Design flood levels

The NRA has indicated that the initial design proposal has suggested a finished first floor elevation approximately three feet above existing grade, corresponding to approximately 13-feet NAVD88. The existing grade within the proposed building footprint on the West Lot currently varies from approximately 9.5 feet to 14.5 feet NAVD88. Existing grade on the East Lot is relatively flat, with an approximate elevation range of 9.3 to 11.1 feet NAVD88 within the proposed building footprint. Excavation to approximately 12-feet below the existing surface, corresponding to an approximate elevation of -2 feet NAVD88, will likely accommodate the excavation needs for the below ground parking.

The borings from both the east and west lot explorations indicate that both parcels are underlain by a fill material across the building footprints that consists of very loose to dense, brown to black, fine to coarse sand and silt containing up to 35 percent gravel, fragments of brick, wood, glass, coal, cinders, and shells. A natural, intermittent organic silt or peat layer was encountered below the fill in three borings. The organic silt layer was approximately 4 to 7-feet thick, and generally consisted of medium dense, black silt, containing up to ten percent gravel and organic fibers. A natural silt and fine sand layer was encountered at elevations ranging between -4 and -6 feet NAVD88 on the West Lot and 0 to -6 feet NAVD88 on the East Lot. These soils generally consisted of medium dense to dense, brown to olive gray silt containing up to ten percent fine sand. SPT N-Values within the silt and fine sand layer ranged from 19 to 85 bpf. Bedrock was observed and verified from a core sample taken at GZ-11, near Merrimac Street on the west lot, from 10.5 to 14.3 feet bgs, approximately corresponding to elevations 2.7 to -1.1 feet NAVD88.

West Lot Foundations

Individual column footings and perimeter wall footings for the proposed buildings can be supported on the shallow bedrock, encountered at elevations ranging between 7 and -9 feet NAVD88 near the proposed building footprints, or structural fill extending to the natural silt and sand stratum. Over-excavation of unsuitable fill to bedrock or proof-compacted natural sand and silt should be carried out prior to placement of properly compacted structural fill or foundation components. Construction dewatering would be necessary, and a temporary excavation support structure such as steel sheetpiling, may be required. Alternatively, it may be feasible to use construction methods that allow the permanent foundation wall to be used for excavation support such as slurry walls or secant-pile walls. Excavation support systems would limit the soil excavation quantity, since side-sloping would not be required. Portions of the building excavations may require rock excavation (possibly blasting) to attain a final excavation grade of -2 feet NAVD88. Footings on bedrock should be designed with a maximum net allowable bearing pressure of eight tons per square foot (8 tsf). Footings on structural fill or natural sand and silt should be designed with a maximum net allowable bearing pressure of two tons per square foot (2 tsf). Deep foundations (piles) are not recommended for the West Lot. The underground parking structural slab should be designed to resist hydrostatic uplift pressures in conjunction with the waterproofing system selected with for the proposed development.

East Lot Foundations

Individual column footings and perimeter wall footings for the proposed buildings can be supported on compacted structural fill extending to proof-compacted natural silt and sand encountered at elevations ranging from 1 to -6 feet NAVD88. Over-excavation of unsuitable fill to proof-compacted natural sand and silt should be carried out prior to placement of properly compacted structural fill or foundation components. Construction dewatering would be necessary, and a temporary excavation support structure such as steel sheetpiling may be required. Alternatively, it may be feasible to use construction methods that allow the permanent wall to be used for excavation support such as slurry walls or secant-pile walls. It should be noted that, excavation support systems would limit the soil excavation quantity, since side-sloping would not be required. Footings on structural fill or natural sand and silt should be designed with a maximum net allowable bearing pressure of two tons per square foot (2 tsf). The underground parking structural slab should be designed to resist hydrostatic uplift pressures in conjunction with the waterproofing system selected with for the proposed development.

Should the finished floor elevation of the garage level be revised higher, deep pile foundations should be considered in order to limit costs associated with soil excavation, soil disposal, and imported structural fill.

FLOOD CONSIDERATIONS

The published Flood Insurance Rate Maps (FIRM) indicate that the 100 year flood elevation at the site varies from elevation 13 feet to elevation 12 feet NAVD88. In accordance with the Federal Emergency Management Agency (FEMA) regulations and the MSBC, the finished floor elevation has to be at or above the FEMA 100 year flood elevation. Additionally, Appendix A, Section XIII of the Newburyport Zoning Bylaw requires an elevation of 11.5 feet NAVD88 for new development on properties with the Floodplain Overlay District. The site is located within the Floodplain Overlay District.

UNDERGROUND PARKING

The proposed development includes the construction of underground parking below each of the three buildings. Excavation to approximately 12-feet below the existing surface, corresponding to an approximate elevation of -2 foot NAVD88, will likely accommodate the excavation needs for the sublevel parking. Groundwater near the proposed construction was measured at an average elevation of 4 feet NAVD88, although the actual groundwater levels will vary according to seasonal and tidal effects.

The parking garage can be constructed below the 100-year flood elevation, provided that measures to protect the garage from flooding are incorporated into the building design. Such protective measures could include waterproofing of the exterior walls and subslab, installation of sumps, basement drainage systems, site grading to prevent water from entering the garage, and installation of watertight entry doors that can be closed when flood conditions are imminent.

Extending the excavations to elevation -2 feet NAVD88 to accommodate underground parking has a premium cost factor related to the additional excavation of soils, the disposal of these soils at special landfills, dewatering during construction, and the installation of a waterproofing and groundwater management system for the operational building.

The basement parking areas of each building should be designed and constructed using a positive-side waterproofing system. The entire lower level structural slab and exterior walls should be designed to resist the hydrostatic uplift of ground water as well as prevent moisture infiltration into the lower level garage space. Some commercially available waterproofing systems include flexible self-adhering rubberized asphalt sheet waterproofing membranes, high-density polypropylene (HDPE) products, bentonite panel systems, and concrete with hydrophobic additives. Installation of an internal pump or drainage system should be considered in order to control infiltrated water in the event of extreme weather events.

It is anticipated that de-watering will be required during construction of the sublevel parking. As groundwater analysis at the two wells recently installed did not reveal detectible concentrations of the chemicals analyzed for, premium environmental concerns related to groundwater discharge due to dewatering are not anticipated.

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1.0 INTRODUCTION

On behalf of Newburyport Redevelopment Authority (NRA), GZA GeoEnvironmental, Inc. (GZA) has prepared this Environmental and Geotechnical Site Evaluation report documenting the results of a subsurface investigation at the property identified as the East and West Waterfront Park Lots in Newburyport, Massachusetts. The NRA is in the process of preparing a Request for Proposals (RFP) for the development of both the East & West Lots located in downtown Newburyport. The NRA retained GZA to assess the environmental and geotechnical characteristics of the soils on this property, and provide an estimate of premium costs related to the disposal of contaminated soils associated with the construction of underground parking beneath proposed buildings. The report and the work described herein are subject to the Limitations contained in Appendix A.

2.0 BACKGROUND

2.1 PROPERTY DESCRIPTION

The Property evaluated in this report is owned by the NRA and covers an area of approximately 4.2 acres on two separate lots, referred to as the East Lot and the West Lot, located on either side of the city's waterfront park. The location of the properties is shown on Figure 1. Both lots are currently used for parking and are covered with a gravel parking surface, concrete curbs, and limited landscaping. The East Lot is part of a Disposal Site tracked by the Massachusetts Department of Environmental Protection (MassDEP) under Release Tracking Number (RTN) 3-15445 due to the presence of lead in soils historically placed as fill materials. The East Lot disposal site is currently listed as having a Class B-2 Response Action Outcome (RAO) with an Activity and Use Limitation (AUL) filed by Western & Sampson in November 2011. The West Lot is not listed as a disposal site with MassDEP.

Site geographical coordinates are as follows:

Latitude: north – 42°48'43.64"N
Longitude: west – 70°52'16.38"W

Universal Transverse Mercator:
Easting: 347014.22 m E
Northing: 4741649.70 m N
Zone: 19T

Site topography within the exploration area on the West Lot slopes downward to the north toward the Merrimack River, and generally ranges in elevation from 14.5 feet to 7.7 feet NAVD88. Site topography within the exploration area on the East Lot is generally flat, with an approximate elevation range of 11.2 feet to 9.3 feet NAVD88.

Proposed development on the East and West Parking Lots consists of three, 3-story, residential and retail buildings occupying a total of approximately 24,200 square feet. The two proposed buildings on the west lot occupy approximately 16,000 square feet, and the one proposed building on the east lot occupies approximately 8,200 square feet. The proposed buildings will be constructed with sublevel parking proposed under each building. NRA members have indicated that the initial design proposal has suggested a finished first floor elevation approximately three feet above existing grade, corresponding to approximately 13-feet NAVD88. It should be noted

that the existing grade on the West Lot varies from 8.2 feet to 14.5 feet NAVD88. Existing grade on the East Lot is relatively flat, with an elevation of approximately 11 feet NAVD88. According to conversations with the NRA, an excavation to approximately 12-feet below the existing surface, corresponding to a basement floor slab elevation of -2 feet NAVD88, will likely accommodate the excavation needs for the sublevel parking. Finished floor elevations and final property grades were not provided.

Additional property development includes limited landscaping, sidewalk construction, and surface parking construction.

2.2 SITE HISTORY

The NRA has owned the Site since the mid- to late 1960s. Prior to this, the Site had a long history of industrial/commercial use. A review of Sanborn maps from 1888 to 1961 indicated that the approximate north half of the East Lot nearest the river was owned and occupied by the Philadelphia and Reading Coal and Iron Company until at least 1928. The other half was used for coal, lumber, and grain storage, and contained a number of businesses including Globe Soap Company, Eagle Chemical Company, fish markets, beef and furniture warehouses, paint and hardware stores, a carpenter shop, a bowling alley, a barber shop, and a grocery store. Railroad tracks were shown on the East Lot in all Sanborn maps during this period along the northern portion of the Site. The 1888 to 1924 Sanborn Maps indicate that the West Lot was occupied by a lumber yard with numerous sheds and a planning mill, with one coal shed shown near the current eastern boundary of the West Lot. A hotel was depicted on the southern portion of the West Lot near Merrimac Street until the 1928 Sanborn map. On maps from 1946 and 1961, a gasoline filling station was depicted on the southern portion of the west lot near where the current chamber of commerce building is located. The 1961 map depicts filling stations near the southwest and southeast corners of the current west parking lot and across Merrimac Street, to the south (upgradient) of the West Lot. Copies of the Sanborn Maps reviewed are included in Appendix F.

According to a Phase I Environmental Site Assessment (ESA) by Ransom Environmental Consultants, Inc. (Ransom), dated July 1998, there are no records with the City of Newburyport Fire Department of underground storage tanks (USTs) for the Site or abutting properties. The Fire Department Chief, however, reportedly indicated that several gasoline service stations were located along Merrimac Street west of the Site during the 1960s, and recalled two USTs being removed from the former fire station south of the Site (now the Firehouse Center). The Ransom Phase I report also stated that several buildings were on-Site at the time NRA took ownership. These buildings, which were reportedly used for storage and printing operations, were in dilapidated condition and were demolished in the late 1960s.

3.0 PREVIOUS INVESTIGATIONS

The following environmental reports, prepared for the East Lot consisting of five parcels (identified as 11-1C, 11-1D, 11-1E, 11-1F and a portion of 12-10), were reviewed in conjunction with this subsurface investigation. No reports were found discussing conditions on the West Lot with the exception of the 1998 Ransom Phase I report.

3.1 LIMITED SITE INVESTIGATION, SIMMONS ENVIRONMENTAL, JANUARY 1997

Simmons Environmental conducted a Limited Site Investigation on the East Lot in January 1997 on behalf of the Newburyport Inn Limited Partnership. The field investigation included advancement of four soil borings using hollow stem auger drilling techniques. Two soil borings were advanced to approximately 14 feet below grade and completed as monitoring wells. During drilling, soil samples were screened in the field for total volatile organic compounds (TVOCs) using a photoionization detector (PID). The highest PID measurement was detected at 32 parts per million by volume (ppmv) in air. All PID readings in three of the borings were non-detect. Two soil samples were submitted for laboratory analyses of metals (arsenic, cadmium, chromium, lead and mercury) and total petroleum hydrocarbon (TPH) fingerprinting. All concentrations were below the applicable Massachusetts Contingency Plan (MCP) Reportable Concentration (RCs) for soil category S-1, except for lead in two samples at 9,300 mg/kg and 530 mg/kg, and EPH parameter C10-C22 aromatics at 400 mg/kg. Groundwater samples were collected and analyzed for TPH. The applicable MCP RC in groundwater (RCGW-2) for TPH of 5 milligrams per liter (mg/L) was exceeded in one well at 8.3 mg/L and was fingerprinted as unknown petroleum hydrocarbons.

Refusal was encountered at two of the Simmons borings on the East Lot at depths of five and eight feet. Two additional boring were advanced to 14 feet without refusal. No indication of the type or density of the soil was given. Borings were not advanced on the West Lot.

3.2 PHASE I INITIAL SITE INVESTIGATION/TIER CLASSIFICATION, RANSOM, JULY 1998

The NRA submitted a release notification form to DEP on July 7, 1997 for the 120-day reportable condition encountered during the Limited Site Investigation. Ransom prepared a Phase I – Initial Site Investigation Report and Tier Classification for submittal to DEP on July 3, 1998. No additional subsurface investigation was performed for the Phase I. The Site was tier classified as Tier II based on a Numerical Ranking System (NRS) score of 250.

3.3 TIER II EXTENSION, VHB, INC., APRIL 2008

On May 17, 2007, MassDEP issued a Notice of Noncompliance (NON) to the NRA for failure to submit a Phase II and Phase II Report within two years of Tier Classification, a Phase IV Report within three years of Tier Classification, and a Response Action Outcome (RAO) Statement within five years of Tier Classification. On January 23, 2008, the NRA agreed to enter into an Administrative Consent Order (ACO) with MassDEP. In April 2008, Vanasse Hangen Brustlin, Inc. (VHB) prepared a Tier II Classification Extension in accordance with the ACO requirements. No subsurface investigation was performed, but the Tier II Classification Extension recommended additional soil and groundwater sampling to evaluate the need for further response actions at the Site.

3.4 INITIAL PHASE II COMPREHENSIVE SITE ASSESSMENT, WESTON & SAMPSON, MAY 2009

On May 27 and 28, 2009, Weston & Sampson observed the advancement of 10 soil borings (WSB-1 through WSB-10) on the East Lot. All borings were advanced to a depth of approximately 15 feet below ground surface or refusal. During drilling, Weston & Sampson collected split spoon samples for field screening using a PID. One soil sample from each boring was submitted for laboratory analyses of EPH parameters with target polycyclic aromatic

hydrocarbons (PAHs) and lead. Five of the soil borings (WSE-1 to WSE-5) were completed as 2-inch diameter monitoring wells. On June 4, 2009, Weston & Sampson collected groundwater samples from the five newly installed Site monitoring wells (WSE-1 through WSE-5) and two existing monitoring wells (MW-2 and MW-3). Additional soil sampling was performed on August 13 and September 28, 2009 to collect additional data for lead. On August 13, 2009, WSB-11 through WSB-14 were advanced within approximately three feet of MW-2 to evaluate the lateral and vertical extent of lead contamination in soil previously detected at this location (9,300 mg/kg). Three soil samples from each boring were collected at 2 to 4 feet, 5 to 7 feet, and 10 to 12 feet for lead analysis. WSB-13 (2 to 4 feet) was also analyzed for VPH/EPH parameters with target VOCs and PAHs because this sample had a high PID reading (49.8 ppmv). On September 28, 2009, a total of 16 soil borings (WSB-15 through WSB-30) were advanced as part of a supplemental lead sampling program. Soil samples were collected from each boring at 2.5 to 5 feet and 5 to 7.5 feet. Additional samples were collected from depth intervals of 7.5 to 10 feet and 10 to 12 feet at selected borings. All samples were analyzed for lead. A total of five samples having lead concentrations greater than 1,000 mg/kg, were also analyzed for Toxicity Characteristic Leaching Procedure (TCLP) lead to determine if excess soil, excavated as part of construction activities, would require disposal as a RCRA hazardous waste, if it were disposed of off-site.

Lead was detected at concentrations ranging from 3.7 mg/kg in WSB-18 to 17,000 mg/kg in WSB-27. The laboratory analyzed a second aliquot from WSB-27 and the result was 2,500 mg/kg. During the initial Phase II investigation, a total of 22 samples had lead concentrations greater than the MCP Method 1 cleanup standard of 300 mg/kg, and 10 of these exceeded the DEP's "background" concentration of 600 mg/kg for lead in urban fill material containing wood or coal ash (DEP, May 2002). Three samples (WSB-13, WSB-15 and WSB-27) exceeded the MCP Upper Concentration Limit of 3,000 mg/kg, although re-analysis of WSB-27 indicated the concentration was below the Upper Concentration Limit. The TCLP lead criterion for hazardous waste disposal of 5.0 mg/L was exceeded in WSB-13, WSB-15, and WSB-27, indicating soil from these locations, if excavated, would be classified as a RCRA hazardous waste for off-Site disposal purposes.

The presence of elevated lead in soil was attributed by Weston and Sampson to on-Site fill material, which was observed at all locations at depths up to 14 feet below grade. Petroleum contaminants were also detected in soil samples, but the concentrations were well below Method 1 cleanup standards. Although elevated lead was detected in soil below the water table in many locations (average depth to groundwater is approximately 6 feet), dissolved lead was not detected above RLs in groundwater samples collected during both field investigations, indicating off-Site migration is negligible.

Boring logs from the Phase II on the East Lot, in the vicinity of the proposed development, indicated loose sand and silt fill to a maximum depth of 14 feet below ground surface (bgs). Refusal was not encountered in the borings near the proposed project area. Borings were not advanced on the West Lot.

3.5 SUPPLEMENTAL PHASE II COMPREHENSIVE SITE ASSESSMENT, PHASE III REMEDIAL ACTION PLAN, AND PHASE IV REMEDY IMPLEMENTATION PLAN, WESTON & SAMPSON, MAY 2011

Weston & Sampson completed a combined Supplemental Phase II – Comprehensive Site Assessment (CSA), Phase III – Remedial Action Plan (RAP), and a Phase IV – Remedy Implementation Plan (RIP) for RTN 3-15445 for approximately 3.2 acres of waterfront property

(the East Lot). The Phase III evaluation of remedial response action (RAA) alternatives focused on eliminating potential exposure to contaminated soil under future use conditions. The alternatives evaluated were limited site excavation with off-Site disposal, capping, and implementation of an Activity and Use Limitation (AUL). The selected RAA alternative involves a combination of AUL implementation, capping areas containing elevated lead concentrations, and excavation as required for Site development. Pre-characterization of soil in areas to be excavated was recommended to evaluate disposal options because of the possibility that some excavated soil may require disposal as RCRA hazardous waste. The Phase IV RIP focused on the response action objectives, Site characteristics, conceptual plan, design criteria, methods for spill control, waste management procedures, potential environmental impacts and procedures for inspection and monitoring of remedial construction. The cap proposed in the Phase IV would consist of at least 3 feet of clean fill overlying the consolidated and existing impacted fill to prevent contact with contaminated soils in open grass areas (i.e., park use), or geotextile and 1 foot of clean fill with pavement. At the completion of redevelopment, a portion of the capped area was anticipated be covered with impervious surfaces (parking lot). The pavement was not included as a component of the remedy, and the capping considerations should also evaluate compensatory flood storage requirements. However, it should be noted that the development plan for the waterfront area, that the risk characterization was based on, was a 2009 concept that included using both lots primarily as park space, which is significantly different from the current concept of residential and commercial usage.

3.6 CLASS B-2 RESPONSE ACTION OUTCOME STATEMENT, WESTON & SAMPSON, NOVEMBER 2011

Weston & Sampson prepared a Class B-2 Response Action Outcome (RAO) Statement for RTN 3-15445 for approximately 3.2 acres of waterfront property (the East Lot). The primary contaminant of concern is lead in soil that range from 3.7 to 17,000 mg/kg. Of 95 soil samples analyzed for lead, approximately one-third were reported to have exceeded the MCP Method 1 cleanup standard of 300 mg/kg. Due to the impracticability of excavating and replacing all lead-impacted soil with clean soil, the decision was made to restrict access to the soils below grade using an Activity and Use Limitation (AUL). Based upon analysis of potentially impacted environmental and human receptors, an MCP Method 3 risk characterization, and the filing of an AUL, Weston & Sampson concluded that "the requirements for a Class B-2 RAO have been met for the Site, and no further response actions are required."

3.7 HISTORIC AREA BORINGS

Prior borings were advanced in the Waterfront Park area by Vine Associates, a Division of GZA as part of the boardwalk design. According to boring logs located in GZA files near the northwest corner of the West Lot in 2001, fill was encountered to approximately 12 to 25 feet below ground surface (bgs), and refusal was encountered at approximately 33 feet bgs. According to boring logs for borings carried out in 1987 and 2001 near the northeast corner of the East Lot, fill was encountered to approximately 20 feet bgs and refusal was encountered at approximately 22 feet bgs.

4.0 CURRENT INVESTIGATIONS

4.1 TEST BORINGS AND MONITORING WELLS

GZA observed the installation of 20 test borings (GZ-1 through GZ-20), including two groundwater monitoring wells (GZ-6/MW-1 and GZ-7–GZ-20/MW-2), by New Hampshire Boring, Inc. of Derry, New Hampshire, in various locations on the Site between August 5 and August 9, 2013. Soil samples were collected and analyzed for both environmental and geotechnical parameters. Boring locations are depicted on Figures 2 and 3.

The Environmental testing program was designed to characterize Site conditions for oil and hazardous materials (OHM) to evaluate whether the West lot had reportable concentrations under the MCP and to characterize soils for waste disposal parameters that could impact future construction costs and methodology. Soil samples for environmental analysis were obtained from GZ-1, GZ-2, GZ-4, GZ-6/MW-1, GZ-10, GZ-14, GZ-17, GZ-19, and GZ-20/MW-2. Samples from GZ-1, GZ-2, and GZ-4 were analyzed for extractable petroleum hydrocarbons (EPH) with target polycyclic aromatic hydrocarbons (PAHs) analytes and volatile petroleum hydrocarbons (VPH) with target volatile organic compound (VOCs) analytes. Samples were taken from two depths at GZ-6/MW-1, GZ-10, GZ-14, GZ-17, GZ-19, and GZ-20/MW-2, and were analyzed for EPH carbon ranges, VPH carbon ranges, Resource Conservation and Recovery Act (RCRA) metals, pH, flashpoint, polychlorinated biphenyls (PCBs), reactivity, conductivity, semi-volatile organic compounds (SVOCs), and VOCs. Select samples were analyzed for specific RCRA metals using the Toxicity Characteristic Leaching Procedure (TCLP) to further characterize the sample for disposal parameters. Borings GZ-6/MW-1 and GZ-20/MW-2 were finished with two-inch diameter PVC groundwater monitoring wells. On the West Lot, soil and groundwater sample analytical results were compared to MassDEP Reportable Concentrations RCS-1 and RCGW-2, as found in 310 CMR 1796, Table 1. On the East Lot, soil and groundwater sample analytical results were compared to MassDEP Method 1 Groundwater standards GW-2 and GW-3 and Method 1 Soil Standards S-1/GW-2 and S-1/GW-3, found in 310 CMR 40.0972(6)(a), Tables 1 and 2. Soil samples from both lots were compared to MassDEP COMM 97 disposal standards to characterize potential excess soil for disposal. Summary analytical result tables are presented in Appendix E and analytical laboratory reports are presented in Appendix F.

Soil samples from borings GZ-1, GZ-3, GZ-15, GZ-8, and GZ-17 were analyzed for geotechnical properties such as gradation using a sieve analysis by ASTM D422.

Soil samples were obtained at boring locations with a hollow-stem auger or casing and decontaminated 24-inch split spoon samplers using Standard Penetration Test (SPT) methodology. Samples were screened with a photoionization detector (PID) for total volatile organic compounds (TVOCs) and classified using a modified Burmister classification system. Samples were retrieved from the surface and five foot intervals thereafter.

4.2 SUBSURFACE CONDITIONS

Refer to Section 6.2 for a description of the soil strata. A summary of observations of subsurface conditions at each boring are presented in the Boring Narrative presented in Appendix D. Detailed boring logs are presented in Appendix D.

5.1 ENVIRONMENTAL DATA

5.1 SOIL

Environmental screening soil samples were retrieved from approximate depths of two to four feet in borings GZ-1, GZ-2, and GZ-4 on August 5, and 6, 2013 and analyzed for VPH with target analytes and EPH with target analytes. Environmental disposal soil samples were retrieved at two depths (approximately two and seven feet bgs) at borings GZ-6/MW-1, GZ-10, GZ-14, GZ-17, GZ-19, and GZ-20/MW-2 on August 6, 7, 8, and 9, 2013 and analyzed for EPH carbon ranges, VPH carbon ranges, RCRA metals, pH, flashpoint, PCBs, reactivity, conductivity, SVOCs, and VOCs. Select chemical concentration detections are shown on Figure 4.

5.1.1 Petroleum Constituents

Trace detections below MassDEP S-1 GW-2 and RCS-1 standards for EPH carbon fractions were detected in soil samples from borings GZ-1, GZ-2, GZ-14, GZ-17, and GZ-19. Concentrations of C_{11}-C_{22} aromatic hydrocarbons and C_9-C_{18} aliphatic hydrocarbons exceeded both S-1/GW-2 and RC/S-1 standards in GZ-10. Trace detections below MassDEP S-1/GW-2 and RC/S-1 standards for VPH fractions were detected in soil samples from boring GZ-19. A concentration of C_9-C_{10} aromatic hydrocarbons exceeded both S-1 GW-2 and RCS-1 standards in GZ-10. A summary of detections is presented in the table below.

Table 1: Petroleum Constituents Detection Summary Table (mg/Kg).

			WEST PARKING LOT					
Sample Depth	**Method 1 MassDEP S1/GW2 S1/GW3**	**MassDEP RCS1**	**8/5/13 GZ-1 2'**	**8/5/13 GZ-2 2'**	**8/7/13 GZ-10 2'**	**8/7/13 GZ-10 6'**	**8/6/13 GZ-19 4'**	**8/6/13 GZ-19 6'-8'**
EPH Ranges								
C11-C22 Aromatic Hydrocarbons	1000	1000	90	55	61	**1700**	130	<12
C19-C36 Aliphatic Hydrocarbons	3000	3000	13	66	16	500	64	<12
C9-C18 Aliphatic Hydrocarbons	1000	1000	<11	<11	<11	**2900**	<12	<12
VPH Ranges								
C5-C8 Aliphatic Hydrocarbons	100	100	<3.1	<3.8	<2.1	23	2.6	2.7
C9-C10 Aromatic Hydrocarbons	100	100	<3.1	<3.8	<2.1	**130**	<2.5	<2.6
C9-C12 Aliphatic Hydrocarbons	1000	1000	<3.1	<3.8	<2.1	120	<2.5	<2.6

Sample Depth	MassDEP S1/GW2 S1/GW3	MassDEP RCS1	EAST PARKING LOT				
			8/8/13 GZ-14 2’	8/9/13 GZ-14 7’	8/9/13 GZ-17 2’	8/9/13 GZ-17 6’-7’	8/9/13 GZ-20 1’-3’
EPH Ranges							
C11-C22 Aromatic Hydrocarbons	1000	1000	77	87	14	43	19
C19-C36 Aliphatic Hydrocarbons	3000	3000	<11	21	<11	43	<11
C9-C18 Aliphatic Hydrocarbons	1000	1000	<11	<13	<11	<11	<11
VPH Ranges							
C5-C8 Aliphatic Hydrocarbons	100	100	<2.5	<3.3	<2.7	<3.8	<2.6
C9-C10 Aromatic Hydrocarbons	100	100	<2.5	<3.3	<2.7	<3.8	<2.6
C9-C12 Aliphatic Hydrocarbons	1000	1000	<2.5	<3.3	<2.7	<3.8	<2.6

*Concentrations in **bold** exceed the Reportable Concentration.

Soil analytical results are presented in Table D-1, which is included in Appendix E. A copy of the soil laboratory analytical report is included in Appendix F.

5.1.2 Chlorinated VOC Constituents

Chlorinated VOC constituents were not detected in any samples, with the one exception of a concentration of 0.11 mg/Kg of methylene chloride at GZ-14. The concentration exceeded the RCS-1 Reportable Concentration of 0.10 mg/Kg. Soil analytical results are presented in Table D-1, which is included in Appendix E. A copy of the soil laboratory analytical report is included in Appendix F.

5.1.3 Polychlorinated Biphenyls (PCBs)

Trace detections of PCBs below S-1 GW-2 and RCS-1 standards of 2 mg/Kg were detected at GZ-10 (0.025 mg/Kg) and GZ-17 (0.016 mg/Kg). Soil analytical results are presented in Table E-1, which is included in Appendix E. A copy of the soil laboratory analytical report is included in Appendix E.

5.1.4 Semi-Volatile Organic Compounds (SVOCs)

Trace concentrations of several SVOCs were detected at GZ-2, GZ-4 GZ-10, GZ-14, GZ-17, GZ-19, and GZ-20. Concentrations of benzo(a)pyrene and dibenz(a, h)anthracene were detected above S-1/GW-2 and RC/S-1 standards at GZ-1 and GZ-19. A concentration of 10 mg/Kg of phenanthrene, equaling the RCS-1 standard, was also detected at GZ-19. A summary of SVOC concentrations detected is presented in the following table.

Table 2: Summary of SVOC concentrations (mg/Kg).

	Mass DEP S1 GW2	Mass DEP RCS1	WEST PARKING LOT					
			8/5/13	8/5/13	8/6/13	8/7/13	8/7/13	8/6/13
Sample Depth			GZ-1 2'	GZ-2 2'	GZ-4 2'	GZ-10 2'	GZ-10 6'	GZ-19 4'
2-Methylnaphthalene	80	0.7	0.12	<0.11	<0.1	<0.27	54	0.45
Acenaphthene	1000	4	0.49	0.22	<0.1	<0.27	4.1	0.92
Acenaphthylene	600	1	<0.11	0.16	<0.1	0.49	<0.28	<0.29
Anthracene	1000	1000	1.1	0.74	<0.1	0.37	1.8	3
Benz(a)anthracene	7	7	3.3	1.8	0.23	1	0.33	6.5
Benzo(a)pyrene	2	2	2.6	1.6	0.27	0.91	<0.28	5.6
Benzo(b)fluoranthene	7	7	2.9	1.5	0.32	0.68	<0.28	5.5
Benzo(g,h,i)perylene	1000	1000	1.5	1.1	0.29	0.53	<0.28	3.3
Benzo(k)fluoranthene	70	70	1.8	1.2	0.23	0.63	<0.28	4.2
Bis(2-ethylhexyl)phthalate	200	200	-	-	-	0.51	<0.28	<0.29
Chrysene	70	70	3.2	1.7	0.28	1.2	0.38	6.5
Dibenz(a,h)anthracene	0.7	0.7	0.76	0.41	0.11	0.29	<0.28	1.7
Fluoranthene	1000	1000	7.3	4	0.34	1.4	1.2	13
Fluorene	1000	1000	0.57	0.33	<0.1	<0.27	4.7	1.4
Indeno(1,2,3-cd)pyrene	7	7	1.5	1.1	0.24	0.48	<0.28	3.2
Naphthalene	40	4	0.16	<0.11	<0.1	<0.27	9.1	1.3
Phenanthrene	500	10	5	3.2	0.18	0.57	19	10
Pyrene	1000	1000	6	3.4	0.34	2.1	1.3	11

	Mass DEP S1 GW2	Mass DEP RCS1	EAST PARKING LOT			
			8/8/13	8/9/13	8/9/13	8/9/13
Sample Depth			GZ-14 2'	GZ-17 2'	GZ-17 6'-7'	GZ-20 1'-3'
2-Methylnaphthalene	80	0.7	<0.27	<0.56	<0.56	<0.28
Acenaphthene	1000	4	<0.27	<0.56	<0.56	<0.28
Acenaphthylene	600	1	0.81	<0.56	<0.56	<0.28
Anthracene	1000	1000	0.79	<0.56	<0.56	<0.28
Benz(a)anthracene	7	7	1.7	<0.56	0.88	0.55
Benzo(a)pyrene	2	2	1.5	0.68	0.95	0.62
Benzo(b)fluoranthene	7	7	1.2	0.68	0.89	0.52
Benzo(g,h,i)perylene	1000	1000	0.88	<0.56	0.6	0.4
Benzo(k)fluoranthene	70	70	1.2	<0.56	0.8	0.53
Bis(2-ethylhexyl)phthalate	200	200	<0.27	<0.56	<0.56	<0.28
Chrysene	70	70	1.9	0.62	1	0.65
Dibenz(a,h)anthracene	0.7	0.7	0.32	<0.56	<0.56	<0.28
Fluoranthene	1000	1000	3.1	0.75	1.4	1.1
Fluorene	1000	1000	<0.27	<0.56	<0.56	<0.28
Indeno(1,2,3-cd)pyrene	7	7	0.8	<0.56	0.57	0.36
Naphthalene	40	4	<0.27	<0.56	<0.56	<0.28
Phenanthrene	500	10	2	<0.56	0.64	0.64
Pyrene	1000	1000	3.4	0.82	1.3	1.1

Soil analytical results are presented in Table E-1, which is included in Appendix D. A copy of the soil laboratory analytical report is included in Appendix E.

5.1.5 Resource Conservation and Recovery Act (RCRA) Metals

All the samples collected were analyzed for eight select RCRA metals. The RCRA eight metals analyzed for are arsenic, barium, cadmium, chromium, lead, selenium, silver, and mercury. Concentrations of all metals were detected in select samples with the exception of cadmium and selenium which were not detected in any sample. Concentrations of arsenic exceeding MassDEP S-1 GW-2 and RCS-1 standards were detected in GZ-1, GZ-2, GZ-6, GZ-10, and GZ-14. Concentrations of chromium exceeding MassDEP S-1 GW-2 and RCS-1 standards were detected in GZ-4, GZ-6, and GZ-10. A concentration of lead exceeding MassDEP S-1 GW-2 and RCS-1 standards was detected in GZ-2. A summary of metals concentrations detected is presented in the following table.

Table 3: RCRA Metals Detection Summary Table.

	Mass DEP S1/ GW2	**Mass DEP RCS1**	**WEST PARKING LOT**								
			8/5/13 GZ-1 2'	**8/5/13 GZ-2 2'**	**8/6/13 GZ-4 2'**	**8/6/13 GZ-6 2'**	**8/6/13 GZ-6 6'**	**8/7/13 GZ-10 2'**	**8/7/13 GZ-10 6'**	**8/6/13 GZ-19 4'**	**8/6/13 GZ-19 6'-8'**
Arsenic	20	20	**22.7**	**21.2**	17.6	**355**	18.2	**21.8**	18	19.7	13.8
Barium	1000	1000	101	102	66.9	37.5	18.3	35.9	37.1	55.9	30
Chromium	30	30	15.3	26.7	**30.3**	**44.6**	13.5	**64.7**	19.4	21.5	15.6
Lead	300	300	219	**479**	31.8	57.6	72.1	101	128	242	207
Silver	100	100	3.67	<1.99	<1.73	<1.86	2.43	<1.79	<1.87	<1.91	<2.04
Mercury	20	20	0.0848	0.682	<0.0483	0.0972	<0.0587	0.12	0.29	0.496	0.764

	Mass DEP S1 GW2	**Mass DEP RCS1**	**EAST PARKING LOT**							
			8/8/13 GZ-14 2'	**8/9/13 GZ-14 7'**	**8/9/13 GZ-17 2'**	**8/9/13 GZ-17 6'-7'**	**8/6/13 GZ-19 4'**	**8/6/13 GZ-19 6'-8'**	**8/9/13 GZ-20 1'-3'**	**8/9/13 GZ-20 6'-8'**
Arsenic	20	20	**20.7**	<7.46	13.7	14.3	19.7	13.8	12	12.7
Barium	1000	1000	45.9	44.6	52.6	46.7	55.9	30	44.7	14
Chromium	30	30	21.2	16.9	25.7	16.4	21.5	15.6	22.8	13
Lead	300	300	92.4	131	188	167	242	207	142	<5.18
Silver	100	100	<1.79	<2.09	<1.96	<1.78	<1.91	<2.04	<1.95	<1.81
Mercury	20	20	0.568	0.367	0.447	0.449	0.496	0.764	0.221	<0.0536

*Concentrations in **bold** exceed the regulatory standard.

Soil analytical results are presented in Table D-1, which is included in Appendix D. A copy of the soil laboratory analytical report is included in Appendix E.

5.1.6 Other Disposal Parameters

Samples from the West Lot (GZ-6, GZ-10, GZ-19) and the East Lot (GZ-14, GZ-17, GZ-20) were analyzed for select additional disposal criteria in order to characterize soils for potential future disposal. The following table presents a summary of disposal parameter analytical results.

	Units	WEST PARKING LOT								
		8/5/13 GZ-1 2'	8/5/13 GZ-2 2'	8/6/13 GZ-4 2'	8/6/13 GZ-6 2'	8/6/13 GZ-6 6'	8/7/13 GZ-10 2'	8/7/13 GZ-10 6'	8/6/13 GZ-19 4'	8/6/13 GZ-19 6'-8'
Flashpoint	°F	---	---	---	>200	>200	>200	>200	>200	>200
Reactive Cyanide	mg/Kg	---	---	---	<21	<23	<21	<22	<23	<23
Reactive Sulfide	mg/Kg	---	---	---	<110	<120	<100	<110	<110	<120
pH	S.U.	---	---	---	8.3	7.3	7	6.9	7.3	7.0
Conductivity	µmhos/cm	---	---	---	1,400	480	140	250	790	320

	Units	EAST PARKING LOT					
		8/8/2013 GZ-14 2'	8/9/2013 GZ-14 7'	8/9/2013 GZ-17 2'	8/9/2013 GZ-17 6'-7'	8/9/2013 GZ-20 1'-3'	8/9/2013 GZ-20 6'-8'
Flashpoint	°F	>200	>200	>200	>200	>200	>200
Reactive Cyanide	mg/Kg	<22	<26	<22	<22	<22	<22
Reactive Sulfide	mg/Kg	<110	<130	<110	<110	<110	<110
pH	S.U.	7.6	6.2	7.3	7.2	7	6.6
Conductivity	µmhos/cm	230	1,100	1,900	1,700	570	350

5.2 GROUNDWATER

Groundwater samples were obtained on August 16, 2013 from the 2-inch PVC monitoring wells, MW-1 and MW-2, installed during the course of this investigation. Prior to sampling, each well was purged and developed using either a low flow peristaltic pump with dedicated, disposable tubing or a dedicated, disposable bailer. Approximately three to five well volumes of water was purged prior to taking samples.

Groundwater samples obtained from the wells were analyzed for VPH with target analytes and EPH with target analytes. Concentrations of all compounds analyzed for were not detected above the laboratory detection limits. Groundwater analytical results are presented in Table D-2, which is included in Appendix D. A copy of the groundwater laboratory analytical report is included in Appendix E.

5.2.1 Groundwater Level Observations

During sampling, groundwater was observed at 6.15-feet bgs (4.0 feet NAVD88) and 7.46-feet bgs (3.74 feet NAVD88) in MW-1 and MW-2, respectively.

6.0 GEOTECHNICAL DATA

6.1 PROPOSED DEVELOPMENT

GZA's understanding of the proposed property development is based on illustrative site plans by Union Studio, most recently dated June 27, 2013, provided by the NRA, and information provided in conversations with the NRA and on the NRA's website. Refer to Section 2.1 for a description of the proposed development.

6.2 SUBSURFACE CONDITIONS

The subsurface conditions described herein are based primarily on geotechnical borings GZ-1 through GZ-20, except where noted. Graphic representations of soil profiles on each lot are presented in Figures 6 and 7.

6.2.1 Soil

Subsurface soil conditions encountered in the explorations generally consisted of the following strata from the ground surface: gravel parking surface/topsoil, fill, organic silt/peat (intermittent), silt/fine sand, and bedrock.

The soil strata encountered in the explorations are described below in further detail. The depths, thicknesses, and elevations referenced herein should be considered approximate. Elevations in the following sections refer to the National American Vertical Datum of 1988 (NAVD88). Refer to the exploration logs provided in Appendix C for detailed subsurface conditions at specific exploration locations.

Gravel Parking Surface/Topsoil - A gravel parking surface was encountered at all borings in both lots, with the exception of GZ-9 (West Lot), where topsoil was present. The gravel parking surface generally consisted of dry, dense to very dense gray, fine to coarse sand containing up to 35 percent gravel and up to 20 percent silt. Standard Penetration Test (SPT) N-Values within the parking surface ranged from 40 to greater than 100 blows per foot (bpf).

The topsoil at GZ-9 consisted of dry, medium dense, fine to coarse sand with up to 20 percent gravel, 10 percent silt, and 10 percent roots. SPT N-value within the topsoil layer was 8 bpf.

Fill (Urban Fill) – At each boring, fill was encountered below the gravel parking surface or topsoil. In the West Lot, the fill extended to , approximate elevations 6 to -5 feet NAVD88. In the East Lot, the fill extended to approximate elevations 1 to -6y feet NAVD88. The fill generally consisted of very loose to dense, brown to black, fine to coarse sand and silt containing up to 35 percent gravel, fragments of brick, wood, glass, coal, cinders, and shells. SPT N-Values within the fill ranged from 4 to 49 bpf; however, most values were between 10 and 30 blows per foot. Obstructions were encountered in the fill primarily consisting of wood and rock, as indicated by drill cuttings.

Organic Silt/Peat – A natural, intermittent organic silt or peat layer was encountered below the fill at GZ-6 (West Lot), GZ-15 (East Lot), and GZ-17 (East Lot). The organic silt layer, encountered at GZ-6, was observed at about 13 feet bgs, approximately corresponding to an elevation of -3 feet NAVD88. The organic silt layer encountered at GZ-15 was observed at about 12 feet bgs, approximately corresponding to an elevation of -2 feet NAVD88. The organic silt layer was approximately 4 to 7-feet-thick, and generally consisted of medium dense, black silt, containing up to ten percent gravel and organic fibers. SPT N-Values within the organic silt layer ranged from 13 to over 17 bpf.

The peat layer, encountered at GZ-17, was observed at approximately 12 bgs, approximately corresponding to elevation -1 bgs NAVD88. The layer was approximately ten inches thick and was composed of silt and plant fibers. SPT N-Value within the peat layer was 4 bpf.

Silt and Fine Sand – A natural silt and fine sand layer was encountered at elevations ranging between -4 and -6 feet NAVD88 on the West Lot and 0 to -6 feet NAVD88 on the East Lot. This layer was penetrated fully to either spoon or auger refusal in all borings (where encountered), with the exception of GZ-1, GZ-2, GZ-7, GZ-14, and GZ-17. These soils generally consisted of medium dense to dense, brown to olive gray silt containing up to ten percent fine sand. SPT N-Values within the silt and fine sand layer ranged from 19 to 85 bpf.

Bedrock – Bedrock was observed and verified from a core sample taken at GZ-11 from 10.5 to 14.3 feet bgs, approximately corresponding to elevations 2.7 to -1.1 feet NAVD88. The rock was classified as moderately to severely weathered, fine-grained green granodiorite. The United States Geologic Survey (USGS) map for the area indicates that bedrock present in the area consists of Newburyport Complex bedrock. The bedrock observed in the sample is consistent with Newburyport Complex tonalitic granodiorite, as described by the United States Geologic Survey (USGS) Mineral Resources On-Line Spatial Data. Rock fragments observed in split spoon samples and drill cuttings from borings GZ-3 through GZ-6, GZ-8 through GZ-13, GZ-15, GZ-16, and GZ-18 through GZ-20 appeared to be consistent with the rock observed in the core sample. Refusal on presumed rock ranged from approximate depths of 8 to 19 feet (7 to -9 feet NAVD88) in the west parking lot and 21 to 32 feet (-12 to -22 feet NAVD88) in the east parking lot. The elevation of rock encountered on the West Lot appears to slope downward from near Merrimac Street toward the Merrimack River. The slope of rock encountered in borings on the East Lot was not apparent based on the exploration observations.

6.2.2. Groundwater

Groundwater measurements were taken within monitoring wells installed in GZ-19/MW-1 and GZ-20/MW-2 on August 16, 2013. Groundwater was encountered in the wells at 6.15 feet bgs (4.0 feet NAVD88) and 7.46 bgs (3.74 feet NAVD88), respectively.

It should be noted that fluctuations in groundwater levels may occur due to variations in season, rainfall, tidal influences, site features and other factors different from those existing at the time of the explorations and measurements.

7.0 ENVIRONMENTAL AND GEOTECHNICAL FINDINGS

7.1 ENVIRONMENTAL FINDINGS

Laboratory analytical results for soil and groundwater samples taken from the east and west lots are presented in Section 5. Chemicals analyzed for were not detected above laboratory detection limits in the groundwater samples analyzed from GZ-19/MW-1 and GZ-20/MW-2. It is anticipated that de-watering will be required during construction of the sublevel parking. As a result, premium environmental costs related to impacted groundwater discharge due to dewatering are not anticipated. The following sections present environmental related findings for soil samples from both parking lot properties.

7.1.1 West Lot

Petroleum-related compounds, PCBs, SVOCs, and metals were detected at concentrations exceeding their laboratory detection limits in several soil samples retrieved from the West Lot. Concentrations of select petroleum related compounds, SVOCs, and Metals exceeded their respective MassDEP reportable Concentrations. The soils samples were all taken from within the first ten feet of soil, and are therefore indicative of the condition of the urban fill layer.

Concentrations of C_{11}-C_{22} aromatic hydrocarbons, C_9-C_{18} aliphatic hydrocarbons, and C_9-C_{10} aromatic hydrocarbons of 1,700 mg/Kg, 2,900 mg/Kg, and 130 mg/Kg, respectively, in GZ-10, exceeded both the applicable S-1/GW-2 standards and RCS-1 Reportable Concentration. These exceedances, according to MassDEP regulations, are required to be reported to MassDEP within 120 days. Based on the current investigation, the source of these detections is not apparent. The potential exists for either a historic on-site source like the filling stations observed on Sanborn Maps or migration of the chemicals onto the site from an upgradient, off-site source like the filling station south of Merrimac Street depicted on the 1961 Sanborn Map.

Concentrations of various SVOCs were detected in several samples on the West Parking lot, with two samples exceeding MassDEP standards for four compounds. According to MassDEP regulations, the presence of coal, coal ash or wood ash in urban fill allows for detections of SVOC's to be classified as "background," and thus exempt from the reporting requirements. Coal and wood cinders were observed in samples on the west lot, and per the MCP, SVOC compounds exceeding MassDEP standards are not reportable to MassDEP.

Concentrations of several metals were detected above MassDEP S-1/GW-2 standards and RC/S-1 Reportable Concentrations. Arsenic was detected above regulatory standards at GZ-1, GZ-2, GZ-6 2', and GZ-10 2'. Chromium was detected above regulatory standards at GZ-4 2', GZ-6, and GZ-10. Lead was also detected above regulatory standards at GZ-2 2'. TCLP analyses were carried out on the samples with the three highest lead concentrations and the highest arsenic concentration. The results of all the TCLP analyses were below the EPA Toxicity Characteristic Threshold, indicating that the soils to be excavated are not likely considered hazardous for disposal purposes. Based on the widely spaced results, it is likely that the metals concentrations are a result of historic coal storage, industrial operations on the property, and historic land filling with soils of unknown origin.

7.1.2 East Lot

As discussed in the "Previous Investigations" section, the East Lot is considered a waste site listed as RTN 3-15445, which currently has a Class B-2 RAO issued in November 2011. All concentrations of contaminants encountered in this investigation are similar to the Contaminants of Concern (COC) identify by Weston & Sampson in earlier investigations. Therefore, no additional reporting requirements or changes to the RAO in effect are required. Laboratory detection limits were exceeded for various petroleum-related compounds, chlorinated VOCs, PCBs, SVOCs, and metals. Concentrations of compounds did not exceed their respective MassDEP regulatory standards, with the exception of concentrations of VOCs and Metals. The soil samples were all taken from within the first ten feet of soil, and are indicative of the condition of the urban fill layer.

A concentration of 0.11 mg/Kg of methylene chloride was detected above the MassDEP RC/S-1 standard. As noted on the laboratory report, this result is likely due to laboratory contamination, and is therefore not representative of site conditions.

Concentrations of various SVOCs were detected in several samples on the West Parking lot, with two samples exceeding MassDEP standards for four compounds. According to MassDEP regulations, the presence of coal, coal ash, or wood ash in urban fill allows for detections of SVOC's to be classified as background. Coal and wood cinders were observed in samples on the west lot and, per the MCP, SVOC compounds exceeding MassDEP standards are not reportable to MassDEP.

One concentration of arsenic was detected above regulatory standards at GZ-14 on the East Lot. As the East Lot is already considered a MassDEP site for elevated metals concentrations, no additional reporting obligations are required from this detection.

7.1.3 Disposal Parameters

Samples from the West Lot (GZ-6, GZ-10, GZ-9) and the East Lot (GZ-14, GZ-17, GZ-20) were analyzed for select disposal criteria in order to characterize soils for potential future disposal. Using a total average excavation depth of 12-feet from the existing ground surface on both the East and West lots, as currently planned, approximately 10,800 cubic yards (in place volume) of material will be required to be excavated for the installation of the sublevel parking beneath the buildings. It should be noted that approximately 1,500 yds^3 of rock excavation, primarily on the West Lot near Merrimac Street, is included in this estimate. According to MassDEP disposal criteria for disposal at in-state landfills, combined with the other environmental analytical data, approximately 9000 yds^3 are within MassDEP parameters to be disposed within an unlined in-state landfill, approximately 200 yds^3 are within MassDEP parameters to be disposed within an in-state lined landfill, and approximately 200 yds^3 are required to be disposed in a landfill capable of accommodating soils exceeding the MassDEP Lined Landfill parameters, most likely an out of state landfill. Approximate locations on Site of the various soils for disposal are depicted on Figure 5. These quantities can be reduced significantly if the soils are reused on site to raise grades for flood protection and overall site grading. It should be noted that additional disposal sampling will be required prior to disposal of excess soils. The disposal estimates herein could vary dramatically from actual disposal quantities based on the finished floor elevations and final site grades. Approximately 1,500 yds^3 of rock excavation will be required assuming an excavation elevation of -2 NAVD88.

7.1.4 MCP Issues

The East Lot is included in the waste site listed as RTN 3-15445, which currently has a Class B-2 RAO issued in November 2011. An Activity and Use Limitation (AUL) is currently in effect for the Site, but the AUL is based on Site usage as a park. The current plans for the East Lot include residential and commercial development, and the Method 3 Risk Characterization on which the current AUL is based must be re-evaluated to take into account the different Site usage. The Method 3 Risk Assessment assumed that the property usage would be as a park.

Metals and PAH compounds detected in the West Lot are assumed to be related to the presence of wood or coal ash and the historic storage of coal on the Site, as indicated on the Sanborn Maps included in Appendix F. Figure 8 shows the approximate boring locations over the 1894 Sanborn Map. According to 310 CMR 40.0317 (9) of the MCP, releases of oil and/or hazardous material related to coal, coal ash, or wood ash, excluding wood ash resulting from the combustion of lumber or wood products that have been treated with chemical preservatives, are exempt from the reporting requirements. However, the metals and PAHs will need to be considered in a Risk Characterization for the West Lot and are subject to Disposal Limitations. The high concentrations found by Weston & Sampson on the East Lot were not detected in samples from

the West Lot, or in the samples from the western portion of the East Lot included in the current proposed development.

However, concentrations of C_{11}-C_{22} aromatic hydrocarbons, C_9-C_{18} aliphatic hydrocarbons, and C_9-C_{10} aromatic hydrocarbons in boring GZ-10, located near the location of a former "filling station on Merrimac Street and across the street from two other former filling stations from the 1960s, exceeded the RCS-1 Reportable Concentration. These exceedances, according to MassDEP regulations, must be reported, by the property owner, to MassDEP within 120 days of discovery.

7.2 GEOTECHNICAL FINDINGS

The primary geotechnical issues that could have a premium cost impact on the design and construction of the proposed building are:

- The presence of unsuitable urban fill;
- The proposed construction of a subsurface parking structure;
- The presence of presumed bedrock at depths ranging from 8 to 32 feet bgs;
- The high groundwater table; and
- Design flood levels.

The existing fill, in its present condition, is considered unsuitable for support of the proposed building due to its uncertain composition, uncertain density, and potential compressibility. The proposed construction of each building includes incorporating an underground parking level that will extend below the groundwater table. Current plans for the project call for excavation to an average depth of 12 feet below the existing grade. Consideration for construction de-watering, and design of a watertight sub level will be required. Final Geotechnical design will require additional borings in each of the buildings due to the variability in subsurface conditions.

Alternatives for support of the proposed construction are presented in the following sections.

7.2.1 Foundation Recommendations

The geotechnical design and construction recommendations presented below are based on our evaluation of the available data and design concepts provided to GZA and are subject to the limitations contained in Appendix A. References to the IBC refer to the International Building Code 2009 with Massachusetts State Building Code 8th Edition (MSBC) amendments.

NRA has indicated that the initial design proposal has suggested a finished first floor elevation approximately three feet above existing grade, corresponding to approximately 13-feet NAVD88. It should be noted that the existing grade within the proposed building footprint on the West Lot varies from approximately 9.5 feet to 14.5 feet NAVD88. Existing grade on the East Lot is relatively flat, with an approximate elevation range of 9.3 to 11.1 feet NAVD88 within the proposed building footprint. According to conversations with the NRA, excavation to approximately 12-feet below the existing surface, corresponding to an approximate elevation of -2 feet NAVD88, will likely accommodate the excavation needs for the below ground parking.

The borings from both the east and west lot explorations indicate that both parcels are underlain by a fill material across the building footprints that consists of very loose to dense, brown to black,

fine to coarse sand and silt containing up to 35 percent gravel, fragments of brick, wood, glass, coal, cinders, and shells. SPT N-Values within the fill ranged from 4 to 49 bpf NAVD88, with most samples ranging between 10 and 30 blows per foot. The fill extended about 7 to 17.5 feet bgs, approximately corresponding to elevations 0 to -6 feet. A natural, intermittent organic silt or peat layer was encountered below the fill at GZ-6 (West Lot), GZ-15 (East Lot), and GZ-17 (East Lot). The organic silt layer was generally observed at about 12 to 13 feet bgs, approximately corresponding to an elevation of 0 feet NAVD88. The organic silt layer was approximately 4 to 7-feet thick, and generally consisted of medium dense, black silt, containing up to ten percent gravel and organic fibers. A natural silt and fine sand layer was encountered at elevations ranging between -4 and -6 feet NAVD88 on the West Lot and 0 to -6 feet NAVD88 on the East Lot. These soils generally consisted of medium dense to dense, brown to olive gray silt containing up to ten percent fine sand. SPT N-Values within the silt and fine sand layer ranged from 19 to 85 bpf. Bedrock was observed and verified from a core sample taken at GZ-11, near Merrimac Street on the west lot, from 10.5 to 14.3 feet bgs, approximately corresponding to elevations 2.7 to -1.1 feet NAVD88.

7.2.2. Shallow Foundations

West Lot

Individual column footings and perimeter wall footings for the proposed buildings can be supported on the shallow bedrock, encountered at elevations ranging between 7 and -9 feet NAVD88 near the proposed building footprints, or structural fill extending to the natural silt and sand stratum. Over-excavation of unsuitable fill to bedrock or proof-compacted natural sand and silt should be carried out prior to placement of properly compacted structural fill or foundation components. Construction dewatering would be necessary, and a temporary excavation support structure such as steel sheet-piling, may be required. Alternatively, it may be feasible to use construction methods that allow the permanent foundation wall to be used for excavation support such as slurry walls or secant-pile walls. Excavation support systems would limit the soil excavation quantity, since side-sloping would not be required. Portions of the building excavations may require rock excavation (possibly blasting) to attain a final excavation grade of -2 feet NAVD88. Footings on bedrock should be designed with a maximum net allowable bearing pressure of eight tons per square foot (8 tsf). Footings on structural fill or natural sand and silt should be designed with a maximum net allowable bearing pressure of two tons per square foot (2 tsf).

East Lot

Individual column footings and perimeter wall footings for the proposed buildings can be supported on compacted structural fill extending to proof-compacted natural silt and sand encountered at elevations ranging from 1 to -6 feet NAVD88. Over-excavation of unsuitable fill to proof-compacted natural sand and silt should be carried out prior to placement of properly compacted structural fill or foundation components. Construction dewatering would be necessary, and a temporary excavation support structure such as steel sheetpiling may be required. Alternatively, it may be feasible to use construction methods that allow the permanent wall to be used for excavation support such as slurry walls or secant-pile walls. It should be noted that, excavation support systems would limit the soil excavation quantity, since side-sloping would not be required. Footings on structural fill or natural sand and silt should be designed with a maximum net allowable bearing pressure of two tons per square foot (2 tsf).

7.2.3. Deep Foundations

Technically feasible end-bearing deep foundations include driven, pre-cast concrete piles, steel H-piles, and concrete-filled, steel pipe piles, or drilled shafts. The final pile type would be selected during final design based on the technical requirements of the foundation system and the commercial availability/economics of pile types.

West Lot
Deep foundations are not required for the proposed buildings on the West Lot.

East Lot
Should the finished floor elevation of the garage level be revised higher, deep pile foundations should be considered in order to limit costs associated with soil excavation, soil disposal, and imported structural fill.

7.2.2 Flood Considerations

As shown on the attached Flood Insurance Rate Maps (FIRM) included in Appendix G, the 100-year flood elevation at the site varies from elevation 13 feet to elevation 12 feet NAVD88. In accordance with the Federal emergency Management Agency (FEMA) regulations and the MSBC, the finished floor elevation has to be at or above the FEMA 100 year flood elevation. . Additionally, Appendix A, Section XIII of the Newburyport Zoning Bylaw requires an elevation of 11.5 feet NAVD88 for new development on properties with the Floodplain Overlay District. The site is located within the Floodplain Overlay District.

7.2.3 Underground Parking Waterproofing

The proposed development includes the construction of underground parking below each of the three buildings. According to conversations with the NRA, excavation to approximately 12-feet below the existing surface, corresponding to an approximate elevation of -2 foot NAVD88, will likely accommodate the excavation needs for the sublevel parking. Groundwater near the proposed construction was measured at an average elevation of 4 feet NAVD88, although the actual groundwater levels will vary according to seasonal and tidal effects.

The parking garage can be below the 100-year flood elevation, as long as measures to protect the garage from flooding are incorporated into the building design. Such protective measures could include waterproofing of the exterior walls and sub-slab, installation of sumps, basement drainage systems, site grading to prevent water from entering the garage and installation of watertight entry doors that can be closed when flood conditions are imminent.

Extending the excavations to elevation -2 feet NAVD88 to accommodate underground parking has a premium cost factor related to the additional excavation of soils, the disposal of these soils at special landfills, dewatering during construction, and the installation of a waterproofing and groundwater management system for the operational building.

The basement parking areas of each building should be designed and constructed using a positive-side waterproofing system. The entire lower level structural slab and exterior walls should be designed to resist the hydrostatic uplift of ground water as well as prevent any moisture infiltration into the lower level garage space. Several waterproofing systems are commercially available and present a viable protective system. Some commercially available waterproofing systems include flexible self-adhering rubberized asphalt sheet waterproofing membranes, high-

density polypropylene (HDPE) products, bentonite panel systems, and concrete with hydrophobic additives. Installation of an internal pump or drainage system should be considered in order to control infiltrated water in the event of extreme weather events.

It is anticipated that de-watering will be required during construction of the sublevel parking. As groundwater analysis at the two wells recently installed did not reveal detectible concentrations of the chemicals analyzed for, premium environmental concerns related to groundwater discharge due to dewatering are not anticipated. Additional testing of groundwater discharge may be required during construction.

7.2.4 Underground Parking Slab

The underground parking structural slab should be designed to resist hydrostatic uplift pressures in conjunction with the waterproofing system selected with for the proposed development. A minimum eight-inch thick layer of compacted Sand-Gravel Fill or ¾-inch Crushed Stone should be provided as base course to act as a cushion over the existing soils. Subgrade preparation recommendations are provided in Section 8.4 of this report.

7.2.5 Pavement Design

Areas of new pavement will likely be required as part of the proposed development and may be required for environmental purposes on the property. In areas of new pavement, GZA recommends the following asphalt pavement sections:

	Light Duty Pavement	Heavy Duty Pavement
Asphalt Surface (in.)	1.5	1.5
Asphalt Binder (in.)	1.5	2.5
Sand-Gravel Base Course (in.)	8	12

7.2.6 Seismic Design

Soils bearing the recommended foundations at the site are not considered liquefiable based on criteria outlined in Section 1804.6 of the MSBC. Based on the soil conditions encountered, we recommend that Site Class C be used for seismic design in accordance with 780 CMR 1615 of the MSBC. Also, the mapped seismic design factors, S_s and S_1, for Newburyport are 0.35 and 0.077, respectively, in accordance with Table 1604.10 of the MSBC.

7.2.7 Lateral Earth Pressures

Retaining walls, buried foundation walls, and other permanent retaining structures subjected to unbalanced earth-loading conditions should be designed to resist lateral earth pressures.

For the purpose of evaluating lateral earth pressures for use in designing building foundation walls and retaining walls above groundwater, we recommend using the following equivalent soil lateral pressures:

Flexible (cantilever) walls such as site retaining walls	40 pounds/cubic foot
Rigid (fixed) walls such as basement walls	65 pounds/cubic foot

These lateral earth pressures assume horizontal backfill conditions and that the walls are backfilled with free draining Sand-Gravel Fill within at least three feet of the back of the walls

Hydrostatic pressure should be included in the design of foundation walls located beneath the anticipated water table.

Where the calculated earth pressure behind the wall is less than 250 pounds per square foot (psf), it should be increased to 250 psf to account for stresses created by compaction within five feet of the wall. Walls should also be designed for appropriate surcharge, sloping backfill, and seismic loads per the MSBC. Walls subject to vehicle loading should be designed for a minimum of the American Association of State Highway Transportation Officials HS-20 loading.

The recommended coefficient of friction to resist sliding between mass concrete/formed concrete and the natural granular soils or Granular Fill is 0.35.

The factors of safety for overturning and sliding under static loads should be at least 1.5. Passive pressure should not be included as a resisting force when analyzing for overturning and sliding.

Dynamic lateral loads will be applied by earthquake loads against exterior foundation walls. Exterior, below-grade walls should be designed to resist an earthquake force calculated using the following equation as described in 780 CMR 1615.0 equation 9.5.2.9 of the MSBC:

$$P_d = 0.040\ \gamma\ H^2$$

where: P_d = dynamic force in pounds per foot of wall;
γ = soil unit weight in pcf (typical unit weight = 130 pcf); and
H = height of foundation unit or depth of wall bgs.

This dynamic force should be applied as an inverse triangle over the height of the wall below-grade and added to the static lateral earth and surcharge pressures to calculate the total lateral stress for design of the wall.

8.0 CONSTRUCTION RECOMMENDATIONS

8.1 BUILDING SUBGRADE PREPARATION

Topsoil and existing unsuitable fill should be removed down to the natural rock stratum or natural sand and silt underneath footings. Based on current and historical borings, we anticipate that the natural sand will be present at approximately elevation -4 NAVD88 on the West Lot and elevation 1 to -6 feet NAVD88 on the East Lot. Based on an excavation elevation of -2 feet NAVD88, over-excavation will be required to remove unsuitable fill beneath a portion of the northernmost West Lot building. Where bedrock is not encountered, excavation to final subgrade elevation should be performed using a smooth-edged bucket (to the extent practical) to minimize possible disturbance to the subgrade. The subgrade should be proof-compacted prior to concrete placement with at least six passes of a large vibratory roller or walk-behind double drum compactor. In confined areas (*i.e.*, footing excavations), where vibratory drum rollers do not fit, proof-rolling should be completed using a heavy vibratory walk behind plate compactor. Any weak or soft spots identified during proof-compaction should be over-excavated and replaced with compacted Granular or Sand-Gravel Fill (refer to **Section 9.4** for Recommended Gradations for Fill Materials). We recommend that final excavation to subgrade elevation not be made until

the areas are ready for fill or concrete placement. Dewatering and methods to stabilize the excavation floor will likely be required for excavation to the final garage depth.

A minimum eight inch-thick base course consisting of compacted Sand-Gravel Fill or ¾-inch Crushed Stone should be provided below the slab. If Crushed Stone is used, it should be wrapped in non-woven filter fabric. If required to raise grades, suitable on-site fill (free of organics and debris), on-site natural sand or natural sand and gravel, or off-site Granular Fill should be placed and compacted as required herein to bottom of slab base course. Subgrades should be observed to be free of any topsoil or large roots prior to fill placement.

8.2 DEMOLITION, REMOVAL, AND BACKFILLING OF EXISTING FOUNDATIONS AND UTILITIES

Remnants of former foundations, if present, and utilities should be completely removed from within the proposed addition to avoid conflicts with proposed utilities and construction. Excavations should be backfilled with material meeting the requirements for Structural Fill (described below) and compacted to at least 95 percent of the material's maximum dry density as determined by ASTM D1557.

8.3 RETAINING WALL AND PAVEMENT SUBGRADE PREPARATION

Topsoil, subsoil, existing fill, and large roots should be removed from any proposed retaining wall alignments and pavement subgrades prior to fill placement. The exposed subgrade should be proof-rolled with at least four passes of a large vibratory roller. Any weak or soft spots identified during proof-rolling should be over-excavated and replaced with compacted Granular or Sand-Gravel Fill.

8.4 FILL MATERIAL AND COMPACTION

Structural Fill placed below and within the 1H:1V zone of influence of the building foundations/slabs, within any retaining wall alignment, or as pavement/sidewalk base course should be compacted to at least 95 percent of the maximum dry density as determined by Modified Proctor Tests (ASTM D-1557, Method C). Structural Fill should be placed systematically in horizontal layers not more than 12 inches in thickness prior to compaction. Compaction equipment should preferably consist of large, self-propelled vibratory rollers capable of generating a minimum of 45,000 pounds of dynamic force. Where hand-guided compaction equipment, such as a small vibratory plate compactor is used, the loose lift thickness should not exceed 6 inches.

Structural Fill should consist of clean, well-graded sand and gravel, free of organic material, snow, ice, or other objectionable materials and should meet the gradation requirements presented in Table 1.

Fill below a sidewalk base course should be compacted to at least 92 percent of the maximum dry density. Fill within two feet of the bottom of pavement should be compacted to at least 95 percent maximum dry density and to at least 92 percent of the maximum dry density at depths greater than two feet. Fill placed within proposed landscaped areas should be compacted to at least 90 percent of the maximum dry density.

Extra care should be used when compacting adjacent to walls. Hand-operated rollers or plate compactors weighing not more than 250 pounds should be used within a lateral distance of five

feet of walls. Where walls are buried on both sides, backfill and compaction should proceed on both sides of the wall so that the difference in top of fill on either side of the wall does not exceed two feet.

Subgrades should be protected from frost at all times during construction. Fill should not be placed over frozen soil.

Recommended Fill Gradation

Sieve Size	Percent Finer By Weight
Granular/Structural Fill	Shall be free from ice and snow, roots, sod, rubbish and other deleterious or organic Matter. Structural fill shall conform to the following gradation requirements:
2/3 of the loose lift thickness	100
No. 10	30 - 95
No. 40	10 - 70
No. 200	*0 - 15 * 0 -8 for backfill behind walls and beneath unheated slabs to a depth of 3 feet.
Sand-Gravel	Shall consist of durable sand and gravel and shall be free from ice and snow, roots, Sod, rubbish and other deleterious or organic matter. Sand-gravel shall conform to the following gradation requirements:
3 inch	100
1/2 inch	50 - 85
No. 4	40 - 75
No. 40	10 - 35
No. 200	0 - 8

8.5 CONSTRUCTION DEWATERING

Excavation for the proposed construction is assumed to be performed to a maximum elevation of approximately -2 feet NAVD88 for the proposed buildings. The excavation elevation is below the expected groundwater elevation at all the proposed buildings.

Construction dewatering will be required at the buildings. Based on a review of existing soil conditions, it is anticipated that this can be achieved through the use of localized sumps for collection and removal of water. It is possible that water could be pumped to temporary discharge pits excavated on Site. No discharge of pumped water off site should be performed unless approved by the appropriate regulatory agencies, and if allowed, should be done in accordance will all federal, state, and/or local regulations. Dewatering will require a discharge permit and possible filtration and chemical testing of the water prior to discharge. Current and previous environmental investigations do not indicate the presence of impacted groundwater on either the West or East Lots. Additional methods, including well point and additional sump installations, may be required in-order to achieve stability of the floor of the excavation.

Additionally, water that collects from precipitation events may impact construction. We recommend that temporary control measures be implemented to reduce the amount of surface water (from rainfall runoff) from potentially entering and ponding in the excavations. Temporary measures should include, but not be limited to, construction of drainage ditches to divert and/or reduce the amount of surface water flowing over exposed subgrades during construction.

8.6 REUSE OF EXISTING MATERIAL

Due to the presence of organics, the limited existing topsoil is unsuitable for reuse in building and pavement areas, but may be reused on Site as cover in landscaped areas.

The unsuitable fill may be used as fill for site grading outside of building areas, provided that the material does not contain organics, roots, or other debris and can be placed and compacted as required herein. Existing materials should not be reused within three feet laterally of walls, as a majority of the existing materials do not meet the criteria for free-draining Sand-Gravel fill, which is required behind foundation and retaining walls. The existing fill material, if reused on site, should be placed at a depth greater than 3- feet below the final finished grade. Reuse of these fill materials could result in a significant cost savings.

8.7 MANAGEMENT AND DISPOSAL OF EXCAVATED SOIL

Excess soils generated from foundation and utility excavations are anticipated to consist of limited topsoil, the sand/gravel parking surface, existing fill, natural sand and silt, and excavated bedrock. Rock and soils that cannot be reused on Site, whether due to excess quantity or the unsuitable nature of the material, will require off-Site disposal. A Materials Management Plan detailing environmental testing and handling of contaminated soils and groundwater may be required, depending on the requirements of the disposal facility/location. Refer to Section 7.1.3 for approximate estimates of soil disposal quantities based on an average excavation depth of 12-feet over the footprint area of the three buildings (24,000 square feet).

8.8 TEMPORARY EXCAVATION SUPPORT

Where temporary excavation support is needed, the support system, such as drilled or driven soldier piles and lagging or steel sheet piles, should be designed and stamped by a registered Professional Engineer in the state of Massachusetts engaged by the Contractor and submitted to GZA for review prior to construction.

The Owner and the Contractor should be aware of, and become familiar with applicable local, state, and federal safety regulations, including the current Occupational Safety and Health Administration (OSHA) Excavation and Trench Safety Standards. Construction site safety generally is the sole responsibility of the Contractor, who shall also be solely responsible for the means, methods, and sequencing of construction operations.

The Contractor should be aware that slope height, slope inclination, or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state, or federal safety regulations, e.g.; OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, or successor regulations. Such regulations are strictly enforced and, if they are not followed, the Owner, Contractor, and/or earthwork and utility subcontractors could be liable for substantial penalties.

As a safety measure, it is recommended that all vehicles and soil piles be kept a minimum lateral distance from the crest of the slope equal to no less than the slope height. Exposed slope faces should also be protected against the elements.

8.9 PROTECTION OF EXISTING STRUCTURES

It is important to limit the potential impact of construction on the neighboring buildings, roads and utilities. We anticipate that some construction operations will cause noticeable levels of noise and/or vibration. The installation of temporary earth support systems and soil compaction/proof-rolling may also cause vibrations. Adjacent utilities to remain should be surveyed prior to the start of construction and monitored throughout construction to evaluate potential movement and possible damage.

9.0 ESTIMATE OF PREMIUM COSTS

Due to subsurface conditions on the East and West Lots, premium costs may be incurred for disposal of excess soil that cannot be reused at the site. The following table provides a summary of the approximate estimated premium environmental costs that may be incurred during the proposed construction for the underground parking garage extending to -2 feet NGVD88. The following estimates are conceptual and preliminary in nature, and should not be used for budgeting purposes.

DISPOSAL COSTS*	**WEST LOT**	**EAST LOT**
MA LINED LANDFILL $47/TON	$15,000	$0
MA UNLINED LANDFILL $35/TON	$300,000	$230,000
OUT-OF-STATE NON-HAZARDOUS LANDFILL $85/TON	$30,000	$0
TOTAL PREMIUM COSTS	$345,000	$230,000

*The disposal volumes and associated costs will be significantly affected by the final floor elevation of the underground parking level, potential reuse of excavated soil to adjust surface grades, additional analyses that will be required for disposal, the availability of landfill space, and the prevailing costs for the location of the site. Volumes used to develop the cost estimates are based on in-place soil volume for a 12-foot excavation below existing grade over the building footprints (24,000 square feet).

Based on the proposed design parameters, geotechnical premium costs are anticipated in areas of the site. The final design elevation of the garage slab will have an impact on the magnitude of the geotechnical premium costs; however, additional premium geotechnical related costs might be expected for the following:

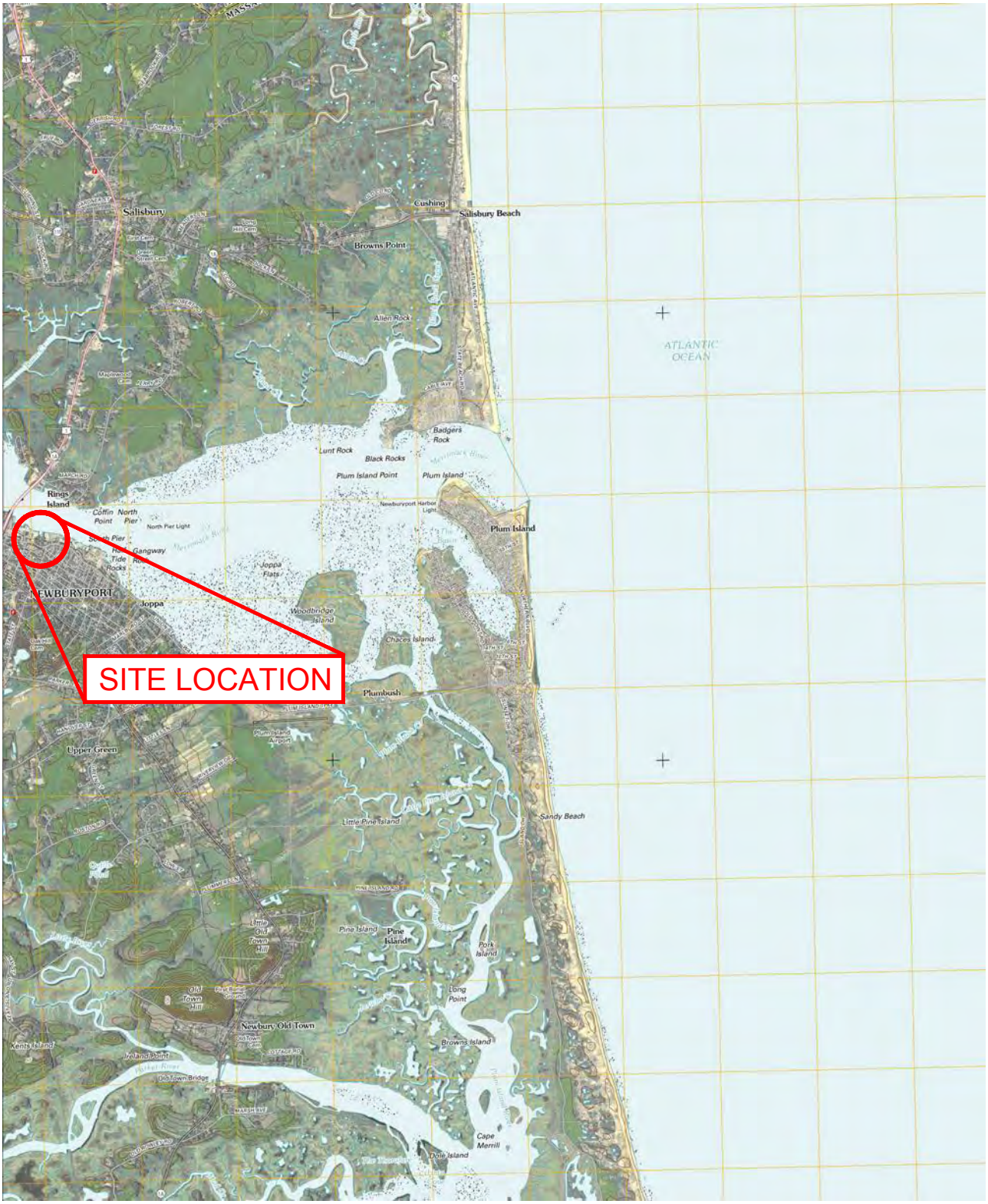
- Rock excavation where bedrock is at an elevation above the design sublevel finished floor (depending on final design floor level);
- Over-excavation in areas where unsuitable bearing soils are present;
- Use of sheet piles or other excavation support systems where side sloping is not feasible or recommended;
- Excavation dewatering during construction, and;
- Waterproofing of the sublevel garage where it is anticipated to be located below the anticipated groundwater table.

Specific estimates of premium geotechnical costs are addressed under separate cover by a cost estimating professional.

10.0 REFERENCES

- Commonwealth of Massachusetts, December 2007, Massachusetts Contingency Plan.,310 CMR 40.0000. Massachusetts Department of Environmental Protection (MassDEP), Bureau of Waste Site Cleanup.
- Commonweath of Massachusetts, September 2008, Massachusetts State Building Code, 780 CMR. State Board of Building Regulations and Standards.
- Limited Site Investigation, Simmons Environmental, January, 1997.
- Phase I Initial Site Investigation and Tier Classification, Ransom Environmental Consultants, Inc., July 1998.
- Tier II Extension, Vanasse, Hangen, Brustlin, Inc., April 2008.
- Initial Phase II Comprehensive Site Assessment, Weston and Sampson, May 2009.
- Supplemental Phase II Comprehensive Site Assessment, Phase III Remedial Action Plan, and Phase IV Remedy Implementation Plan, Weston and Sampson, May 2001.
- Class B-2 Response Action Outcome Statement, Weston and Sampson, November 2011.

FIGURES



NOTE:
USGS TOPOGRAPHIC MAP PROVIDED BY THE US DEPARTMENT OF THE INTERIOR



QUADRANGLE LOCATION



0 2500 5000 10,000

SCALE IN FEET

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THIS DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

LIMITED SUBSURFACE EXPLORATION
EAST AND WEST LOTS, MERRIMAC STREET
NEWBURYPORT, MASSACHUSETTS

SITE LOCATION PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
NEWBURYPORT
REDEVELOPMENT AUTHORITY
60 PLEASANT STREET
NEWBURYPORT, MASSACHUSETTS

PROJ MGR: MLS	REVIEWED BY: WRN	CHECKED BY: JMB	FIGURE 1
DESIGNED BY: FSV	DRAWN BY: MLS/AJK	SCALE: 1" = 5000'	
DATE: SEPTEMBER 2013	PROJECT NO. 18.0171593.00	REVISION NO.	SHEET NO.

© 2011 – GZA GeoEnvironmental, Inc. GZA–J:\171500's\18.0171593.00 Nbpt NRA– Waterfront Park Geotech\Figures–CAD\NBPT_NRA_Site Plan_ajk 082613.dwg [Figure 1 – Locus] August 30, 2013 – 9:03am alexander.ka

©2011 – GZA GeoEnvironmental, Inc. GZA-J:\171500's\18.0171593.00 Nbpt NRA– Waterfront Park Geotech\Figures–CAD\NBPT_NRA_Site Plan_090313.dwg [Figure 2 – Boring Locations] September 06, 2013 – 12:51pm



NOTE:
THE LOCATION OF EXPLORATION AND "FOUND" SITE FEATURES WERE DETERMINED BY USING A TOTAL STATION SURVEY AND/OR GPS SURVEY DEVICE TO OBTAIN FIELD COORDINATES. THE SURVEY DATA WAS INCORPORATED INTO THE ABOVE REFERENCED SITE PLAN BY ALIGNING "FOUND" SITE FEATURES IN THE DRAWING FILE. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

REFERENCE:
BASE MAP FROM GOOGLE PRO, IMAGE DATED 7/15/2013

LEGEND:

- ENVIRONMENTAL BORING WITH MONITORING WELL
- ENVIRONMENTAL BORING FOR DISPOSAL
- ENVIRONMENTAL BORING FOR SCREENING
- GEOTECHNICAL BORING LOCATION

N
W E
S

0 40 80 160
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

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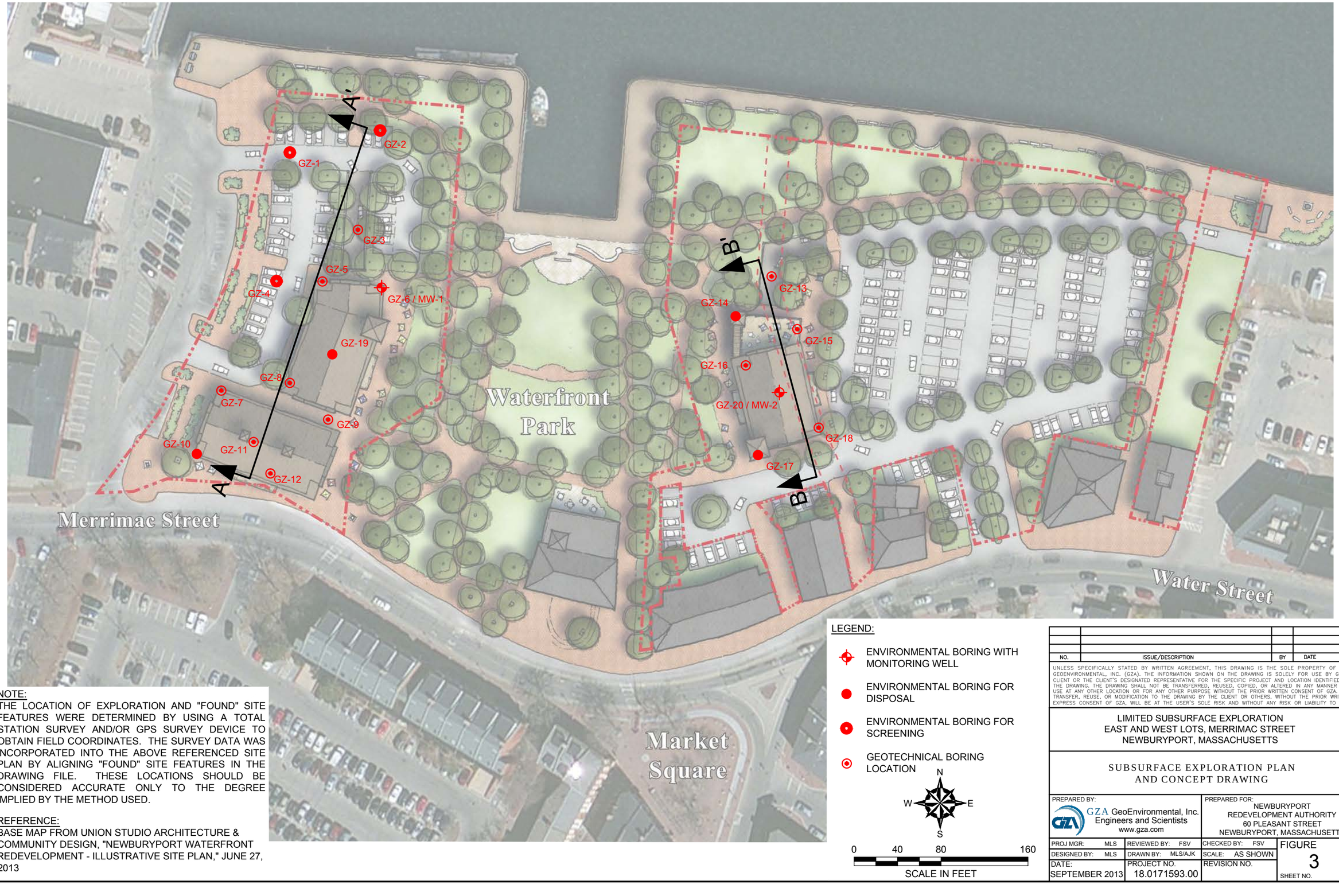
LIMITED SUBSURFACE EXPLORATION
EAST AND WEST LOTS, MERRIMAC STREET
NEWBURYPORT, MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
NEWBURYPORT
REDEVELOPMENT AUTHORITY
60 PLEASANT STREET
NEWBURYPORT, MASSACHUSETTS

PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE 2
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	
DATE: SEPTEMBER 2013	PROJECT NO. 18.0171593.00	REVISION NO.	SHEET NO.



NOTE:
THE LOCATION OF EXPLORATION AND "FOUND" SITE FEATURES WERE DETERMINED BY USING A TOTAL STATION SURVEY AND/OR GPS SURVEY DEVICE TO OBTAIN FIELD COORDINATES. THE SURVEY DATA WAS INCORPORATED INTO THE ABOVE REFERENCED SITE PLAN BY ALIGNING "FOUND" SITE FEATURES IN THE DRAWING FILE. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

REFERENCE:
BASE MAP FROM UNION STUDIO ARCHITECTURE & COMMUNITY DESIGN, "NEWBURYPORT WATERFRONT REDEVELOPMENT - ILLUSTRATIVE SITE PLAN," JUNE 27, 2013

LEGEND:

- ENVIRONMENTAL BORING WITH MONITORING WELL
- ENVIRONMENTAL BORING FOR DISPOSAL
- ENVIRONMENTAL BORING FOR SCREENING
- GEOTECHNICAL BORING LOCATION

N
W E
S

0 40 80 160
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

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LIMITED SUBSURFACE EXPLORATION
EAST AND WEST LOTS, MERRIMAC STREET
NEWBURYPORT, MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN AND CONCEPT DRAWING

PREPARED BY:
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PREPARED FOR:
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REDEVELOPMENT AUTHORITY
60 PLEASANT STREET
NEWBURYPORT, MASSACHUSETTS

PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE 3
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	SHEET NO.
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©2011 – GZA GeoEnvironmental, Inc. GZA–J:\171500's\18.0171593.00 Nbpt NRA– Waterfront Park Geotech\Figures–CAD\NBPT_NRA_Site Plan_ajk 082613.dwg [Figure 3 – Boring Locations (concept)] August 30, 2013 –

©2011 – GZA GeoEnvironmental, Inc. GZA–J:\171500's\18.0171593.00 Nbpt NRA– Waterfront Park Geotech\Figures–CAD\NBPT_NRA_Site Plan_090313.dwg [Figure 4 – Environmental Results] September 06, 2013 – 1:05

COMPOUND (mg/Kg)	8/5/2013	MassDEP LIMITS	
	2'	S1-GW2	RCS1
ARSENIC	**22.7**	20	20
CHROMIUM	15.3	30	30
LEAD	219	300	300
BENZ(A)ANTHRACENE	3.3	7	7
BENZO(A)PYRENE	**2.6**	2	2
BENZO(B)FLUORANTHENE	2.9	7	7

COMPOUND (mg/Kg)	8/5/2013	MassDEP LIMITS	
	2'	S1-GW2	RCS1
ARSENIC	**21.2**	20	20
CHROMIUM	26.7	30	30
LEAD	**479**	300	300
BENZ(A)ANTHRACENE	1.8	7	7
BENZO(A)PYRENE	1.6	2	2
BENZO(B)FLUORANTHENE	1.5	7	7

COMPOUND (mg/Kg)	8/8/2013		MassDEP LIMITS	
	2'	7'	S1-GW2	RCS1
ARSENIC	**20.7**	<7.46	20	20
CHROMIUM	21.2	16.9	30	30
LEAD	92.4	131	300	300
BENZ(A)ANTHRACENE	1.7	<0.34	7	7
BENZO(A)PYRENE	1.5	<0.34	2	2
BENZO(B)FLUORANTHENE	1.2	<0.34	7	7

COMPOUND (mg/Kg)	8/6/2013		MassDEP LIMITS	
	2'	6'	S1-GW2	RCS1
ARSENIC	17.6	20	20	20
CHROMIUM	**30.3**	30	30	30
LEAD	31.8	300	300	300
BENZ(A)ANTHRACENE	0.23	7	7	7
BENZO(A)PYRENE	0.27	2	2	2
BENZO(B)FLUORANTHENE	0.32	7	7	7

COMPOUND (mg/Kg)	8/6/2013		MassDEP LIMITS	
	2'	6'	S1-GW2	RCS1
ARSENIC	**335**	18.2	20	20
CHROMIUM	**44.6**	13.5	30	30
LEAD	57.6	72.1	300	300
BENZ(A)ANTHRACENE	<0.26	<0.3	7	7
BENZO(A)PYRENE	<0.26	<0.3	2	2
BENZO(B)FLUORANTHENE	<0.26	<0.3	7	7

COMPOUND (mg/Kg)	8/7/2013		MassDEP LIMITS	
	2'	6'	S1-GW2	RCS1
ARSENIC	**21.8**	18	20	20
CHROMIUM	**64.7**	19.4	30	30
LEAD	101	128	300	300
C11-C22 AROMATIC	61	**1700**	1000	1000
C19-C36 ALIPHATIC	16	500	3000	3000
C9-C18 ALIPHATIC	<11	**2900**	1000	1000
C5-C8 ALIPHATIC	<2.1	23	100	100
C9-C10 AROMATIC	<2.1	**130**	100	100
C9-C12 ALIPHATIC	<2.1	120	1000	1000
BENZ(A)ANTHRACENE	1	0.33	7	7
BENZO(A)PYRENE	0.91	<0.28	2	2
BENZO(B)FLUORANTHENE	0.68	<0.28	7	7

COMPOUND (mg/Kg)	8/6/2013		MassDEP LIMITS	
	4'	6'-8'	S1-GW2	RCS1
ARSENIC	19.7	13.8	20	20
CHROMIUM	21.5	15.6	30	30
LEAD	242	207	300	300
BENZ(A)ANTHRACENE	6.5	<0.29	7	7
BENZO(A)PYRENE	**5.6**	<0.29	2	2
BENZO(B)FLUORANTHENE	5.5	<0.29	7	7

COMPOUND (mg/Kg)	8/9/2013		MassDEP LIMITS	
	1'-3'	6'-8'	S1-GW2	RCS1
ARSENIC	12	12.7	20	20
CHROMIUM	22.8	13	30	30
LEAD	142	<5.18	300	300
BENZ(A)ANTHRACENE	0.55	<0.28	7	7
BENZO(A)PYRENE	0.62	<0.28	2	2
BENZO(B)FLUORANTHENE	0.52	<0.28	7	7

COMPOUND (mg/Kg)	8/9/2013		MassDEP LIMITS	
	2'	6'-7'	S1-GW2	RCS1
ARSENIC	13.7	14.3	20	20
CHROMIUM	25.7	16.4	30	30
LEAD	188	167	300	300
BENZ(A)ANTHRACENE	<0.56	0.88	7	7
BENZO(A)PYRENE	0.68	0.95	2	2
BENZO(B)FLUORANTHENE	0.68	0.89	7	7

GZ-1
GZ-2
GZ-3
GZ-4
GZ-5
GZ-6 / MW-1
GZ-7
GZ-8
GZ-9
GZ-10
GZ-11
GZ-12
GZ-13
GZ-14
GZ-15
GZ-16
GZ-17
GZ-18
GZ-19
GZ-20 / MW-2

APPROXIMATE BOUNDARY OF RTN 3-15445

Merrimac St

NOTES:
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2. **BOLD** INDICATES EXCEEDANCE OF THE REGULATORY STANDARD.

REFERENCE:
BASE MAP FROM GOOGLE PRO, IMAGE DATED 7/15/2013

LEGEND:
- ENVIRONMENTAL BORING WITH MONITORING WELL
- ENVIRONMENTAL BORING FOR DISPOSAL
- ENVIRONMENTAL BORING FOR SCREENING
- GEOTECHNICAL BORING LOCATION

N W E S

0 40 80 160
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

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LIMITED SUBSURFACE EXPLORATION
EAST AND WEST LOTS, MERRIMAC STREET
NEWBURYPORT, MASSACHUSETTS

SUBSURFACE EXPLORATION PLAN WITH SELECT ENVIRONMENTAL SOIL SAMPLE DETECTIONS

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
www.gza.com

PREPARED FOR:
NEWBURYPORT
REDEVELOPMENT AUTHORITY
60 PLEASANT STREET
NEWBURYPORT, MASSACHUSETTS

PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE 4
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	
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NOTES:

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2. SOIL VOLUME CALCULATIONS REPRESENT IN-PLACE VOLUME AND DO NOT INCLUDE EXCAVATION SIDE-SLOPE VOLUMES.
3. VOLUME CALCULATION ASSUMES AN EXCAVATION TO APPROXIMATELY 12 FEET BELOW THE EXISTING GROUND SURFACE (-2 FEET NAVD88).

REFERENCE:

BASE MAP FROM UNION STUDIO ARCHITECTURE & COMMUNITY DESIGN, "NEWBURYPORT WATERFRONT REDEVELOPMENT - ILLUSTRATIVE SITE PLAN," JUNE 27, 2013

	DISPOSAL VOLUMES (yd³)		
	EXCEEDS COMM-97	LINED LANDFILL	UNLINED LANDFILL
WEST LOT	200	200	5,000
EAST LOT	0	0	4,000
SUBTOTAL	200	200	9,000
TOTAL	9,400		

LEGEND:

- ENVIRONMENTAL BORING WITH MONITORING WELL
- ENVIRONMENTAL BORING FOR DISPOSAL
- ENVIRONMENTAL BORING FOR SCREENING
- GEOTECHNICAL BORING LOCATION

N / W / E / S

0 40 80 160

SCALE IN FEET

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LIMITED SUBSURFACE EXPLORATION
EAST AND WEST LOTS, MERRIMAC STREET
NEWBURYPORT, MASSACHUSETTS

PROPOSED SITE PLAN WITH DISPOSAL VOLUMES

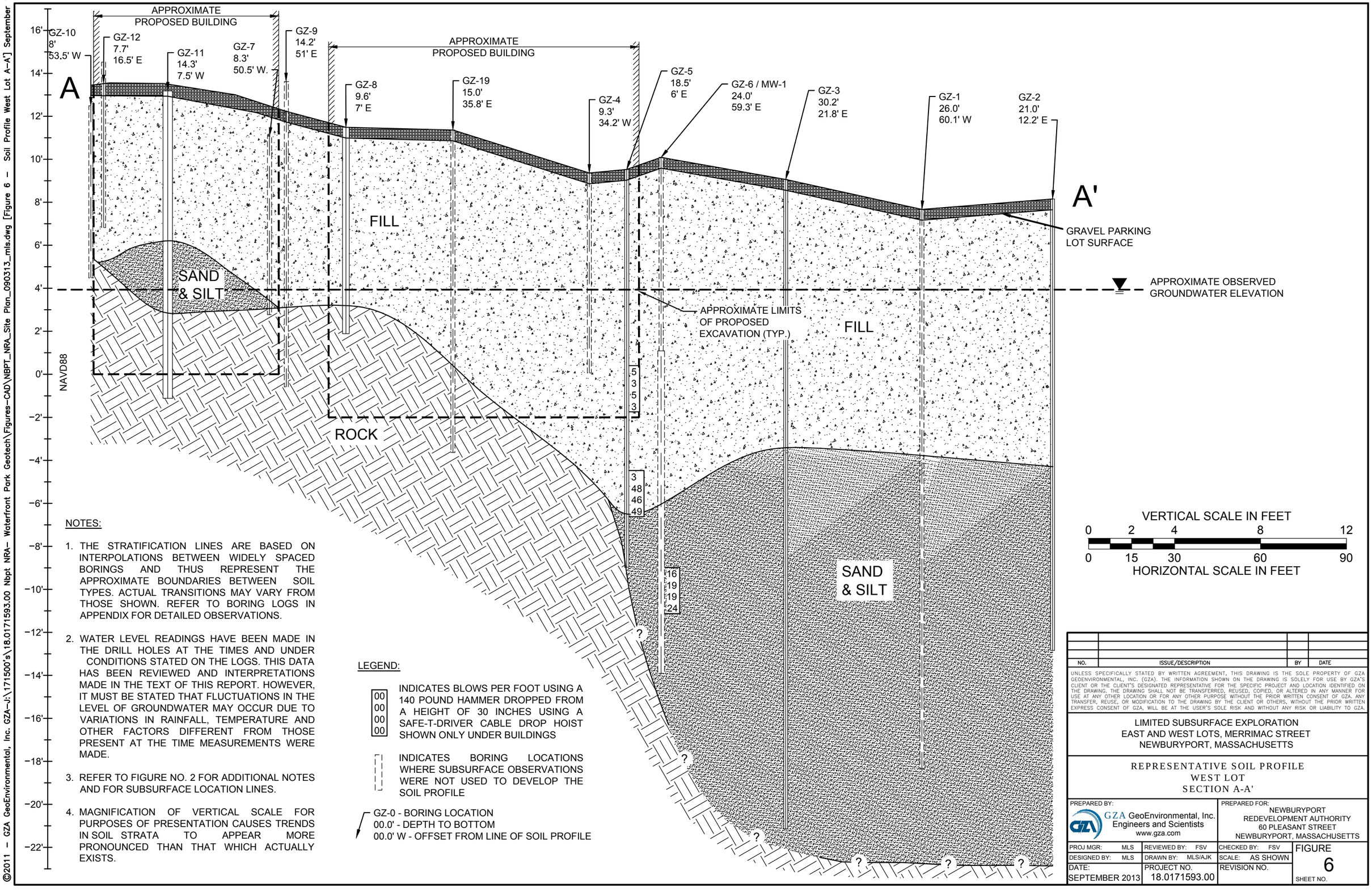
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GZA GeoEnvironmental, Inc.
Engineers and Scientists
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PREPARED FOR:
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REDEVELOPMENT AUTHORITY
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NEWBURYPORT, MASSACHUSETTS

PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE 5
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	
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©2011 - GZA GeoEnvironmental, Inc. GZA-J:\171500's\18.0171593.00 Nbpt NRA- Waterfront Park Geotech\Figures-CAD\NBPT_NRA_Site Plan_090313_mls.dwg [Figure 5 - Proposed Site Plan & Disposal Volumes] s

©2011 – GZA GeoEnvironmental, Inc. GZA–J:\171500's\18.0171593.00 Nbpt NRA– Waterfront Park Geotech\Figures–CAD\NBPT_NRA_Site Plan_090313_mls.dwg [Figure 6 – Soil Profile West Lot A–A'] September 16, 20



NOTES:

1. THE STRATIFICATION LINES ARE BASED ON INTERPOLATIONS BETWEEN WIDELY SPACED BORINGS AND THUS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. ACTUAL TRANSITIONS MAY VARY FROM THOSE SHOWN. REFER TO BORING LOGS IN APPENDIX FOR DETAILED OBSERVATIONS.
2. WATER LEVEL READINGS HAVE BEEN MADE IN THE DRILL HOLES AT THE TIMES AND UNDER CONDITIONS STATED ON THE LOGS. THIS DATA HAS BEEN REVIEWED AND INTERPRETATIONS MADE IN THE TEXT OF THIS REPORT. HOWEVER, IT MUST BE STATED THAT FLUCTUATIONS IN THE LEVEL OF GROUNDWATER MAY OCCUR DUE TO VARIATIONS IN RAINFALL, TEMPERATURE AND OTHER FACTORS DIFFERENT FROM THOSE PRESENT AT THE TIME MEASUREMENTS WERE MADE.
3. REFER TO FIGURE NO. 2 FOR ADDITIONAL NOTES AND FOR SUBSURFACE LOCATION LINES.
4. MAGNIFICATION OF VERTICAL SCALE FOR PURPOSES OF PRESENTATION CAUSES TRENDS IN SOIL STRATA TO APPEAR MORE PRONOUNCED THAN THAT WHICH ACTUALLY EXISTS.

LEGEND:

00 00 00 00 — INDICATES BLOWS PER FOOT USING A 140 POUND HAMMER DROPPED FROM A HEIGHT OF 30 INCHES USING A SAFE-T-DRIVER CABLE DROP HOIST SHOWN ONLY UNDER BUILDINGS

INDICATES BORING LOCATIONS WHERE SUBSURFACE OBSERVATIONS WERE NOT USED TO DEVELOP THE SOIL PROFILE

GZ-0 - BORING LOCATION
00.0' - DEPTH TO BOTTOM
00.0' W - OFFSET FROM LINE OF SOIL PROFILE

VERTICAL SCALE IN FEET
0 2 4 8 12
0 15 30 60 90
HORIZONTAL SCALE IN FEET

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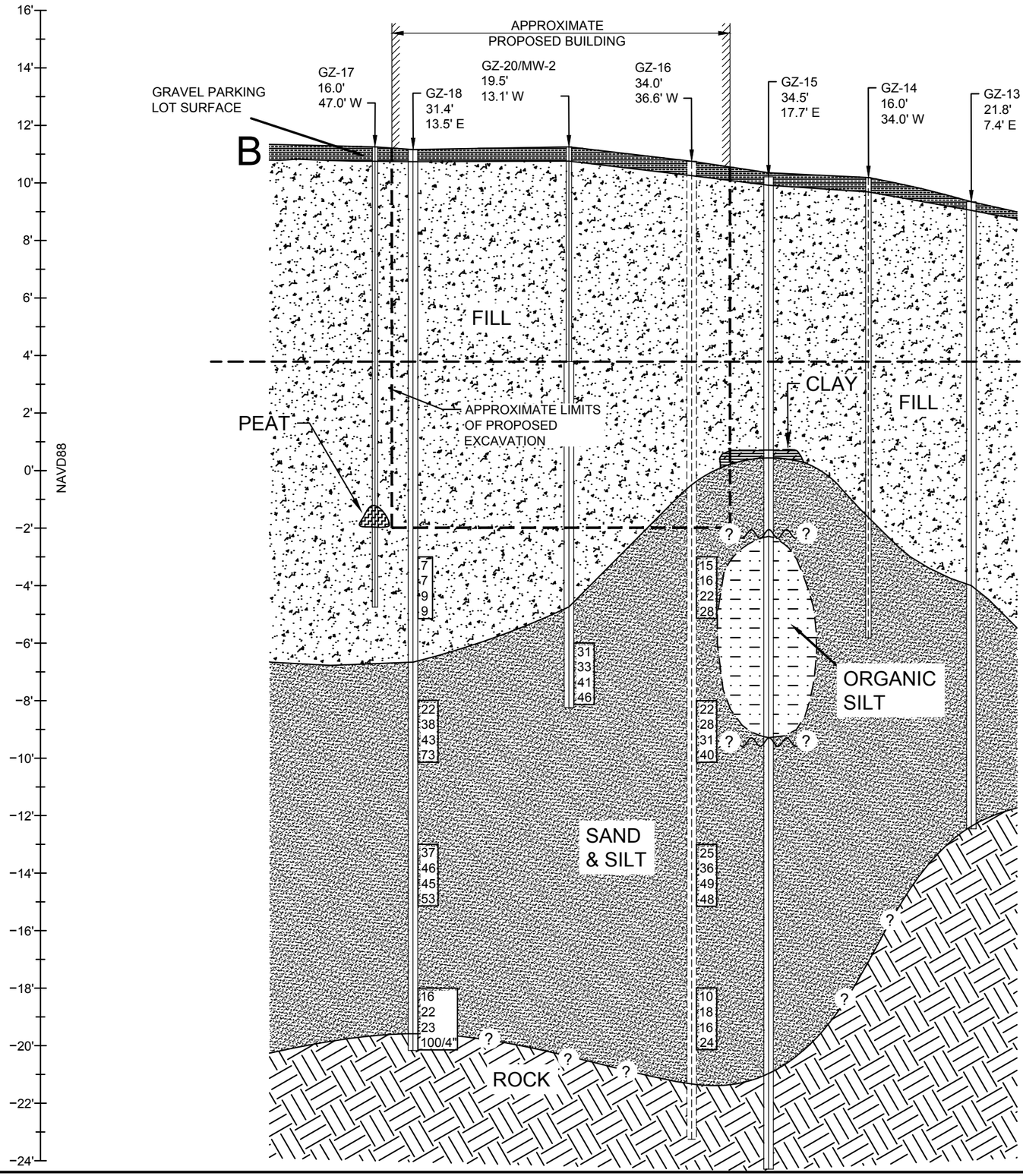
REPRESENTATIVE SOIL PROFILE
WEST LOT
SECTION A-A'

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PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE 6
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	
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NOTES:

1. THE STRATIFICATION LINES ARE BASED ON INTERPOLATIONS BETWEEN WIDELY SPACED BORINGS AND THUS REPRESENT THE APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. ACTUAL TRANSITIONS MAY VARY FROM THOSE SHOWN. REFER TO BORING LOGS IN APPENDIX FOR DETAILED OBSERVATIONS.
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LEGEND:

00 / 00 / 00 / 00 — INDICATES BLOWS PER FOOT USING A 140 POUND HAMMER DROPPED FROM A HEIGHT OF 30 INCHES USING A SAFE-T-DRIVER CABLE DROP HOIST SHOWN ONLY UNDER BUILDINGS

INDICATES BORING LOCATIONS WHERE SUBSURFACE OBSERVATIONS WERE NOT USED TO DEVELOP THE SOIL PROFILE

GZ-0 - BORING LOCATION
00.0' - DEPTH TO BOTTOM
00.0' W - OFFSET FROM LINE OF SOIL PROFILE

VERTICAL SCALE IN FEET
0 2 4 8 12
0 15 30 60 90
HORIZONTAL SCALE IN FEET

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LIMITED SUBSURFACE EXPLORATION
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NEWBURYPORT, MASSACHUSETTS

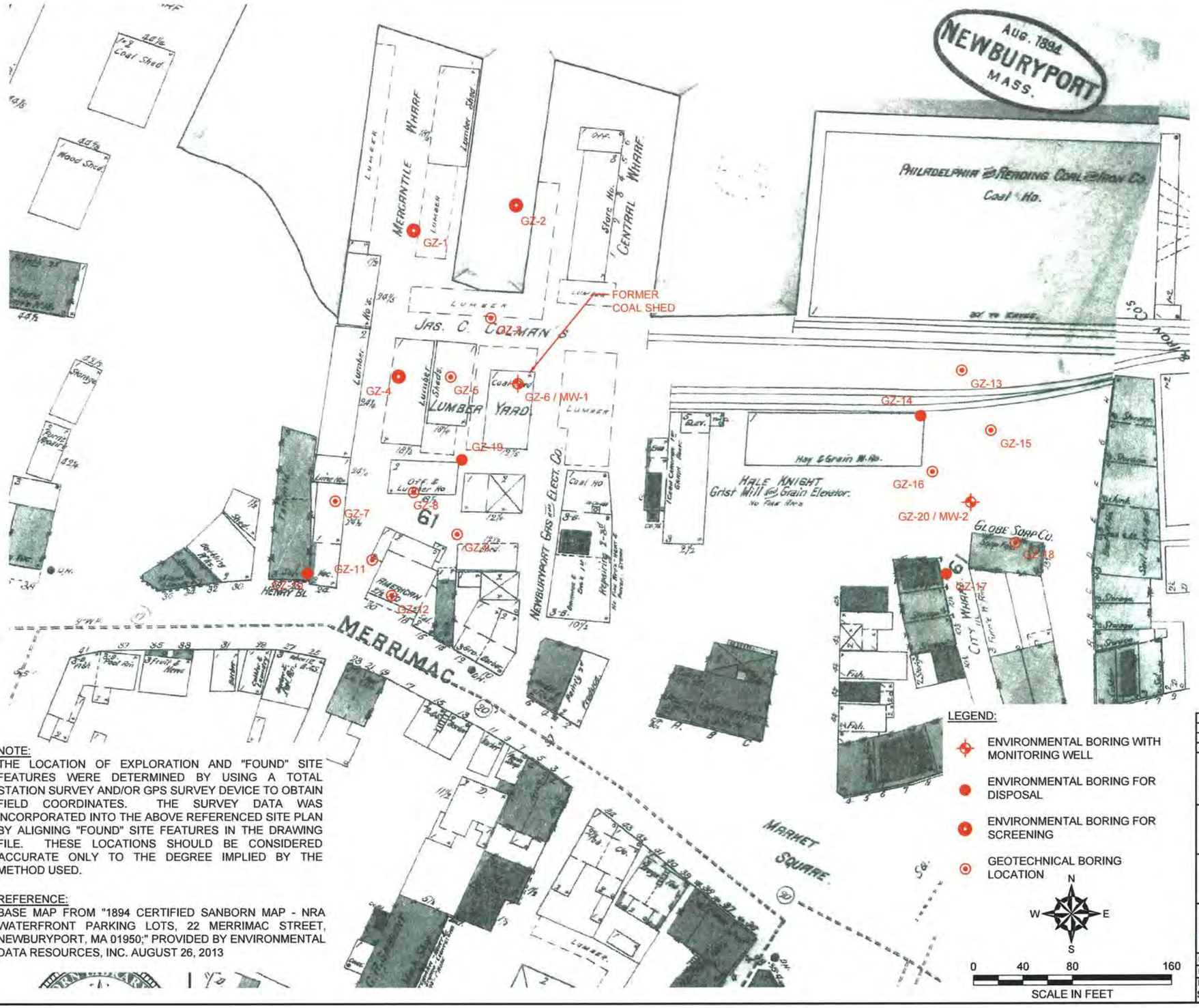
REPRESENTATIVE SOIL PROFILE
EAST LOT
SECTION B-B'

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60 PLEASANT STREET
NEWBURYPORT, MASSACHUSETTS

PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE 7
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	
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©2011 – GZA GeoEnvironmental, Inc. GZA–J:\171500's\18.0171593.00 Nbpt NRA– Waterfront Park Geotech\Figures–CAD\NBPT_NRA_Site Plan_090313.dwg [Figure 8 – 1894 Sanborn] September 06, 2013 – 2:07pm mg



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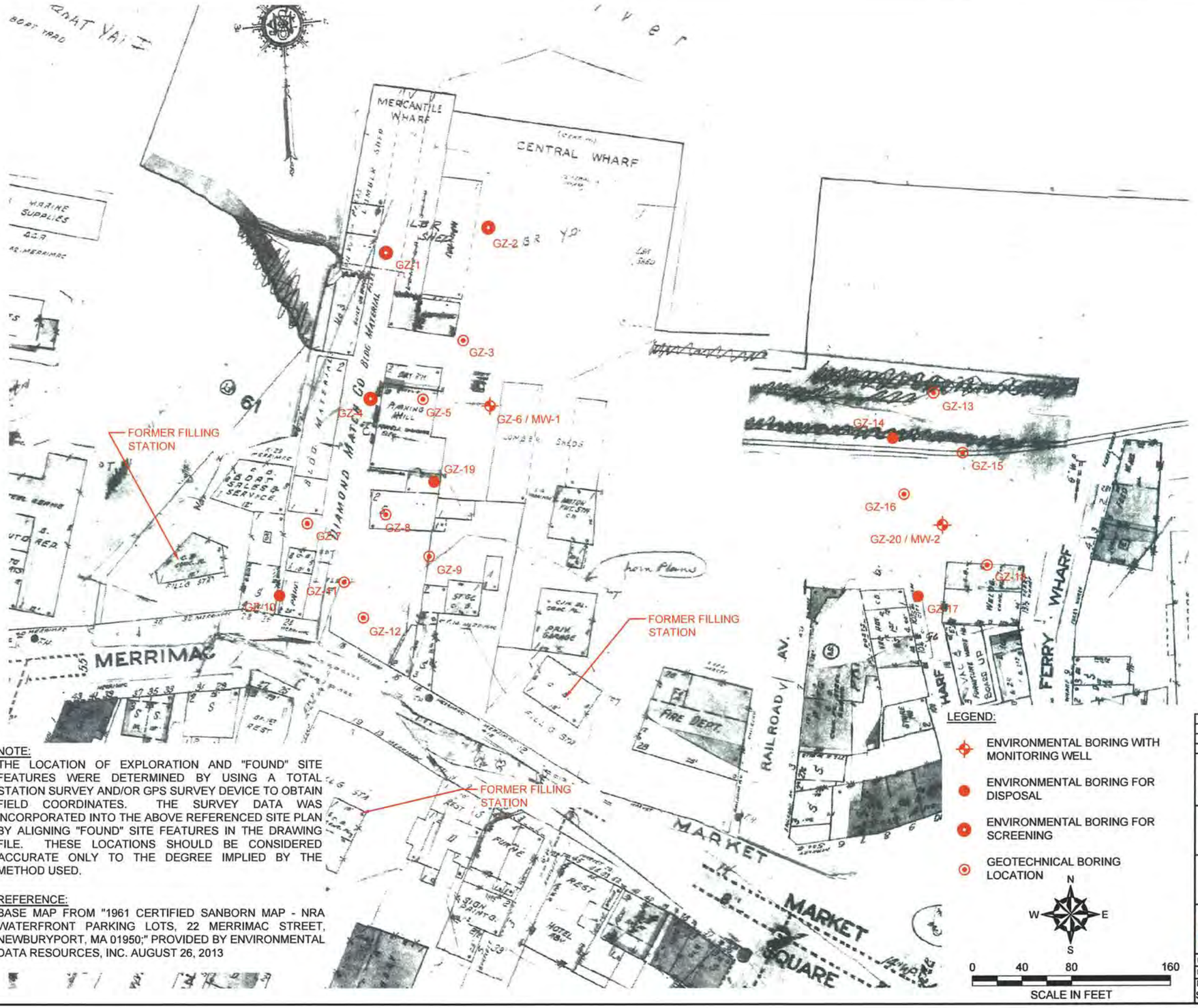
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LIMITED SUBSURFACE EXPLORATION
EAST AND WEST LOTS, MERRIMAC STREET
NEWBURYPORT, MASSACHUSETTS

1894 HISTORICAL SANBORN MAP WITH EXPLORATION LOCATIONS

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GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		NEWBURYPORT REDEVELOPMENT AUTHORITY 60 PLEASANT STREET NEWBURYPORT, MASSACHUSETTS	
PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	8
DATE: SEPTEMBER 2013	PROJECT NO. 18.0171593.00	REVISION NO.	SHEET NO.

©2011 – GZA GeoEnvironmental, Inc. GZA–J:\171500's\18.0171593.00 Nbpt NRA– Waterfront Park Geotech\Figures–CAD\NBPT_NRA_Site Plan_090313_mls.dwg [Figure 9 – 1961 Sanborn] September 09, 2013 – 4:08pm



NOTE:
THE LOCATION OF EXPLORATION AND "FOUND" SITE FEATURES WERE DETERMINED BY USING A TOTAL STATION SURVEY AND/OR GPS SURVEY DEVICE TO OBTAIN FIELD COORDINATES. THE SURVEY DATA WAS INCORPORATED INTO THE ABOVE REFERENCED SITE PLAN BY ALIGNING "FOUND" SITE FEATURES IN THE DRAWING FILE. THESE LOCATIONS SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE IMPLIED BY THE METHOD USED.

REFERENCE:
BASE MAP FROM "1961 CERTIFIED SANBORN MAP - NRA WATERFRONT PARKING LOTS, 22 MERRIMAC STREET, NEWBURYPORT, MA 01950;" PROVIDED BY ENVIRONMENTAL DATA RESOURCES, INC. AUGUST 26, 2013

LEGEND:

- ENVIRONMENTAL BORING WITH MONITORING WELL
- ENVIRONMENTAL BORING FOR DISPOSAL
- ENVIRONMENTAL BORING FOR SCREENING
- GEOTECHNICAL BORING LOCATION

N
W E
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0 40 80 160
SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

UNLESS SPECIFICALLY STATED BY WRITTEN AGREEMENT, THE DRAWING IS THE SOLE PROPERTY OF GZA GEOENVIRONMENTAL, INC. (GZA). THE INFORMATION SHOWN ON THE DRAWING IS SOLELY FOR USE BY GZA'S CLIENT OR THE CLIENT'S DESIGNATED REPRESENTATIVE FOR THE SPECIFIC PROJECT AND LOCATION IDENTIFIED ON THE DRAWING. THE DRAWING SHALL NOT BE TRANSFERRED, REUSED, COPIED, OR ALTERED IN ANY MANNER FOR USE AT ANY OTHER LOCATION OR FOR ANY OTHER PURPOSE WITHOUT THE PRIOR WRITTEN CONSENT OF GZA. ANY TRANSFER, REUSE, OR MODIFICATION TO THE DRAWING BY THE CLIENT OR OTHERS, WITHOUT THE PRIOR WRITTEN EXPRESS CONSENT OF GZA, WILL BE AT THE USER'S SOLE RISK AND WITHOUT ANY RISK OR LIABILITY TO GZA.

LIMITED SUBSURFACE EXPLORATION
EAST AND WEST LOTS, MERRIMAC STREET
NEWBURYPORT, MASSACHUSETTS

1961 HISTORICAL SANBORN MAP WITH EXPLORATION LOCATIONS

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists www.gza.com		PREPARED FOR: NEWBURYPORT REDEVELOPMENT AUTHORITY 60 PLEASANT STREET NEWBURYPORT, MASSACHUSETTS	
PROJ MGR: MLS	REVIEWED BY: FSV	CHECKED BY: FSV	FIGURE 9
DESIGNED BY: MLS	DRAWN BY: MLS/AJK	SCALE: AS SHOWN	
DATE: SEPTEMBER 2013	PROJECT NO. 18.0171593.00	REVISION NO.	SHEET NO.

APPENDICES

APPENDIX A

LIMITATIONS

GEOHYDROLOGICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of the Newburyport Redevelopment Authority (NRA) for the stated purpose(s) and location(s) identified in the Proposal for Services and Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Proposal for Services and Report and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. Conditions other than described in this report may be found at the subject location(s).

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made. Specifically, GZA does not and cannot represent that the Site contains no hazardous material, oil, or other latent condition beyond that observed by GZA during its study. Additionally, GZA makes no warranty that any response action or recommended action will achieve all of its objectives or that the findings of this study will be upheld by a local, state or federal agency.

4. In conducting our work, GZA relied upon certain information made available by public agencies, Client and/or others. GZA did not attempt to independently verify the accuracy or completeness of that information. Inconsistencies in this information which we have noted, if any, are discussed in the Report.

Subsurface Conditions

5. The generalized soil profiles provided in our Report are based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

6. Water level readings have been made in test holes (as described in the Report) and monitoring wells at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The observed water table may be other than indicated in the Report.

Compliance with Codes and Regulations

7. We used reasonable care in identifying and interpreting applicable codes and regulations necessary to execute our scope of work. These codes and regulations are subject to various, and possibly contradictory, interpretations. Interpretations and compliance with codes and regulations by other parties is beyond our control.

Screening and Analytical Testing

8. GZA collected environmental samples at the locations identified in the Report. These samples were analyzed for the specific parameters identified in the report. Additional constituents, for which analyses were not conducted, may be present in soil, groundwater, surface water, sediment and/or air. Future Site activities and uses may result in a requirement for additional testing.

9. Our interpretation of field screening and laboratory data is presented in the Report. Unless otherwise noted, we relied upon the laboratory's QA/QC program to validate these data.

10. Variations in the types and concentrations of contaminants observed at a given location or time may occur due to release mechanisms, disposal practices, changes in flow paths, and/or the influence of various physical, chemical, biological or radiological processes. Subsequently observed concentrations may be other than indicated in the Report.

Interpretation of Data

11. Our opinions are based on available information as described in the Report, and on our professional judgment. Additional observations made over time, and/or space, may not support the opinions provided in the Report.

Additional Information

12. In the event that the NRA or others authorized to use this report obtain information on environmental or hazardous waste issues at the Site not contained in this report, such information shall be brought to GZA's attention forthwith. GZA will evaluate such information and, on the basis of this evaluation, may modify the conclusions stated in this report.

Additional Services

13. GZA recommends that we be retained to provide services during any future investigations, design, implementation activities, construction, and/or property development/ redevelopment at the Site. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

Cost Estimates

14. Unless otherwise stated, our cost estimates are for comparative or general planning purposes. These estimates may involve approximate quantity estimates. Note that these quantity estimates may not be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in this Report. Further, since we have no control over the labor and material costs required to plan and execute the anticipated work, our estimates were made based on our experience and readily available information. Actual costs may change over time and could be significantly more, or less, than those indicated in the Report.

CONSTRUCTION COST OPINION LIMITATIONS

Use of Report

1. GeoEnvironmental, Inc. (GZA) prepared this Report on behalf of, and for the exclusive use of the Newburyport Redevelopment Authority (NRA) at the stated time, for the stated purpose(s) and location(s) identified in the Report. Use of this Report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use(s). Further, reliance by any party not identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in the Report and proposal, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work.

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services at the same time, under similar conditions, and at the same or a similar property. No warranty, expressed or implied, is made.

4. Basis of Opinion of Cost Unless otherwise stated, our opinions of cost are only for comparative and general planning purposes. These opinions are based on the limited data and the conditions and assumptions described in the Report. The cost estimates may involve approximate quantity evaluations and are not intended to be sufficiently accurate to develop construction bids, or to predict the actual cost of work addressed in the Report. Further, since we have no control over when the work will take place nor the labor and material costs required to plan and execute the anticipated work, our cost opinions were made by relying on our experience, the experience of others, and other sources of readily available information. Actual costs may vary over time and could be significantly more, or less, than stated in the Report.

5. Cost opinions presented in the Report are based on a combination of sources and may include published RS Means Cost Data; past bid documents; cost data from federal, state or local transportation agency web sites; discussions with local experienced contractors; and GZA's experience with costs for similar projects at similar locations. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation. Actual costs will likely vary depending on the quality of materials and installation; manufacturer of the materials or equipment; field conditions; geographic location; access restrictions; phasing of the work; subcontractors mark-ups; quality of the contractor(s); project management exercised; and the availability of time to thoroughly solicit competitive pricing. In view of these limitations, the costs presented in the Report should be considered "order of magnitude" and used for budgeting and comparison purposes only. Detailed quantity and cost estimating should be performed by experienced professional cost estimators to evaluate actual costs. The opinions of cost in the Report should not be interpreted as a bid or offer to perform the work. Unless stated otherwise, all costs are based on present value.

6. The opinion of costs are based only on the quantity and/or cost items identified in the Report, and should not be assumed to include other costs such as legal, administrative, permitting or others. The estimate also does not include any costs with respect to third-party claims, fines, penalties, or other charges which may be assessed against any responsible party because of either the existence of present conditions or the future existence or discovery of any such conditions.

Additional Services

7. It is recommended that GZA be retained to provide engineering services during any final design, construction and/or implementation of any measures recommended in this Report. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; and iii) provide modifications to our design.

GEOTECHNICAL LIMITATIONS

Use of Report

1. GZA GeoEnvironmental, Inc. (GZA) prepared this report on behalf of, and for the exclusive use of the Newburyport Redevelopment Authority (NRA) for the stated purpose and location identified in the Proposal for Services and Report. Use of this report, in whole or in part, at other locations, or for other purposes, may lead to inappropriate conclusions; and we do not accept any responsibility for the consequences of such use. Further, reliance by any party not expressly identified in the agreement, for any use, without our prior written permission, shall be at that party's sole risk, and without any liability to GZA.

Standard of Care

2. GZA's findings and conclusions are based on the work conducted as part of the Scope of Services set forth in Proposal for Services and Report, and reflect our professional judgment. These findings and conclusions must be considered not as scientific or engineering certainties, but rather as our professional opinions concerning the limited data gathered during the course of our work. If conditions other than those described in this report are found at the subject location, or the design has been altered in any way, GZA shall be so notified and afforded the opportunity to revise the report,as appropriate, to reflect the unanticipated changed conditions .

3. GZA's services were performed using the degree of skill and care ordinarily exercised by qualified professionals performing the same type of services, at the same time, under similar conditions, at the same or a similar property. No warranty, expressed or implied, is made.

Subsurface Conditions

4. The generalized soil profile provided in our Report is based on widely-spaced subsurface explorations and are intended only to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized, and were based on our assessment of subsurface conditions. The composition of strata, and the transitions between strata, may be more variable and more complex than indicated. For more specific information on soil conditions at a specific location refer to the exploration logs.

5. In preparing this report, GZA relied on certain information provided by the Client, state and local officials, and other parties referenced therein which were made available to GZA at the time of our evaluation. GZA did not attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this evaluation.

6. Water level readings have been made in test holes as described in the report at the specified times and under the stated conditions. These data have been reviewed and interpretations have been made in this Report. Fluctuations in the level of the groundwater however occur due to temporal or spatial variations in areal recharge rates, soil heterogeneities, the presence of subsurface utilities, and/or natural or artificially induced perturbations. The water table encountered in the course of the work may differ from that indicated in the Report.

7. GZA's services did not include an assessment of the presence of oil or hazardous materials at the property. Consequently, we did not consider the potential impacts (if any) that contaminants in soil or groundwater may have on construction activities, or the use of structures on the property.

8. Recommendations for foundation drainage, waterproofing, and moisture control address the conventional geotechnical engineering aspects of seepage control. These recommendations may not preclude an environment that allows the infestation of mold or other biological pollutants.

Compliance with Codes and Regulations

9. We used reasonable care in identifying and interpreting applicable codes and regulations. These codes and regulations are subject to various, and possibly contradictory, interpretations. Compliance with codes and regulations by other parties is beyond our control.

Additional Services

10. GZA recommends that we be retained to provide services during any future: site observations, design, implementation activities, construction and/or property development/redevelopment. This will allow us the opportunity to: i) observe conditions and compliance with our design concepts and opinions; ii) allow for changes in the event that conditions are other than anticipated; iii) provide modifications to our design; and iv) assess the consequences of changes in technologies and/or regulations.

APPENDIX B

HISTORICAL DOCUMENTATION

NRA Waterfront Parking Lots
22 Merrimac Street
Newburyport, MA 01950

Inquiry Number: 3705288.1
August 26, 2013

Certified Sanborn® Map Report

EDR® Environmental Data Resources Inc

440 Wheelers Farms Road
Milford, CT 06461
800.352.0050
www.edrnet.com

Certified Sanborn® Map Report

8/26/13

Site Name:
NRA Waterfront Parking Lots
22 Merrimac Street
Newburyport, MA 01950

EDR Inquiry # 3705288.1

Client Name:
GZA GeoEnvironmental, Inc.
249 Vanderbilt Avenue
Norwood, MA 02062

Contact: Matt Steele

EDR® Environmental Data Resources Inc

The complete Sanborn Library collection has been searched by EDR, and fire insurance maps covering the target property location provided by GZA GeoEnvironmental, Inc. were identified for the years listed below. The certified Sanborn Library search results in this report can be authenticated by visiting www.edrnet.com/sanborn and entering the certification number. Only Environmental Data Resources Inc. (EDR) is authorized to grant rights for commercial reproduction of maps by Sanborn Library LLC, the copyright holder for the collection.

Certified Sanborn Results:

Site Name: NRA Waterfront Parking Lots
Address: 22 Merrimac Street
City, State, Zip: Newburyport, MA 01950
Cross Street:
P.O. # 18.0171593.00
Project: NRA Waterfront Parking Lots
Certification # B2E3-4B84-8714

Maps Provided:

1961	1894
1946	1888
1924	
1914	
1906	
1900	

Sanborn® Library search results
Certification # B2E3-4B84-8714

The Sanborn Library includes more than 1.2 million Sanborn fire insurance maps, which track historical property usage in approximately 12,000 American cities and towns. Collections searched:

- ✓ Library of Congress
- ✓ University Publications of America
- ✓ EDR Private Collection

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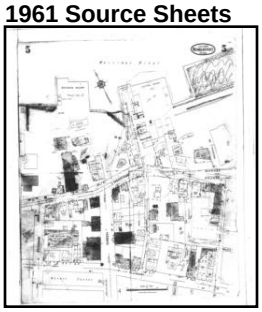
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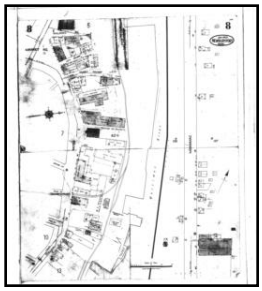
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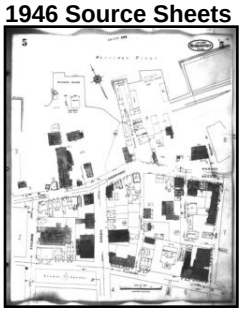


Volume 1, Sheet 5

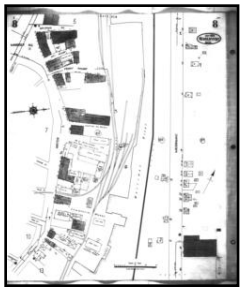


Volume 1, Sheet 8

1946 Source Sheets



Volume 1, Sheet 5

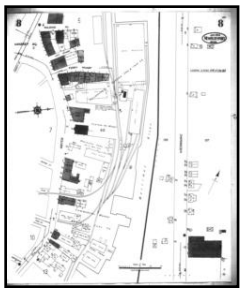


Volume 1, Sheet 8

1924 Source Sheets



Volume 1, Sheet 5

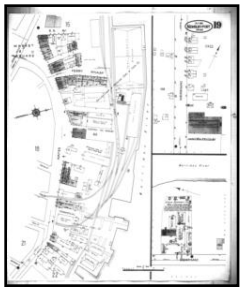


Volume 1, Sheet 8

1914 Source Sheets



Volume 1, Sheet 15



Volume 1, Sheet 19

1906 Source Sheets



Volume 1, Sheet 14



Volume 1, Sheet 17



Volume 1, Sheet 18

1900 Source Sheets



Volume 1, Sheet 11



Volume 1, Sheet 15



Volume 1, Sheet 16

1894 Source Sheets

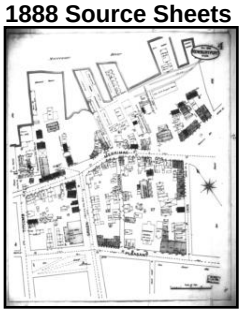


Volume 1, Sheet 9



Volume 1, Sheet 14

1888 Source Sheets



Volume 1, Sheet 4



Volume 1, Sheet 6

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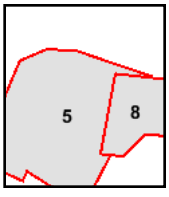
Certification # B2E3-4B84-8714

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City, ST, ZIP: Newburyport MA 01950
Client: GZA GeoEnvironmental, Inc.
EDR Inquiry: 3705288.1
Order Date: 8/26/2013 3:59:04 PM
Certification # B2E3-4B84-8714
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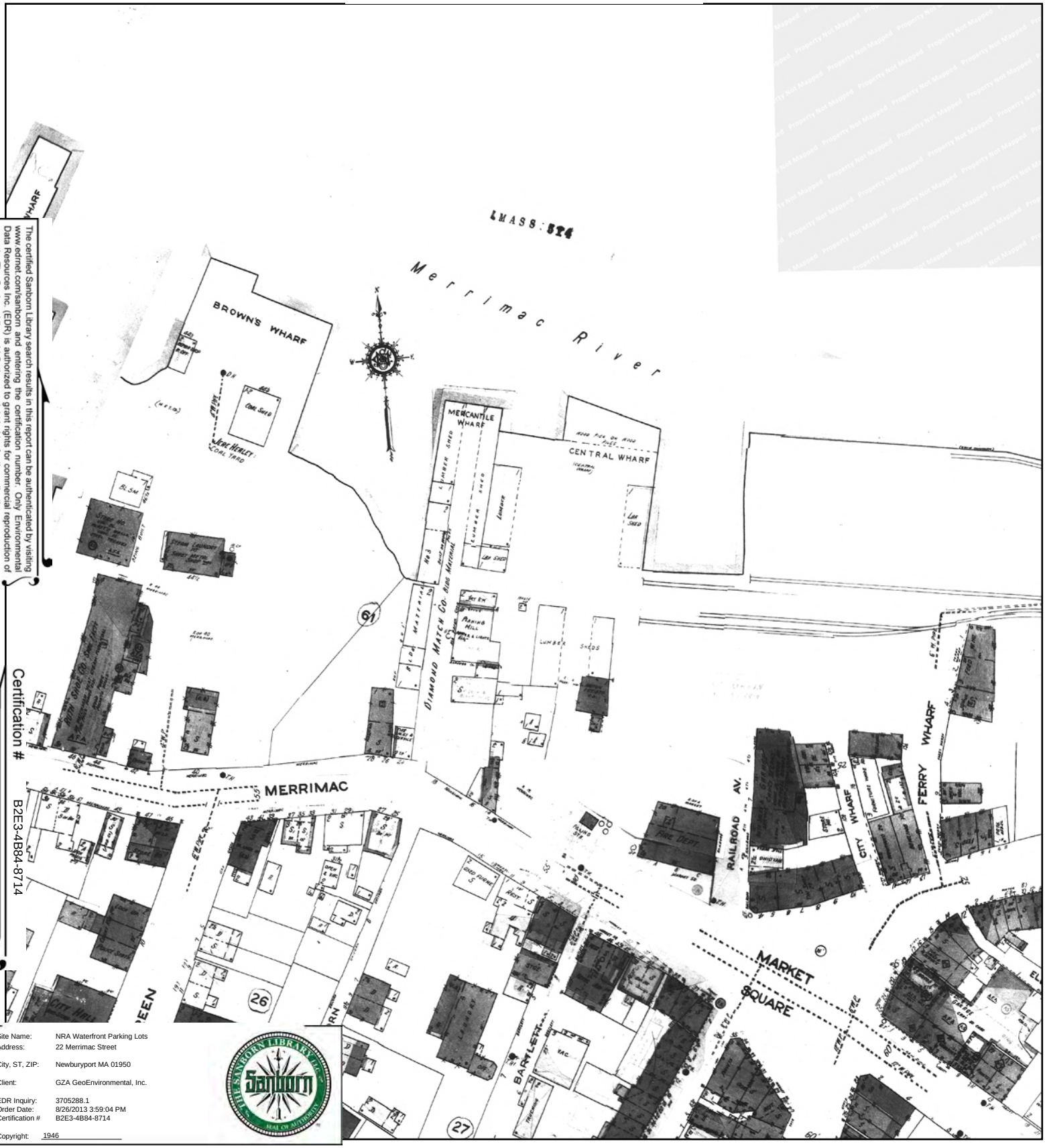




Volume 1, Sheet 5
Volume 1, Sheet 8

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1946 Certified Sanborn Map



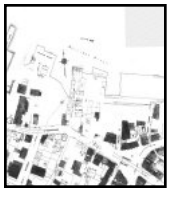
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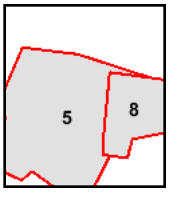
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City, ST, ZIP: Newburyport MA 01950
Client: GZA GeoEnvironmental, Inc.
EDR Inquiry: 3705288.1
Order Date: 8/26/2013 3:59:04 PM
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Volume 1, Sheet 5
Volume 1, Sheet 8

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1924 Certified Sanborn Map

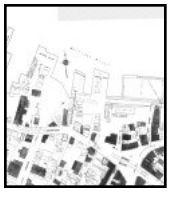


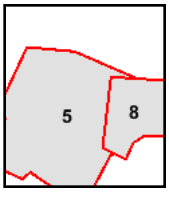
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Site Name:	NRA Waterfront Parking Lots
Address:	22 Merrimac Street
City, ST, ZIP:	Newburyport MA 01950
Client:	GZA GeoEnvironmental, Inc.
EDR Inquiry:	3705288.1
Order Date:	8/26/2013 3:59:04 PM
Certification #	B2E3-4B84-8714
Copyright:	1924

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Volume 1, Sheet 5
Volume 1, Sheet 8

0 Feet 150 300 600

N

1914 Certified Sanborn Map



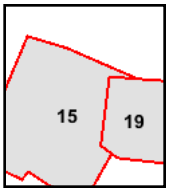
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Volume 1, Sheet 15
Volume 1, Sheet 19

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1906 Certified Sanborn Map



Certification # B2E3-4B84-8714

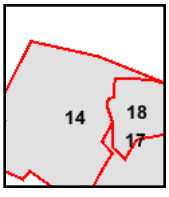
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Site Name:	NRA Waterfront Parking Lots
Address:	22 Merrimac Street
City, ST, ZIP:	Newburyport MA 01950
Client:	GZA GeoEnvironmental, Inc.
EDR Inquiry:	3705288.1
Order Date:	8/26/2013 3:59:04 PM
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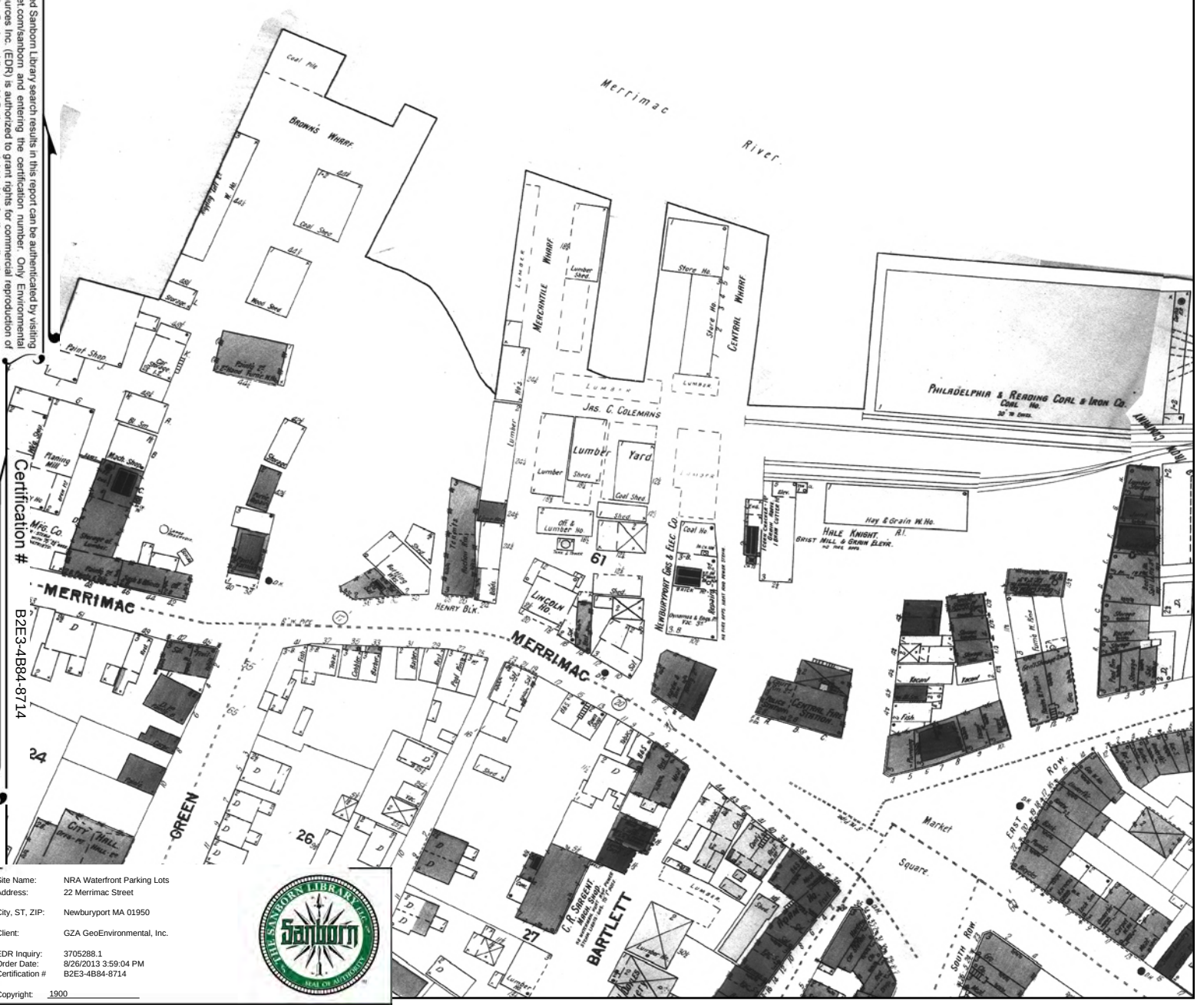
Volume 1, Sheet 14
Volume 1, Sheet 17
Volume 1, Sheet 18

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1900 Certified Sanborn Map

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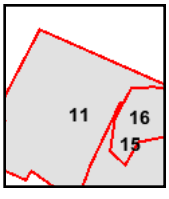
Certification # B2E3-4B84-8714



Site Name:	NRA Waterfront Parking Lots
Address:	22 Merrimac Street
City, ST, ZIP:	Newburyport MA 01950
Client:	GZA GeoEnvironmental, Inc.
EDR Inquiry:	3705288.1
Order Date:	8/26/2013 3:59:04 PM
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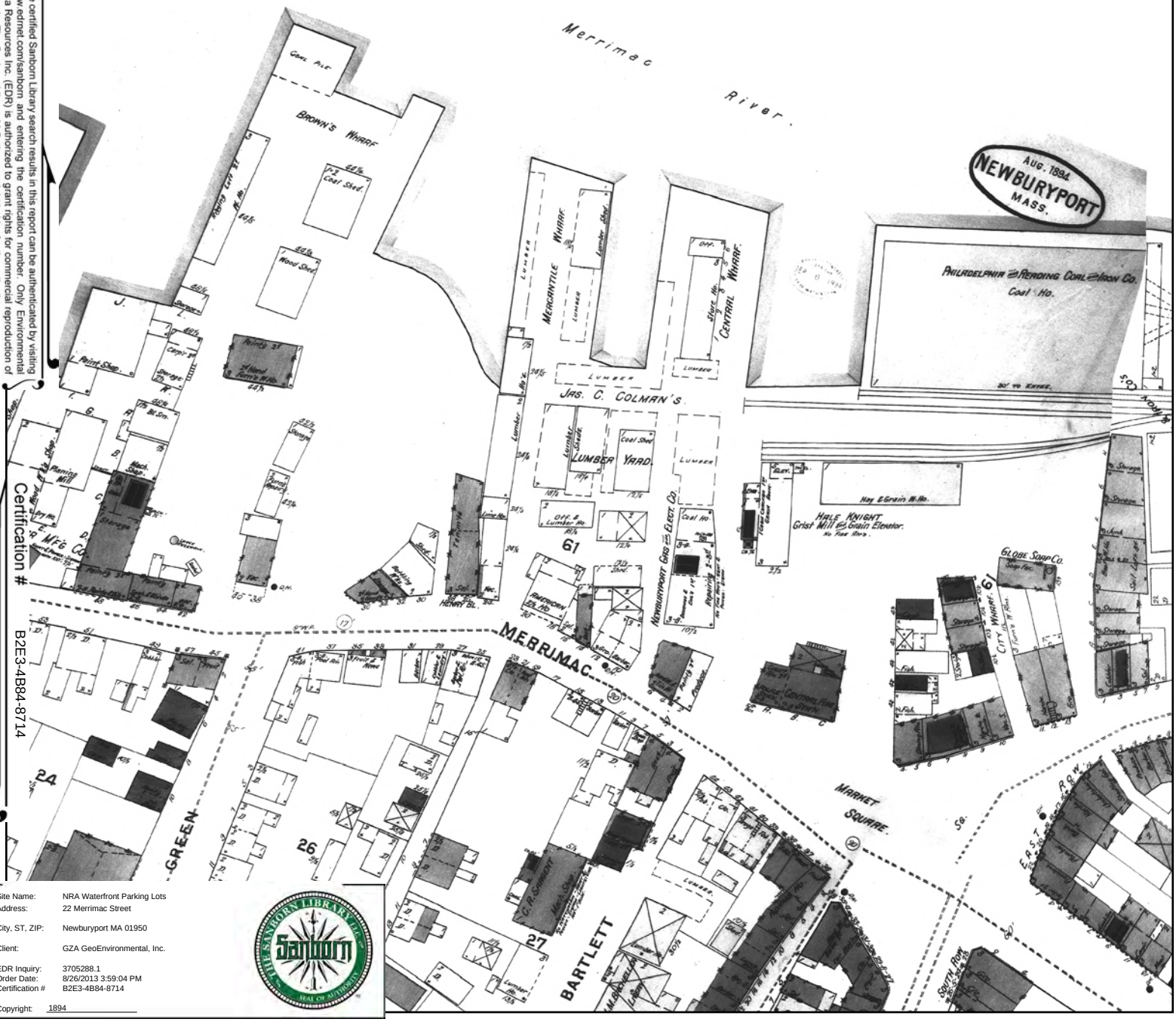
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Volume 1, Sheet 16

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1894 Certified Sanborn Map

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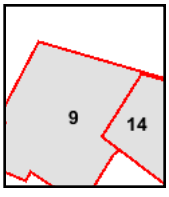
Certification # B2E3-4B84-8714

Site Name:	NRA Waterfront Parking Lots
Address:	22 Merrimac Street
City, ST, ZIP:	Newburyport MA 01950
Client:	GZA GeoEnvironmental, Inc.
EDR Inquiry:	3705288.1
Order Date:	8/26/2013 3:59:04 PM
Certification #	B2E3-4B84-8714
Copyright:	1894

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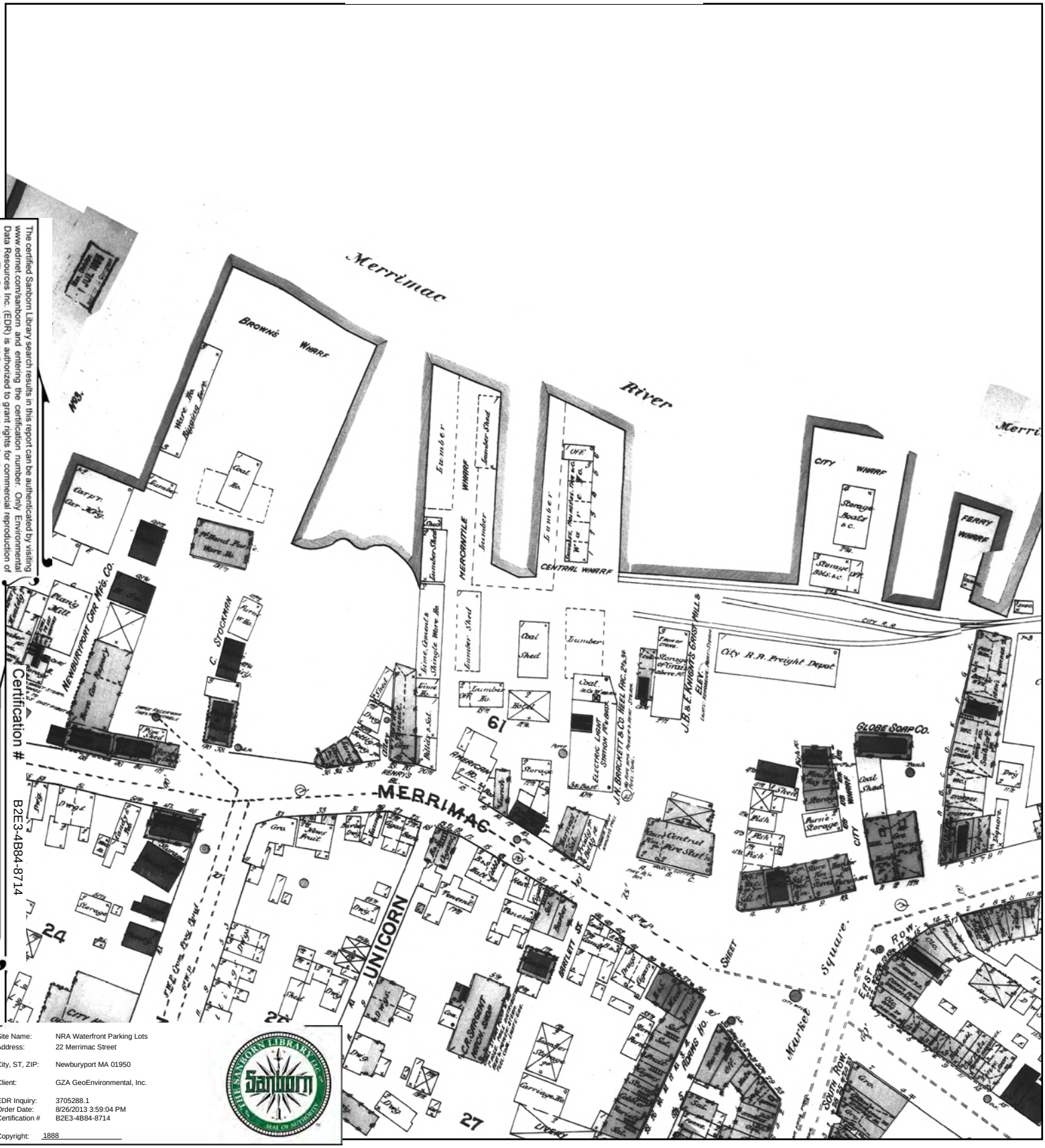




Volume 1, Sheet 9
Volume 1, Sheet 14

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1888 Certified Sanborn Map



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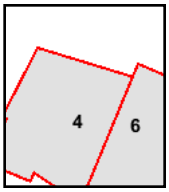
Certification # B2E3-4B84-8714

Site Name:	NRA Waterfront Parking Lots
Address:	22 Merrimac Street
City, ST, ZIP:	Newburyport MA 01950
Client:	GZA GeoEnvironmental, Inc.
EDR Inquiry:	3705288.1
Order Date:	8/26/2013 3:59:04 PM
Certification #	B2E3-4B84-8714
Copyright:	1888

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0 Feet 150 300 600





Volume 1, Sheet 4
Volume 1, Sheet 6

N

APPENDIX C

PHOTOGRAPHS

GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Newburyport Redevelopment Authority	Waterfront Park, Newburyport, Massachusetts	18.0171593.00

Photo No.	Date:
1	2/21/2013

Direction Photo Taken:
Southwest

Photographer:
Matthew Steele

Description:

East Lot, viewed from across the Merrimack River.



Photo No.	Date:
2	9/6/2013

Direction Photo Taken:
Northeast

Photographer:
Matthew Steele

Description:

Southern Portion of the West Lot, viewed from near the southwest property corner.



GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Newburyport Redevelopment Authority	Waterfront Park, Newburyport, Massachusetts	18.0171593.00

Photo No.	Date:
3	9/6/2013

Direction Photo Taken:
Southwest

Photographer:
Matthew Steele

Description:

Northern portion of the West Lot, taken from near the northeast corner of the lot.



Photo No.	Date:
4	9/6/2013

Direction Photo Taken:
Northwest

Photographer:
Matthew Steele

Description:

Eastern side of the East Lot, taken from near the southeast corner of the parking lot.



GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Newburyport Redevelopment Authority	Waterfront Park, Newburyport, Massachusetts	18.0171593.00

Photo No.	Date:
5	9/6/2013

Direction Photo Taken:
Southeast

Photographer:
Matthew Steele

Description:

Western portion of the East Lot, taken from near the northwest corner of the parking lot.



Photo No.	Date:
6	8/8/2013

Direction Photo Taken:
East

Photographer:
Matthew Steele

Description:

Typical Drill rig set up on the East Lot.



GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Newburyport Redevelopment Authority	Waterfront Park, Newburyport, Massachusetts	18.0171593.00

Photo No. 7 | **Date:** 8/6/2013

Direction Photo Taken:
Northeast

Photographer:
Matthew Steele

Description:

Typical drill rig set up on the West Lot.



Photo No. 8 | **Date:** 8/6/2013

Direction Photo Taken:
N/A

Photographer:
Matthew Steele

Description:

Sample from the surface to an approximate depth of 2-feet at GZ-5 on the West Lot. The sample shows approximately 6-inches of the parking lot surface followed by fill with brick fragments. The sample represents a typical surface sample.



GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Newburyport Redevelopment Authority	Waterfront Park, Newburyport, Massachusetts	18.0171593.00

Photo No.	Date:
9	8/6/2013

Direction Photo Taken:
N/A

Photographer:
Matthew Steele

Description:

Sample from approximately 4 to 6-feet at GZ-5 on the West Lot. The sample shows typical fill encountered.



Photo No.	Date:
10	8/6/2013

Direction Photo Taken:
N/A

Photographer:
Matthew Steele

Description:

Sample from approximately 14 to6 6-feet at GZ-6 on the West Lot. The sample shows the typical organic silt encountered.



GZA GeoEnvironmental, Inc.

PHOTOGRAPHIC LOG

Client Name:	Site Location:	Project No.
Newburyport Redevelopment Authority	Waterfront Park, Newburyport, Massachusetts	18.0171593.00

Photo No. 11 | **Date:** 8/6/2013

Direction Photo Taken:
N/A

Photographer:
Matthew Steele

Description:

Sample from approximately 19 to 21-feet at GZ-6 on the West Lot. The sample shows the typical fine sand encountered.



Photo No. 12 | **Date:** 8/7/2013

Direction Photo Taken:
N/A

Photographer:
Matthew Steele

Description:

Rock core sample from approximately 11.3 to 14.3-feet at GZ-11. Rock is composed of severely weathered granodiorite.



APPENDIX D

BORING LOGS

BORING NARRATIVE

GZ-1

Boring GZ-1 was advanced near the northwest corner of the west parking lot to a depth of 26-feet using hollow-stem auger methods in order to characterize the soil for environmental parameters. Soil samples were collected continuously to a depth of six-feet and at five foot intervals thereafter. A soil sample for analysis of EPH and VPH with target analytes was collected from an approximate depth of two to four feet below ground surface (bgs). A soil sample was also collected from approximately 19-feet to 21-feet for submission to the laboratory for geotechnical sieve analysis.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick and wood fibers from approximately 0.5-feet to 7.0-feet bgs, underlain by; and
- Fine sand and silt to the bottom of the boring at 26-feet.

PID screening results, in all samples analyzed, were below 6.5 parts per million (ppm), with the exception of a concentration of 60.7 ppm from approximately two to four feet bgs. Refusal was not encountered at GZ-1; however, high SPT hammer blow counts (70 blows per foot) were observed at the deepest sample. High blow counts were likely observed due to sands running into the auger and increasing friction on the split spoon sampler.

GZ-2

Boring GZ-2 was advanced near the northeast corner of the west parking lot to a depth of 21.0-feet using hollow-stem auger methods in order to characterize the soil for environmental parameters. Soil samples were collected continuously to a depth of six-feet and at five foot intervals thereafter. A soil sample for analysis of EPH and VPH with target analytes was collected from an approximate depth of two to four feet below ground surface (bgs).

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick, coal, and wood fibers from approximately 0.5-feet to 12.5-feet bgs, underlain by; and
- Fine sand and silt to the bottom of the boring at 21-feet.

PID screening results, in all samples analyzed, were below detection limits with the exception of two surface soil concentrations below 7.4 ppm. Refusal was not encountered at GZ-2.

GZ-3

Boring GZ-3 was advanced near the center of the west parking lot to a depth of 30.2-feet using hollow-stem auger methods in order to characterize the soil for geotechnical parameters. Soil samples were collected continuously to a depth of six-feet and at five foot intervals thereafter. A soil sample was collected from approximately 19-feet to 21-feet for submission to the laboratory for geotechnical sieve analysis.

BORING NARRATIVE

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick, coal, and wood fibers from approximately 0.5-feet to 12.5-feet bgs, underlain by;
- Sand and silt from approximately 12.5-feet to 17-feet, underlain by; and
- Fine to medium sand from approximately 17-feet to the bottom of the boring at 30.2-feet.

PID screening results, in all samples analyzed, were below detection limits with the exception of three concentrations in shallow soils. Split spoon refusal was encountered at a depth of 30.2-feet bgs.

GZ-4

Boring GZ-4 was advanced near the west boundary of the west parking lot to a depth of 9.3-feet using hollow-stem auger methods in order to characterize the soil for environmental parameters. Soil samples were collected continuously to a depth of six-feet and at five foot intervals thereafter. A soil sample for analysis of EPH and VPH with target analytes was collected from an approximate depth of two to four feet below ground surface (bgs).

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick, asphalt, shells, and wood fibers from approximately 0.5-feet to the bottom of the boring at 9.3-feet bgs.

PID concentrations, in all samples analyzed, were below 5.6 ppm. Split spoon refusal was encountered at approximately 9.3-feet bgs. Wood fibers observed in the deepest split spoon indicate that the spoon refusal was likely due to subsurface wood debris in the fill.

GZ-5

Boring GZ-5 was advanced near the center of the west parking lot to a depth of 18.5-feet using hollow-stem auger methods in order to characterize the soil for geotechnical parameters. Soil samples were collected from the surface and at five foot intervals thereafter.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick, from approximately 0.5-feet to 17.3-feet bgs, underlain by; and
- Sand and silt, from approximately 17.3-feet to the bottom of the boring at 18.5-feet bgs.

PID concentrations, in all samples analyzed, were below 1.2 ppm. An obstruction was encountered with auger refusal at approximately 17.3-feet bgs. Split spoon refusal was encountered at approximately 18.5 feet bgs with rock fragments observed in the bottom 7 inches of the deepest spoon.

GZ-6/MW-1

Boring GZ-6/MW-1 was advanced near the east boundary of the west parking lot to a depth of 24-feet using hollow-stem auger methods to approximately 8-feet bgs, then cased, drive and wash methods were used to advance to the bottom of the boring in order to characterize the soils for disposal parameters. Soil samples were collected continuously from the surface to 8-feet bgs and at five foot intervals thereafter.

BORING NARRATIVE

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy and silty fill with traces of brick, shells and wood fibers, from approximately 0.5-feet to 13.0-feet bgs, underlain by;
- Organic silt, from approximately 13.0-feet to 17.0-feet bgs, underlain by; and
- Fine sand from 17.0-feet bgs to the bottom of the boring at 24.0-feet bgs.

PID concentrations, in all samples analyzed, were below the instrument detection limits. An obstruction was encountered at approximately 23.5-feet bgs. A tricone roller bit was advanced to approximately 24.0-feet bgs. Rock fragments were observed in the drill cuttings. Split spoon refusal was encountered at approximately 24.0-feet bgs.

GZ-7

Boring GZ-7 was advanced near the southwest boundary of the west parking lot to a depth of 8.3-feet using hollow-stem auger methods in order to characterize the soil for geotechnical parameters. Soil samples were collected at the surface, four feet bgs, and 8 feet bgs.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick, from approximately 0.5-feet to the bottom of the boring at 8.3-feet bgs.

PID concentrations in all samples analyzed were below the instrument detection limits. An obstruction was encountered with auger refusal at approximately 8.3-feet bgs. Split spoon refusal was also encountered at approximately 8.3-feet bgs.

GZ-8

Boring GZ-8 was advanced near the approximate center of the west parking lot to a depth of 9.6-feet using hollow-stem auger methods in order to characterize the soil for geotechnical parameters. Soil samples were collected at the surface and four feet bgs.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick, shells and coal from approximately 0.5-feet to the bottom of the boring at 9.6-feet bgs.

PID concentrations, in all samples analyzed, were below 5.7 ppm. An obstruction was encountered with auger and split spoon refusal at approximately 8.3-feet bgs.

GZ-9

Boring GZ-9 was advanced near the southeast boundary of the west parking lot to a depth of 14.2-feet using hollow-stem auger methods in order to characterize the soil for geotechnical parameters. Soil samples were collected at the surface and at five-foot intervals thereafter.

BORING NARRATIVE

Soils encountered consist of:

- Topsoil from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick, coal, glass and wood fibers from approximately 0.5-feet to the bottom of the boring at 14.2-feet bgs.

PID concentrations in all samples analyzed were below the instrument detection limits. An obstruction was encountered with auger and split spoon refusal at approximately 14.2 feet bgs. Rock fragments were observed in the tip of the final spoon.

GZ-10

Boring GZ-10 was advanced near the southwest corner of the west parking lot to a depth of 8.0-feet using hollow-stem auger methods in order to characterize the soils for disposal parameters. Soil samples were collected continuously from the surface to the bottom of the boring.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick and wood fibers from approximately 0.5-feet to the bottom of the boring at 8.0-feet bgs.

PID concentrations were elevated in all samples analyzed and a petroleum-like odor was observed in the soil samples from approximately 4.0-feet bgs to the bottom of the boring. An obstruction was encountered with auger and split spoon refusal at approximately 8.0 feet bgs.

GZ-11

Boring GZ-11 was advanced near the southern property boundary of the west parking lot to a depth of 14.3-feet using drive and wash methods in order to characterize the soil for geotechnical parameters. Soil samples were collected from the surface and at five foot intervals to the bottom of the boring. Additionally, a rock core sample was taken from approximately 10.5-feet bgs to 14.3-feet bgs to confirm that bedrock was present.

Soils and rock encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick from approximately 0.5-feet to 7.0-feet bgs, underlain by;
- Fine sand and silt from approximately 7.0-feet to 10.5-feet bgs, underlain by; and
- Highly fractured rock from approximately 10.5-feet to the bottom of the boring at 14.3-feet bgs.

PID concentrations in all samples analyzed were below the instrument detection limits. An obstruction was encountered with casing and split spoon refusal at approximately 10.5 feet bgs.

GZ-12

Boring GZ-12 was advanced near the southeast corner of the west parking lot to a depth of 7.7-feet using hollow-stem auger methods in order to characterize the soil for geotechnical parameters. Soil samples were collected from the surface, at four feet bgs and at 7.7-feet bgs.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick from approximately 0.5-feet to the bottom of the boring at 7.7-feet bgs.

PID concentrations did not exceed 2.8 ppm; however, a petroleum-like odor was observed in the sample from approximately 7.7-feet bgs. An obstruction was encountered with auger and split spoon refusal at approximately 8.0-feet bgs.

GZ-13

Boring GZ-13 was advanced near the northern boundary of the east parking lot to a depth of 21.8-feet using drive and wash methods in order to characterize the soil for geotechnical parameters. Soil samples were collected from the surface and at five-foot intervals thereafter.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick and wood from approximately 0.5-feet to 15.0-feet bgs, underlain by; and
- Silt and sand from approximately 15.0-feet bgs to the bottom of the boring at 21.8-feet bgs.

PID concentrations did not exceed the instrument detection limit in the samples analyzed. An obstruction was encountered at approximately 21.2-feet bgs. A tricone roller bit was advanced to approximately 21.8-feet bgs. Rock fragments were observed in the drill cuttings from the bottom of the boring.

GZ-14

Boring GZ-14 was advanced near the northwest corner of the east parking lot to a depth of 16.0-feet using hollow stem auger methods in order to characterize the soils for disposal parameters. Soil samples were collected from the surface and at five-foot intervals thereafter.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick, cinders and wood from approximately 0.5-feet to the bottom of the boring at 16.0-feet bgs.

PID concentrations did not exceed the instrument detection limit in the samples analyzed. Refusal was not encountered at the bottom of the boring.

GZ-15

Boring GZ-15 was advanced near the eastern boundary of the east parking lot to a depth of 34.5-feet using drive and wash methods in order to characterize the soil for geotechnical parameters. Soil samples were collected from the surface and at five-foot intervals thereafter.

BORING NARRATIVE

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill from approximately 0.5-feet to 9.5-feet bgs, underlain by;
- Clay from approximately 9.5-feet to 9.8-feet bgs, underlain by;
- Fine to medium sand from approximately 9.8-feet to 12.5-feet bgs, underlain by;
- Organic silt from approximately 12.5-feet to 19.5-feet bgs, underlain by;
- Silt from approximately 19.5-feet to 32.0-feet bgs, underlain by; and
- Rock from approximately 32.0-feet bgs to the bottom of the boring at 34.5-feet bgs.

PID concentrations did not exceed the instrument detection limit in the samples analyzed. An obstruction was encountered at approximately 32.0-feet bgs. A tricone roller bit was advanced to approximately 34.5-feet bgs. Rock fragments were observed in the drill cuttings from the bottom of the boring.

GZ-16

Boring GZ-16 was advanced near the eastern boundary of the east parking lot to a depth of 34.0-feet using drive and wash methods in order to characterize the soil for geotechnical parameters. Soil samples were collected from the surface and at five-foot intervals thereafter.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of shells, wood, and brick from approximately 0.5-feet to 13.0-feet bgs, underlain by;
- Silt and fine sand from approximately 13.0-feet to 33.0-feet bgs, underlain by; and
- Rock from approximately 33.0-feet bgs to the bottom of the boring at 34.0-feet bgs.

PID concentrations did not exceed 2.3 ppm in the samples analyzed. An obstruction was encountered at approximately 33.0-feet bgs. A tricone roller bit was advanced to approximately 34.0-feet bgs. Rock fragments were observed in the drill cuttings from the bottom of the boring.

GZ-17

Boring GZ-17 was advanced near the western boundary of the east parking lot to a depth of 16.0-feet using hollow stem auger methods in order to characterize the soils for disposal parameters. Soil samples were collected from the surface and at five-foot intervals thereafter.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick and wood fibers, from approximately 0.5-feet to 12.5-feet bgs, underlain by;
- Peat from approximately 12.5-feet to 13.0-feet bgs, underlain by; and
- Clayey silt from approximately 13.0-feet bgs to the bottom of the boring at 16.0-feet bgs.

PID concentrations did not exceed 0.4 ppm in the samples analyzed. Refusal was not encountered at the bottom of the boring.

BORING NARRATIVE

GZ-18

Boring GZ-18 was advanced near the southern boundary of the east parking lot to a depth of 31.4-feet using drive and wash methods in order to characterize the soil for geotechnical parameters. Soil samples were collected from the surface and at five-foot intervals thereafter.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick, coal, cinders and wood fibers, from approximately 0.5-feet to 17.5-feet bgs, underlain by; and
- Clayey silt from approximately 17.5-feet bgs to the bottom of the boring at 30.8-feet bgs.

PID concentrations did not exceed the instrument detection limits. An obstruction was encountered with spoon refusal at 30.8-feet bgs. Pulverized rock was observed in the refused spoon tip and a tricone roller bit was advanced to approximately 31.4-feet bgs with rock fragments observed in the drill cuttings.

GZ-19

Boring GZ-19 was advanced near the western boundary of the west parking lot to a depth of 15.0-feet using hollow stem auger methods in order to characterize the soils for disposal parameters. Soil samples were collected from the surface and at five-foot intervals thereafter and the boring was finished with a two-inch PVC monitoring well.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by; and
- Sandy fill with traces of brick and wood fibers from approximately 0.5-feet bgs to the bottom of the boring at 15.0-feet bgs.

PID concentrations did not exceed the instrument detection limits. An obstruction was encountered with spoon refusal at 15.0-feet bgs. Pulverized rock was observed in the refused spoon tip.

GZ-20/MW-2

Boring GZ-20/MW-2 was advanced near the eastern boundary of the east parking lot to a depth of 19.5-feet using hollow stem auger methods in order to characterize the soils for geotechnical parameters. Soil samples were collected from the surface and at five-foot intervals thereafter and the boring was finished with a two-inch PVC monitoring well.

Soils encountered consist of:

- Gravel parking surface from the surface to approximately 0.5-feet bgs, underlain by;
- Sandy fill with traces of brick and asphalt pavement from approximately 0.5-feet bgs to 16.0-feet bgs, underlain by; and
- Fine sand and silt from approximately 16.0-feet bgs to the bottom of the boring at 19.5-feet bgs.

PID concentrations did not exceed the instrument detection limits. An obstruction was encountered at 19.5-feet bgs. Rock fragments were observed in the drill cuttings.

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-1
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 7.7	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 26	**V. Datum:** NAVD 88
		Date Start - Finish: 8/5/2013 - 8/5/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	16	45 67 30 26	97	S-1A: Top 9": Dry, very dense, gray, fine to coarse SAND, some Gravel, little Silt. (Parking Surface)	1	S1A	0.5'	GRAVEL / PARKING SURFACE	7.2'
								S-1B: Bottom 9": Dry, very dense, gray, fine to coarse SAND, little Gravel, little Silt, trace Brick. (FILL)	2	6.5			
		S-2	2-4	24	18	19 36 39 42	75	S-2: Dry, dense, brown, fine to coarse SAND, trace Gravel, trace Silt, trace Brick. (FILL)	3	S1B 60.7			
5		S-3	4-6	24	8	1 1 6 8	7	S-3: Wet, loose, black, fine to coarse SAND, little Silt, trace Gravel, trace Wood Chips. (FILL)	4	S2 9.1 S3 ND		FILL	
											7'		0.7'
10		S-4	9-11	24	16	1 2 2 3	4	S-4: Moist, loose, black, fine SAND and SILT, trace Gravel.		S4 2.2			
15		S-5	14-16	24	24	3 6 6 8	12	S-5: Moist, medium dense, black, fine SAND and SILT, trace Gravel.		S5 6.3		FINE SAND AND SILT	
20		S-6	19-21	24	24	WOR 2 3 2	5	S-6: Moist, loose, brown, fine SAND and SILT, trace Gravel.	5	S6 2.2			
25		S-7	24-26	24	24	55 45 25 35	70	S-7: Wet, very dense, black, fine SAND, some Gravel, little Silt.	6	S7 4.7			
											26'		-18.3'
30								Bottom of boring at 26 feet.					

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Samples S-1 and S-2 driven continuously.
3. Wood fibers in the tip of S-2.
4. Soil sample S-2 obtained for EPH/VPH analysis.
5. "WOR" indicates weight of rods.
6. Running sands in augers likely causing high blow counts.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-1

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-2
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 8.2	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 21	**V. Datum:** NAVD 88
		Date Start - Finish: 8/5/2013 - 8/5/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	14	53 28 25 29	53	S-1A: Top 6": Dry, very dense, gray, fine to coarse SAND and GRAVEL, little Silt. (Parking Surface)	1	S1A	0.5'	GRAVEL PARKING SURFACE	7.7'
								S-1B: Bottom 8": Dry, very dense, brown, fine to coarse SAND, some Silt, little Gravel, trace Coal.	2	3.5			
		S-2	2-4	24	16	30 31 29 32	60	S-2: Dry, dense, brown, fine SAND and SILT, trace Gravel, trace Brick, trace Wood fibers.	3	S1B 7.4 S2			
5		S-3	4-6	24	14	8 9 20 6	29	S-3: Moist, medium dense, black, fine to coarse SAND and SILT, trace Gravel, trace Shells. (FILL)		ND S3 ND		FILL	
10		S-4	9-11	24	14	5 2 3 7	5	S-4: Wet, loose, black, SILT and fine SAND, trace Gravel, trace Brick.	4	S4 ND	12.5'		-4.3'
15		S-5	14-16	24	16	1 12 12 10	24	S-5: Wet, loose, black, SILT and fine SAND, trace Gravel.		S5 ND		FINE SAND AND SILT	
20		S-6	19-21	24	24	1 2 3 3	5	S-6: Wet, loose, black, SILT and fine SAND, trace Gravel.		S6 ND	21'		-12.8'
								Bottom of boring at 21 feet.	5				
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Samples S-1 and S-2 driven without auger casing.
3. Soil sample S-2 obtained for EPH/VPH analysis.
4. Brick fragments observed in sample S-4.
5. Borehole abandoned at about 21 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-2

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-3
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 9.1	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 30.2	**V. Datum:** NAVD 88
		Date Start - Finish: 8/5/2013 - 8/5/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	16	29 26 17 18	43	S-1: Dry, medium dense, brown, fine to coarse SAND. little Gravel, little Silt. (Parking Surface)	1 2	S1 90.6	0.5'	GRAVEL PARKING SURFACE	8.6'
		S-2	2-4	24	14	8 13 21 42	34	S-2: Dry, medium dense, brown, fine to coarse SAND, some Silt, little Gravel.		S2 11.0			
5		S-3	4-6	24	1	11 6 4 3	10	S-3: Dry, loose, brown, fine to coarse SAND, little Silt, trace Gravel.	3	S3 2.0		FILL	
10		S-4	9-11	24	16	4 4 5 9	9	S-4: Moist, loose, black, fine SAND and SILT, trace Glass fragments, trace Roots, trace Shells.		S4 ND	12.5'		-3.4'
15		S-5	14-16	24	24	2 3 4 7	7	S-5: Moist, loose, black, fine SAND and SILT, trace Gravel.	4	S5 ND	17'	SAND AND SILT	-7.9'
20		S-6	19-21	24	24	4 13 22 41	35	S-6: Moist, dense, brown, fine to medium SAND, trace Silt, trace Gravel.	5	S6 0.3		FINE SAND	
25											25'		-15.9'
												FINE TO MEDIUM SAND	
30		S-7	29-30.2	15	15	25 47 100/3"	R	S-7A: Top 10": Wet, very dense, black, fine to medium SAND, trace Silt. S-7B: Bottom 5": Wet, very dense, brown, fine to medium SAND, trace Silt.	6	S7A ND S7B ND	30.2'		-21.1'
								Bottom of boring at 30.2 feet.					
35													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Possible Cinders in samples S-1 and S-2.
3. Groundwater observed on auger at about 5.4 feet.
4. Auger chatter at about 16.5 feet, indicating possible gravel or boulder.
5. Running sands encountered in augers.
6. Spoon refusal at about 30.2 feet possibly due to running sands in augers.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-3

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-4
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 9.4	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 9.3	**V. Datum:** NAVD 88
		Date Start - Finish: 8/6/2013 - 8/6/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	18	32 43 22 23	65	S-1A: Top 6": Dry, dense, gray, fine to coarse SAND. some Gravel, little Silt. (Parking Surface)	1 2	S1A 4.5	0.5'	GRAVEL PARKING SURFACE	8.9'
		S-2	2-4	17	10	40 41 100/5"	R	S-1B: Bottom 12": Dry, very dense, brown, fine to coarse SAND, little Silt, trace Gravel, trace Brick, trace Shells. (FILL) S-2: Dry, very dense, brown, fine to coarse SAND, little Gravel, trace Silt, trace Brick. (FILL)		S1B 4.3 S2			
5		S-3	4-6	24	13	15 16 16 10	32	S-3: Moist, dense, black, fine to coarse SAND and SILT, trace Gravel, trace Brick, trace Wood fibers, trace Asphalt.	3 4	3.5 S3 5.6		FILL	
		S-4	8.5-9.3	9	4	54 100/3"	R	S-4: WOOD fibers.	5 6		9.3'		0.1'
10								Bottom of boring at 9.3 feet.					
15													
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Samples S-1 and S-2 driven without auger casing. Sample taken for analysis from S-2.
3. Obstruction in spoon tip and auger refusal, moved boring 4 feet to the east and sampled S-3.
4. Brick fragments in top of sample S-3.
5. Wood Fibers in cuttings from about 8 to 8.5 feet.
6. Spoon refusal at 9.3 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-4

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-5
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 9.5	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 18.5	**V. Datum:** NAVD 88
		Date Start - Finish: 8/5/2013 - 8/5/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	14	38 50 33 22	83	S-1: Dry, dense, gray, fine to coarse SAND, little Gravel, trace Silt.	1 2	S1 0.9	0.5'	GRAVEL PARKING SURFACE	9.0'
5		S-2	4-6	24	14	8 7 4 9	11	S-2: Moist, medium dense, black, fine to coarse SAND, little Silt, trace Gravel.		S2 0.2		FILL	
10		S-3	9-11	24	6	5 3 5 3	8	S-3: Wet, loose, black, fine to carse SAND, some Gravel, trace Silt, trace Brick.		S3 0.5			
15		S-4	14-16	24	16	3 48 46 49	94	S-4: Wet, very dense, black, fine to coarse SAND, trace Silt, trace Gravel, trace Brick.	3	S4 1.2	16'		-6.5'
		S-5	17.3-18.5	15	10	49 84 100/3"	R	S-5: Wet, very dense, fine SAND, little Silt.	4 5		18.5'	SAND AND SILT	-9.0'
20								Bottom of boring at 18.5 feet.					
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Brick fragments in sample S-1.
3. Brick fragments in sample S-4.
4. Obstruction encountered at about 17.3 feet, auger refusal.
5. Drove split spoon to 18.5 with refusal, bottom 7-inches of sample contained rock fragments.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-5

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-6/MW-1
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 10.1	**V. Datum:** NAVD 88
Logged By: Matt Steele	**Drilling Method:** Auger/Drive & Wash	**Final Boring Depth (ft.):** 24	
		Date Start - Finish: 8/6/2013 - 8/6/2013	

Auger/Casing Type: HSA/HW
I.D./O.D.: 2.25"/4"
Hmr Weight (lb.): 300 lbs
Hmr Fall (in.): 30"
Other:

Sampler Type: Split Spoon
I.D./O.D (in.): 1-3/8"/2"
Sampler Hmr Wt: 140 lbs
Sampler Hmr Fall: 30"
Other:

Groundwater Depth (ft.)

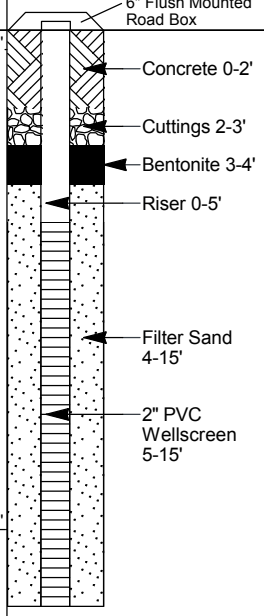
Date	Time	Water Depth	Casing	Stab. Time
8/16/13	0714	6.15'		10 days

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description Modified Burmister	Remark	Field Test Data
		S-1	0-2	24	16	30 32 24 29	56	S-1A: Top 6" Dry, very dense, gray, fine to coarse SAND, some Gravel, little Silt. (Parking Surface)	1	S1A
									2	ND
		S-2	2-4	24	12	27 30 32 22	62	S-1B: Bottom 10": Dry, very dense, brown, fine to medium SAND, little Gravel, little Silt, trace Brick.	3	S1B ND
5		S-3	4-6	24	20	16 14 15 13	29	S-2A: Top 6": Dry, very dense, brown, fine to medium SAND, little Gravel, little Silt, trace Brick.		S2A ND
		S-4	6-8	24	20	9 14 11 6	25	S-2B: Bottom 6": Dry, very dense, black, fine to coarse SAND, little Gravel, trace Silt.	4	S2B ND
10		S-5	9-11	24	10	2 6 5 6	11	S-3: Moist, medium dense, black, SILT, some fine Sand, trace Gravel, trace Shells, trace Brick.		
								S-4A: Top 6": Moist, medium dense, black, SILT, some fine Sand, trace Gravel, trace Shells, trace Brick.		
15		S-6	14-16	24	16	6 5 8 13	13	S-4B: Bottom 14": Moist, medium dense, olive, fine SAND and SILT, trace Gravel. S-5: Wet, medium dense, olive, SILT and fine SAND, trace Gravel, trace Wood fibers. S-6: Moist, medium dense, black SILT, trace Plant fibers.	5	
20		S-7	19-21	24	14	16 19 19 24	38	S-7A: Top 10": Wet, dense, olive, fine to medium SAND, trace Silt, trace Gravel. S-7B: Bottom 4": Wet, dense, brown, fine to medium SAND, trace Silt, trace Gravel.	6	
									7	
25		S-8	24-24	0	0	100/0"	R	S-8: No Recovery. Bottom of boring at 24 feet.	8	
30										

Stratum Description

Depth (ft)	Elev. (ft)	Description
0.5'	9.6'	GRAVEL PARKING SURFACE
13'	-2.9'	FILL
17'	-6.9'	ORGANIC SILT
24'	-13.9'	FINE SAND

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Samples S-1 and S-2 driven continuously.
3. GZ-6, 2 feet sample from bottom of S-1 and top of S-2.
4. Switched from HSA to 4-inch casing with drive and wash.
5. Organic odor noted in sample S-6.
6. Casing not used from 19 to 24 feet.
7. Obstruction encountered at 23.5 feet, used tri-cone rollerbit for about 5 to 10 n=minutes, possible bedrock.
8. Monitoring well installed.

See log key for explanation of sample descriptions and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-6/MW-1

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STANDARD BORING W/E W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-7
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 11.1	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 8.3	**V. Datum:** NAVD 88
		Date Start - Finish: 8/7/2013 - 8/7/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon		
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"		
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs		
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"		
Other:	**Other:**		

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	14	21 31 27 34	58	S-1A: Top 4": Dry, very dense, gray, fine to coarse SAND, some Gravel, trace Silt. (Parking Surface) S-1B: Bottom 10": Dry, very dense, brown, fine to coarse SAND, some Gravel, trace Silt . (FILL)	1	S1 ND	0.5'	GRAVEL PARKING SURFACE	10.6'
5		S-2	4-6	24	8	3 3 4 2	7	S-2: Moist, loose, brown, fine to coarse SAND, some Gravel, trace Silt, trace Brick. (FILL)		S2 ND		FILL	
		S-3	8.3-8.3	0	0	100/0"	R	S-3: No Recovery.	2 3		8.3'		2.8'
10								Bottom of boring at 8.3 feet.					
15													
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Obstruction encountered with auger at about 8.3 feet.
3. Spoon refusal at about 8.3 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-7

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-8
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 11.5	
Logged By: Matt Steele	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 9.6	**V. Datum:** NAVD 88
		Date Start - Finish: 8/6/2013 - 8/6/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.): 300 lbs	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.): 30"	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	16	30 30 23 20	53	S-1A: Top 6": Dry, very dense, gray, fine to coarse SAND, some Gravel, little Silt. (Parking Surface) S-1B: Bottom 10": Dry, very dense, brown, fine to coarse SAND, little Silt, trace Gravel, trace Coal.	1	S1A 5.5 S1B 5.7	0.5'	GRAVEL PARKING SURFACE	11.0'
5		S-2	4-6	24	10	9 5 3 3	8	S-2: Loose, black, fine to coarse SAND, little Silt, trace Gravel, some Brick, little Shells.	2	S2 ND	8.3'	FILL	3.2'
10								Bottom of boring at 9.6 feet.					
15													
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Obstruction encountered at about 8 feet bgs, drill cuttings indicate rock, tricone rollerbit to about 9.6 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-8

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-9
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 13.7	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 14.2	**V. Datum:** NAVD 88
		Date Start - Finish: 8/7/2013 - 8/7/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	16	4 10 13 18	23	S-1A: Top 6": Dry, medium dense, dark brown, fine to coarse SAND, little Gravel, trace Silt, trace Roots. (TOPSOIL) S-1B: Bottom 10": Dry, medium dense, brown, fine to coarse SAND, little Gravel, trace Silt, trace Roots.	1	S1A ND S1B ND	0.5'	TOPSOIL	13.2'
5		S-2	4-6	24	18	5 6 5 3	11	S-2: Moist, medium dense, brown, fine to coarse SAND, some Silt, little Gravel, trace Shells, trace Brick, trace Glass, trace Coal.		S2 ND		FILL	
10		S-3	9-11	24	3	1 2 2 3	4	S-3: Wet, loose, black, fine to coarse SAND, little Silt, trace Gravel, trace Glass, trace Wood fibers.	2	S3 ND			
15		S-4	14-14.2	2	2	100/2"	R	S-4: Wet, fine to coarse SAND, some Silt, little Gravel. Bottom of boring at 14.2 feet.	3		14.2'		-0.5'
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Auger grinding/resistance at about 12 feet bgs.
3. Obstruction encountered spoon refusal with rock fragments in tip.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-9

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-10
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 12.5	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 8	**V. Datum:** NAVD 88
		Date Start - Finish: 8/7/2013 - 8/7/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:** Safe-T-Hoist Used	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	14	20 25 19 27	44	S-1A: Top 6": Dry, dense, gray, fine to coarse SAND, some Gravel, trace Silt (Parking Surface).	1	S1A	0.5'	GRAVEL PARKING SURFACE	12.0'
								S-1B: Bottom 8": Dry, brown, fine to coarse SAND, little Gravel, trace Silt, trace Bricks.	2	0.1			
		S-2	2-4	24	14	24 30 39 46	69	S-2A: Top 7": Dry, very dense, brown, fine to coarse SAND, trace Silt, trace Gravel.	3	S1B			
								S-2B: Bottom 7": Dry, brown, fine to coarse SAND, some Silt, trace Wood, trace Brick.	4	1.4			
		S-3	4-6	24	16	32 35 38 42	73	S-3: Moist, very dense, brown, fine to coarse SAND, some Gravel, trace Silt, trace Brick.		S2A			
5										100.6		FILL	
		S-4	6-6.3	3	3	100/3"	R	S-4: Moist, very dense, brown, fine to coarse SAND, some Gravel, little Silt, trace Brick.		S2B			
										288			
		S-5	8-8	0	0	100/0"	R	S-5: No Recovery.		S5	8.3'		4.2'
										106.7			
10								Bottom of boring at 8 feet.					
15													
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Samples S-1 and S-2 driven continuously.
3. Strong petroleum odor noted in sample from 4.5 to 6.3 feet.
4. Augered to refusal at about 8 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-10

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-11
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 13.2	
Logged By: Matt Steele	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 14.3	**V. Datum:** NAVD 88
		Date Start - Finish: 8/7/2013 - 8/7/2013	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.): 300 lbs	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.): 30"	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	14	21 31 17 14	48	S-1A: Top 1" Dry, dense, gray, fine to coarse SAND, some Gravel, trace Silt.	1	S1	0.4'	GRAVEL PARKING SURFACE	12.8'
								S-1B: Bottom 10": Dry, dense, brown, fine to coarse SAND, little Gravel, little Silt. (FILL)	2	ND			
		S-2	4-6	24		7 7 4 3	11	S-2: Wet, fine to coarse SAND, trace Gravel, trace Silt, trace Brick.		S2 ND		FILL	
5											7'		6.2'
		S-3	9-10.5	18	10	13 25 100/5"	R	S-3A: Top 4": Moist, dense, brown, fine to medium SAND, trace Silt, trace Gravel.	3			FINE SAND AND SILT	
10	min/ft							S-3B: Bottom 4": Moist, dense, brown, SILT, some Sand, trace Gravel.			10.5'		2.7'
	4:20	C-1	11.3-12.8	18	14			C-1: Hard, moderately severely weathered, fine-grained, green, GRANODIORITE, with very thin, very close fractures. Extremely fractured.	4 5 6	RQD 0%		ROCK	
	7:31								7	RQD			
	4:20	C-2	12.8-14.3	18	14				8 9	42%	14.3'		-1.1'
15								C-2: Hard, moderately severely weathered, fine-grained, green, GRANODIORITE, with very thin, very close fractures. Extremely fractured.					
								Bottom of boring at 14.3 feet.					
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Silt and rock fragments in tip.
3. Casing driven to about 10.4 feet, seated in bedrock.
4. Tricone rollerbit to about 11.3 feet.
5. Data in column named "Casing Blows/Core Rate" column represents core barrel penetration rate in minutes per foot. RQD = "Rock Quality Designation".
6. Drill rate reduced at about 12 feet bgs.
7. Cored C-1 advance from 11.3 to 12.9, core highly fractured.
8. Lost drill water at about 13.8 feet.
9. Recovered C-2, highly fractured.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-11

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-12
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 14.5	
Logged By: Matt Steele	**Drilling Method:** HSA	**Final Boring Depth (ft.):** 7.7	**V. Datum:** NAVD 88
		Date Start - Finish: 8/7/2013 - 8/7/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	15	10	23 32 100/3"	R	S-1A: Top 2" Dry, very dense, gray, fine to coarse SAND, some Gravel, trace Silt. S-1B: Bottom 8": Dry, brown, fine to coarse SAND, little Gravel, little Silt, trace Brick.	1 2 3	S1 2.8	0.5'	GRAVEL PARKING SURFACE	14.0'
5		S-2	4-6	24	14	2 2 3 6	5	S-2: Dry, loose, brown, fine to coarse SAND, some Silt, trace Gravel.		S2 ND		FILL	
		S-3	7.7-7.7	1	1	100/1"	R	S-3: Wet, gray, SILT and CLAY, some Sand.	4 5	S3 23.7	7.7'		6.8'
10								Bottom of boring at 7.7 feet.					
15													
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Obstruction encountered at about 1.3 feet, moved boring 2 feet north.
3. Easy auger conditions from about 2 to 4 feet.
4. Obstruction encountered at about 7.7 feet.
5. Possible petroleum-like odor noted in sample S-3, spoon refusal at about 7.7 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-12

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-13
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 9.3	
Logged By: Matt Steele	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 21.8	**V. Datum:** NAVD 88
		Date Start - Finish: 8/8/2013 - 8/18/2013	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.): 300 lbs	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.): 30"	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	14	23 80 70 37	R	S-1A: Top 4" Dry, very dense, gray, fine to coarse SAND, some Gravel, trace Silt (Parking Surface). S-1B: Bottom 10": Dry, very dense, brown, fine to coarse SAND, little Gravel, trace Silt, trace Brick, trace Ceramics. (FILL)	1 2	S1A ND S1B ND	0.3'	PARKING SURFACE	9.0'
5		S-2	4-6	24	10	16 15 10 7	25	S-2A: Top 8": Medium dense, brown, fine to coarse SAND, little Gravel, trace Brick. S-2B: Bottom 2": Medium dense, SILT, some fine Sand, trace Gravel.	4 3			FILL	
10		S-3	9-11	24	2	1 1 2 6	3	S-3: WOOD fibers (cuttings).					
		S-4	11-13	24	24	5 2 2 5	4	S-4: Loose, SILT and fine SAND, some Wood, trace Brick. (FILL)					
15		S-5	14.5-16.5	24	8	26 21 9 15	30	S-5A: Top 4": Dense, fine to coarse GRAVEL, some Sand, trace Wood fibers. S-5B: Bottom 4": Medium dense, brown, SILT, some Sand.	5		15'	SILT AND SAND	-5.7'
20		S-6	19-21	24	14	14 8 11 15	19	S-6: Medium dense, light brown SILT, trace Sand.	6				
									7		21.2'		-11.9'
								Bottom of boring at 21.8 feet.			21.8'	ROCK	-12.5'
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Brick fragments in tip of sample S-1.
4. Drove 3-inch split spoon, no recovery.
3. Casing bouncing at about 8 feet, wood fibers in cuttings for 8 inches.
5. Wood fibers in cuttings at about 14.5 feet.
6. Increased resistance at the tip of sample S-6.
7. Obstruction encountered at about 21.2 feet used tricone rollerbit to 21.8 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-13

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-14
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 10.2	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 16	**V. Datum:** NAVD 88
		Date Start - Finish: 8/8/2013 - 8/8/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
											0.3'	GRAVEL PARKING SURFACE	9.9'
		S-1	1-3	24	16	2 6 6 12	12	S-1: Dry, medium dense, brown, fine to coarse SAND, some Silt, little Gravel.	1				
5		S-2	4-6	24	14	20 15 30 32	45	S-2: Wet, dense, brown, fine SAND and SILT, little Gravel, trace Brick.	2	S2 ND			
		S-3	6-8	24	20	5 7 11 10	18	S-3: Wet, black, SILT, some Sand, trace Wood fibers, trace Cinders.	3	S3 ND		FILL	
10		S-4	9-11	24	8	9 9 5 6	14	S-4: Wet, medium dense, dark brown, Silt, trace Sand, trace Wood fibers.	4	S4 ND			
15		S-5	14-16	24	14	3 13 10 8	23	S-5A: Top 8": Wet, medium dense, dark brown, SILT, trace Brick, trace Organic fibers. S-5B: Bottom 6": Wet, medium dense, fine to coarse SAND, little Gravel, little Silt, trace Brick.		S5A ND S5B ND	16'		-5.8'
								Bottom of boring at 16 feet.					
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Sample for analysis from S-2.
3. Sample for analysis from S-3.
4. Organic odor noted in sample S-4.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-14

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-15
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 10.2	
Logged By: Matt Steele	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 34.5	**V. Datum:** NAVD 88
		Date Start - Finish: 8/8/2013 - 8/8/2013	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.): 300 lbs	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.): 30"	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Recorded			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	16	19 20 31 29	51	S-1A: Top 4" Dry, very dense, gray, fine to coarse SAND, some Gravel, trace Silt. (Parking Surface)	1	S1A	0.3'	PARKING LOT	9.9'
								S-1B: Bottom 12": Dry, very dense, brown, SILT, little Sand, little Gravel.	2	ND			
									3	S1B			
5		S-2	4-6	24		9 9 11 10	20	S-2: Moist, medium dense, brown, fine to coarse SAND, trace Silt, trace Gravel.	4	ND S2 ND		FILL	
10		S-3	9-11	24	16	6 4 8 10	12	S-3A: Top 6": Medium dense, gray, fine to medium SAND, trace Silt.	5		9.5' 9.8'	CLAY	0.7' 0.4'
								S-3B: MIddle 3": Gray, CLAY and SILT, trace Sand.				SAND	
								S-3C: Bottom 7": Medium dense, black, fine to medium SAND, little Silt.			12.5'		-2.3'
15		S-4	14-16	24	14	8 6 7 13	13	S-4: Medium dense, black, SILT, trace Gravel, trace Sand, trace Organic fibers.				ORGANIC SILT	
									6				
20		S-5	19-21	24	12	5 12 17 31	29	S-5A: Top 6": Medium dense, brown, SILT, little Sand, trace Gravel, trace Organic fibers.	7		19.5'		-9.3'
								S-5B: Bottom 6": Medium dense, olive, SILT, some fine Sand, trace Gravel.					
25		S-6	24-26	24	18	22 27 21 34	48	S-6: Dense, brown SILT, some fine Sand, brown fine sand lenses.				SILT	
									8				
30		S-7	29-31	24	20	8 10 21 24	31	S-7A: Top 12": Dense, brown, SILT, trace Sand.	9				
								S-7B: Bottom 8": Dense, brown, SILT, little Sand.					
									10		32'		-21.8'
												WEATHERED ROCK	
35								Bottom of boring at 34.5 feet.			34.5'		-24.3'
40													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Easier driving casing from 2 feet to 9 feet.
3. Cuttings at about 3 feet indicate brick.
4. Possible brick in sample S-2.
5. Open-hole drilling from about 9 feet.
6. Increase drill resistance at about 18 feet, wood fibers in cuttings.
7. Organic odor noted in sample S-5A.
8. Possible Clay in tip.
9. Orange fine sand partings (~ 1/8") in sample S-7B.
10. Trinecone rollerbit grinding from about 32 to 34.5 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-15

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-16
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 10.8	
Logged By: Matt Steele	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 34	**V. Datum:** NAVD 88
		Date Start - Finish: 8/8/2013 - 8/8/2013	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon		
I.D/O.D.(in): 4"	**I.D./O.D. (in.):** 1-3/8"/2"		
Hammer Weight (lb.): 300 lbs	**Sampler Hmr Wt (lb):** 140 lbs		
Hammer Fall (in.): 30"	**Sampler Hmr Fall (in):** 30"		
Other:	**Other:**		

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	9	19 30 38 29	68	S-1A: Top 3" Dry, very dense, gray, fine to coarse SAND and GRAVEL, trace Silt (Parking Surface). S-1B: Bottom 6": Dry, very dense, brown, fine to coarse SAND, some Gravel, trace Silt, trace Brick.	1	S1A ND S1B ND	0.5'	PARKING SURFACE	10.3'
5		S-2	4-6	24	16	25 29 20 13	49	S-2A: Top 10": Dense, dark brown, SILT and SAND, little Gravel, trace Shells. S-2B: Bottom 6": Dense, brown, fine SAND, some Silt, little Gravel.		S2A ND S2B ND		FILL	
10		S-3	9-11	24	5	16 9 6 5	15	S-3: WOOD fibers and wash Metal fragments.	2	S3 2.3	12.5' 13'	SAND	-1.7' -2.2'
15		S-4	14-16	24	14	15 16 22 28	38	S-4A: Top 4": Dense, brown, fine to coarse SAND and SILT, trace Gravel. S-4B: Bottom 10": Dense, gray SILT, little fine to medium Sand, trace Gravel.	3	S4A ND			
20		S-5	19-21	24	16	22 28 31 40	59	S-5: Very dense, olive/gray, SILT, trace fine to coarse Sand.		S5A ND		SILT AND FINE SAND	
25		S-6	24-26	24	18	25 36 49 48	85	S-6: Very dense, olive/gray, SILT, trace Sand, 1-inch seam coarse Sand.					
30		S-7	29-31	24	20	10 18 16 24	34	S-7: Dense, light brown, SILT and fine SAND.	4				
									5		33'	ROCK	-22.2'
35								Bottom of boring at 34 feet.	6		34'		-23.2'
40													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Wood in cuttings at about 8 feet.
3. Open hole drilling from about 14 feet to the bottom of the boring.
4. Possible Clayey Silt at top of spoon.
5. Obstruction encountered at 33 feet, cuttings indicate rock.
6. Tricone rollerbit to about 34 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-16

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-17
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 11.2	
Logged By: Matt Steele	**Drilling Method:** Auger	**Final Boring Depth (ft.):** 16	**V. Datum:** NAVD 88
		Date Start - Finish: 8/9/2013 - 8/9/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
									1		0.5'	PARKING SURFACE	10.7'
		S-1	1-3	24	16	17 16 40 54	56	S-1: Dry, dense, dark brown, fine to coarse SAND, little Silt, trace Gravel, trace Brick.	2	S1 0.4			
5		S-2	4-6	24	14	17 17 15 11	32	S-2: Moist, dense, black, fine to coarse SAND, trace Silt, trace Gravel, trace Brick, trace Wood fibers.	3	S2 ND			
		S-3	6-8	24	8	10 14 24 19	38	S-3: Moist, dense, black, fine to coarse SAND, little Silt, trace Gravel, trace Brick, trace Wood fibers.	4	S3 ND		FILL	
10		S-4	9-11	24	6	2 2 13 11	15	S-4: Wet, medium dense, black, fine to coarse SAND, little Silt, trace Gravel, trace Weed.	5	S4 ND			
											12'		-0.8'
											13'	PEAT	-1.8'
15		S-5	14-16	24	16	1 3 3 5	6	S-5A: Top 6": Wet, loose, black, PEAT. S-5B: Middle 4": Wet, loose, black, Clayey SILT, trace Organics (Organic Silt). S-5C: Bottom 6": Wet, loose, Clayey SILT, trace Sand.	6			CLAYEY SILT	
											16'		-4.8'
20								Bottom of boring at 16 feet.					
25													
30													
35													
40													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Sample for analysis from S-1.
3. Samples S-2 and S-3 driven continuously.
4. Wood observed in tip of sample S-3.
5. Wood observed in tip of sample S-4.
6. Odor noted in samples S-5A and S-5B.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-17

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-18
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 11.2	
Logged By: Matt Steele	**Drilling Method:** Drive & Wash	**Final Boring Depth (ft.):** 31.4	**V. Datum:** NAVD 88
		Date Start - Finish: 8/9/2013 - 8/9/2013	

Auger/Casing Type: HW	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 4"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.): 300 lbs	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.): 30"	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	18	31 39 33 40	72	S-1A: Top 6": Dry, dense,gray, fine to coarse SAND,some Gravel, trace Silt, (Parking Surface). S-1B: Bottom 12": Dry, dense, brown, fine to coarse SAND, some Silt, trace Brick, trace Coal. (FILL)	1	S1A ND S1B ND	0.5'	GRAVEL PARKING SURFACE	10.7'
5		S-2	4-6	24	18	17 10 8 7	18	S-2: Wet, medium dense, black, fine to coarse SAND, some Silt, trace Gravel, trace Shells, trace Brick, trace Cinders, trace Wood.		S2 ND			
10		S-3	9-11	24	0	5 3 1 3	4	S-3: No Recovery.	2			FILL	
15		S-4	14-16	24	12	7 7 9 9	16	S-4A: Top 6": Wet, medium dense, dark brown, fine to medium SAND, some Silt, trace Brick, trace Cinders, trace Gravel. S-4B: Bottom 6": Wet, medium dense, dark brown, SILT, some Sand, little Wood fragments, trace Gravel.	3 4	S4A ND S4B	17.5'		-6.3'
20		S-5	19-21	24	14	22 38 43 73	81	S-5: Very dense, brown, SILT, trace Sand.					
25		S-6	24-26	24	24	37 46 45 53	91	S-6: Very dense, brown, fine SAND and SILT.				SILT AND FINE SAND	
30		S-7	29-31	22	16	16 22 23 100/4"	45	S-7: Wet, dense, brown, fine SAND and SILT.	5		30.8'		-19.6'
											31.4'	ROCK	-20.2'
35								Bottom of boring at 31.4 feet.					

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Obstruction encountered at about 8 feet, bouncing indicates wood obstruction.
3. Casing not used from about 14 feet to the bottom of the boring.
4. Pulverized rock in tip.
5. Advanced rollerbit from 30.8 to 31.4 feet.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-18

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STRATUM ONLY W/O SMPL 2PG; 9/5/2013

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-19
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring	**Type of Rig:** Dietrich	**Boring Location:** See Plan	**H. Datum:**
Foreman: Walter Hoeckele	**Rig Model:** D-50	**Ground Surface Elev. (ft.):** 11.4	
Logged By: Matt Steele	**Drilling Method:** HSA	**Final Boring Depth (ft.):** 15	**V. Datum:** NAVD 88
		Date Start - Finish: 8/6/2013 - 8/6/2013	

Auger/Casing Type: HSA	**Sampler Type:** Split Spoon	
I.D/O.D.(in): 2.25"	**I.D./O.D. (in.):** 1-3/8"/2"	
Hammer Weight (lb.):	**Sampler Hmr Wt (lb):** 140 lbs	
Hammer Fall (in.):	**Sampler Hmr Fall (in):** 30"	
Other:	**Other:**	

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
Not	Measured			

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Pen. (in)	Rec. (in)	Blows (per 6 in.)	SPT Value	Sample Description and Identification (Modified Burmister Procedure)	Remark	Field Test Data	Stratum Depth (ft.)	Stratum Description	Stratum Elev. (ft.)
		S-1	0-2	24	12	19 25 22 27	47	S-1A: Top 4": Dry, very dense,gray, fine to coarse SAND,some Gravel, little Silt. (Parking Surface)	1	S1A ND	0.5'	GRAVEL PARKING SURFACE	10.9'
		S-2	2-4	24	1	30 27 16 14	43	S-1B: Bottom 8": Dry, very dense, black, fine to coarse SAND, trace Gravel, trace Silt, trace Brick. S-2: Dry, dense, brown, fine to coarse SAND, little Silt, trace Gravel.	2	S1B ND S2			
5		S-3	4-6	24	12	17 12 15 16	27	S-3: Dry, medium dense, black, fine to coarse SAND, little Gravel, trace Silt, trace Brick.	3 4	ND			
		S-4	6-8	24	14	9 8 7 10	15	S-4: Wet, medium dense, black, fine to medium SAND, some Silt, trace Gravel.	5	S4 ND		FILL	
10		S-5	9-11	24	24	2 3 2 2	5	S-5: Wet, loose, black, fine to coarse SAND, some Silt, trace Gravel, trace Brick, trace Wood fibers.					
15		S-6	14-15	12	10	23 100/6"	R	S-6: Wet, dense, brown, fine to coarse SAND, little Silt, trace Gravel, trace Brick, trace Wood fibers.	6		15'		-3.6'
								Bottom of boring at 15 feet.					
20													
25													
30													

REMARKS

1. Field testing results represent total organic vapor levels, referenced to a benzene standard, measured in the headspace of sealed soil sample jars using a MiniRae 3000 organic vapor meter equipped with a photoionization detector (PID) and 10.6eV lamp. Results in parts per million by volume (ppmv). ND indicates nothing detected (<0.1 ppmv).
2. Augered to about 2 feet, prior to obtaining sample S-2.
3. Brick in top of sample S-3.
4. Sample for analysis from S-3 (4 to 6 feet).
5. Sample for analysis from S-4 (6 to 8 feet).
6. Obstruction encountered in sample S-6, weathered rock in tip.

See Log Key for explanation of sample description and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-19

TEST BORING LOG

GZA GeoEnvironmental, Inc.
Engineers and Scientists

NRA - Geotechnical & Environmental
Waterfront Parking Lots
Newburyport, Massachusetts

BORING NO.: GZ-20/MW-2
SHEET: 1 of 1
PROJECT NO: 18.0171593.00
REVIEWED BY:

Drilling Co.: New Hampshire Boring
Foreman: Walter Hoeckele
Logged By: Matt Steele

Type of Rig: Dietrich
Rig Model: D-50
Drilling Method: Auger/Drive & Wash

Boring Location: See Plan
Ground Surface Elev. (ft.): 11.2
Final Boring Depth (ft.): 19.5
Date Start - Finish: 8/9/2013 - 8/9/2013

H. Datum:
V. Datum: NAVD 88

Auger/Casing Type: HSA/HW
I.D./O.D.: 2.25"/4"
Hmr Weight (lb.): 300 lbs
Hmr Fall (in.): 30"
Other:

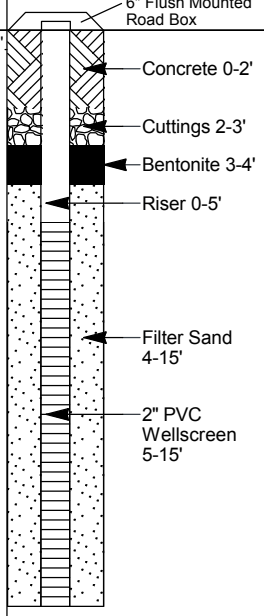
Sampler Type: Split Spoon
I.D./O.D (in.): 1-3/8"/2"
Sampler Hmr Wt: 140 lbs
Sampler Hmr Fall: 30"
Other:

Groundwater Depth (ft.)

Date	Time	Water Depth	Casing	Stab. Time
8/16/13	0859	7.46'		13 days

Depth (ft)	Casing Blows/ Core Rate	Sample No.	Sample Depth (ft.)	Sample Pen. (in)	Sample Rec. (in)	Sample Blows (per 6 in.)	Sample SPT Value	Sample Description Modified Burmister	Remark	Field Test Data	Stratum Depth (ft)	Stratum Description	Stratum Elev. (ft)
									1		0.5'	GRAVEL PARKING SURFACE	10.7'
		S-1	1-3	24	16	7 15 18 100/3"	33	S-1: Dry, dense, brown, fine to coarse SAND, little Silt, little Gravel, trace Brick, trace Asphalt.	2	S1 ND			
5		S-2	4-6	24	22	27 23 15 13	38	S-2A: Top 6": Dry, dense, black, fine to coarse SAND, little Silt, trace Gravel, trace Brick.	3	S2A ND			
		S-3	6-8	24	14	11 22 15 8	37	S-2B: Bottom 16": Moist, medium dense, brown, fine to coarse SAND, trace Silt, trace Gravel.	4	S2B ND			
								S-3: Wet, dense, brown, fine to coarse SAND, trace Silt, trace Gravel.	5	S3 ND		FILL	
10									6				
15									7		16'		-4.8'
		S-4	17.5-19.5	24	0	31 33 41 46	74	S-4: No Recovery.				FINE SAND AND SILT	
20								Bottom of boring at 19.5 feet.			19.5'		-8.3'
25													
30													

Equipment Installed



REMARKS

1. Field testing results represent total organic vapor levels
2. Sample for analysis from S-1.
3. Samples S-2 and S-3 driven continuously.
4. Sample for analysis from S-3.
5. Switched to wash and drive techniques after sample S-3
6. Obstruction inside casing at about 9 feet. Drove casing to about 14 feet and tried to clean casing.
7. Advanced casing to about 16 feet and cleaned with a 3-inch rollerbit. Brick, glass and wood fragments observed.

See log key for explanation of sample descriptions and identification procedures. Stratification lines represent approximate boundaries between soil and bedrock types. Actual transitions may be gradual. Water level readings have been made at the times and under the conditions stated. Fluctuations of groundwater may occur due to other factors than those present at the times the measurements were made.

Boring No.: GZ-20/MW-2

18.0171593.00 WATERFRONT PARKING LOTS_NEWBURYPORT_MA.GPJ; STANDARD BORING W/E W/O SMPL 2PG; 9/5/2013

APPENDIX E

ANALYTICAL DATA SUMMARY TABLES

Table E-1: Soil Analytical Summary Table.

Environmental and Geotechnical Site Evaluation
East and West Waterfront Lots, Newburyport, Massachusetts
Project No. 18.0171593.00

		MassDEP Comm 97		MassDEP S1 GW2	MassDEP RCS1	Units	WEST PARKING LOT									EAST PARKING LOT					
		Lined Landfill	Unlined Landfill				8/5/2013 GZ-1 2'	8/5/2013 GZ-2 2'	8/6/2013 GZ-4 2'	8/6/2013 GZ-6 2'	8/6/2013 GZ-6 6'	8/7/2013 GZ-10 2'	8/7/2013 GZ-10 6'	8/6/2013 GZ-19 4'	8/6/2013 GZ-19 6'-8'	8/8/2013 GZ-14 2'	8/9/2013 GZ-14 7'	8/9/2013 GZ-17 2'	8/9/2013 GZ-17 6'-7'	8/9/2013 GZ-20 1'-3'	8/9/2013 GZ-20 6'-8'
RCRA 8 Metals	Arsenic	40	40	20	20	mg/Kg	**22.7**	**21.2**	17.6	**355**	18.2	**21.8**	18	19.7	13.8	**20.7**	<7.46	13.7	14.3	12	12.7
	Barium	---	---	1000	1000	mg/Kg	101	102	66.9	37.5	18.3	35.9	37.1	55.9	30	45.9	44.6	52.6	46.7	44.7	14
	Cadmium	80	30	2	2	mg/Kg	<0.653	<0.711	<0.617	<0.664	<0.694	<0.64	<0.667	<0.683	<0.729	<0.64	<0.746	<0.701	<0.637	<0.696	<0.647
	Chromium	1,000	1,000	30	30	mg/Kg	15.3	26.7	**30.3**	**44.6**	13.5	**64.7**	19.4	21.5	15.6	21.2	16.9	25.7	16.4	22.8	13
	Lead	2,000	2,000	300	300	mg/Kg	219	**479**	31.8	57.6	72.1	101	128	242	207	92.4	131	188	167	142	<5.18
	Selenium	---	---	400	400	mg/Kg	<15.7	<17.1	<14.8	<15.9	<16.7	<15.4	<16	<16.4	<17.5	<15.4	<17.9	<16.8	<15.3	<16.7	<15.5
	Silver	---	---	100	100	mg/Kg	3.67	<1.99	<1.73	<1.86	2.43	<1.79	<1.87	<1.91	<2.04	<1.79	<2.09	<1.96	<1.78	<1.95	<1.81
	Mercury	10	10	20	20	mg/Kg	0.0848	0.682	<0.0483	0.0972	<0.0587	0.12	0.29	0.496	0.764	0.568	0.367	0.447	0.449	0.221	<0.0536
	TCLP Metals																				
	Arsenic	---	---	NA	NA	mg/L	-	-	-	<0.25	-	-	-	-	-	-	-	-	-	-	-
	Lead	---	---	NA	NA	mg/L	-	1.7	-	-	-	-	-	<0.25	-	-	-	0.53	-	-	-
	PCBs																				
	Aroclor Total	<2	<2	2	2	mg/Kg	---	---	---	<0.026	<0.03	0.025	<0.028	<0.028	<0.029	<0.027	<0.034	<0.028	0.016	<0.028	<0.028
	EPH Ranges																				
	C11-C22 Aromatic Hydrocarbons	5,000 (Total TPH)	2,500 (Total TPH)	1000	1000	mg/Kg	90	55	<10	<11	<12	61	**1700**	130	<12	77	87	14	43	19	<11
	C19-C36 Aliphatic Hydrocarbons			3000	3000	mg/Kg	13	66	<10	<11	<12	16	500	64	<12	<11	21	<11	43	<11	<11
	C9-C18 Aliphatic Hydrocarbons			1000	1000	mg/Kg	<11	<11	<10	<11	<12	<11	**2900**	<12	<12	<11	<13	<11	<11	<11	<11
EPH with Targets	2-Methylnaphthalene	100 (Total)	100 (Total)	80	0.7	mg/Kg	0.12	<0.11	<0.1	---	---	---	---	---	---	---	---	---	---	---	---
	Acenaphthene			1000	4	mg/Kg	0.49	0.22	<0.1	---	---	---	---	---	---	---	---	---	---	---	---
	Acenaphthylene			600	1	mg/Kg	<0.11	0.16	<0.1	---	---	---	---	---	---	---	---	---	---	---	---
	Anthracene			1000	1000	mg/Kg	1.1	0.74	<0.1	---	---	---	---	---	---	---	---	---	---	---	---
	Benz(a)anthracene			7	7	mg/Kg	3.3	1.8	0.23	---	---	---	---	---	---	---	---	---	---	---	---
	Benzo(a)pyrene			2	2	mg/Kg	**2.6**	1.6	0.27	---	---	---	---	---	---	---	---	---	---	---	---
	Benzo(b)fluoranthene			7	7	mg/Kg	2.9	1.5	0.32	---	---	---	---	---	---	---	---	---	---	---	---
	Benzo(g,h,i)perylene			1000	1000	mg/Kg	1.5	1.1	0.29	---	---	---	---	---	---	---	---	---	---	---	---
	Benzo(k)fluoranthene			70	70	mg/Kg	1.8	1.2	0.23	---	---	---	---	---	---	---	---	---	---	---	---
	Chrysene			70	70	mg/Kg	3.2	1.7	0.28	---	---	---	---	---	---	---	---	---	---	---	---
	Dibenz(a,h)anthracene			0.7	0.7	mg/Kg	**0.76**	0.41	0.11	---	---	---	---	---	---	---	---	---	---	---	---
	Fluoranthene			1000	1000	mg/Kg	7.3	4	0.34	---	---	---	---	---	---	---	---	---	---	---	---
	Fluorene			1000	1000	mg/Kg	0.57	0.33	<0.1	---	---	---	---	---	---	---	---	---	---	---	---
	Indeno(1,2,3-cd)pyrene			7	7	mg/Kg	1.5	1.1	0.24	---	---	---	---	---	---	---	---	---	---	---	---
	Naphthalene			40	4	mg/Kg	0.16	<0.11	<0.1	---	---	---	---	---	---	---	---	---	---	---	---
	Phenanthrene			500	10	mg/Kg	5	3.2	0.18	---	---	---	---	---	---	---	---	---	---	---	---
	Pyrene			1000	1000	mg/Kg	6	3.4	0.34	---	---	---	---	---	---	---	---	---	---	---	---
VOCs	1,1,1,2-Tetrachloroethane	10 (Total)	4 (Total)	0.1	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,1,1-Trichloroethane			500	30	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,1,2,2-Tetrachloroethane			0.02	0.005	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,1,2-Trichloroethane			2	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,1-Dichloroethane			5	0.4	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,1-Dichloroethene			40	3	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,2,4-Trichlorobenzene			70	2	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,2-Dibromoethane			0.1	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,2-Dichlorobenzene			30	9	mg/Kg	---	---	---	<0.037	<0.026	<0.02	<0.11	<0.036	<0.024	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	1,2-Dichloroethane			0.1	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,2-Dichloropropane			0.1	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	1,3-Dichlorobenzene			40	1	mg/Kg	---	---	---	<0.037	<0.026	<0.02	<0.11	<0.036	<0.024	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	1,4-Dichlorobenzene			4	0.7	mg/Kg	---	---	---	<0.037	<0.026	<0.02	<0.11	<0.036	<0.024	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	2-Butanone			50	4	mg/Kg	---	---	---	<0.37	<0.26	<0.2	<1.1	<0.36	<0.24	<0.32	<0.54	<0.28	<0.3	<0.27	<0.26
	4-Methyl-2-pentanone			50	0.4	mg/Kg	---	---	---	<0.37	<0.26	<0.2	<1.1	<0.36	<0.24	<0.32	<0.54	<0.28	<0.3	<0.27	<0.26
	Acetone			50	6	mg/Kg	---	---	---	<0.37	<0.26	<0.2	<1.1	<0.36	<0.24	<0.32	<0.54	<0.28	<0.3	<0.27	<0.26
	Benzene			30	2	mg/Kg	---	---	---	<0.037	<0.026	<0.02	<0.11	<0.036	<0.024	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	Bromodichloromethane			0.1	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Bromoform			1	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Bromomethane			0.5	0.5	mg/Kg	---	---	---	<0.15	<0.1	<0.082	<0.44	<0.15	<0.097	<0.13	<0.22	<0.11	<0.12	<0.11	<0.11
	Carbon tetrachloride			5	5	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Chlorobenzene			3	1	mg/Kg	---	---	---	<0.037	<0.026	<0.02	<0.11	<0.036	<0.024	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	Chloroform			0.3	0.3	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	cis-1,2-Dichloroethene			0.4	0.3	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Dibromochloromethane			0.03	0.005	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Ethylbenzene			500	40	mg/Kg	---	---	---	<0.037	<0.026	<0.02	0.76	<0.036	<0.024	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	Hexachlorobutadiene			6	6	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Methyl tert-butyl ether			100	0.1	mg/Kg	---	---	---	<0.037	<0.026	<0.02	<0.11	<0.036	<0.024	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	Methylene chloride			20	0.1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	**0.11**	<0.11	<0.056	<0.061	<0.053	<0.053
	Naphthalene			40	4	mg/Kg	---	---	---	<0.074	<0.052	<0.041	**6.5**	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Styrene			4	3	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053

		MassDEP Comm 97		MassDEP S1 GW2	MassDEP RCS1	Units	WEST PARKING LOT									EAST PARKING LOT					
		Lined Landfill	Unlined Landfill				8/5/2013 GZ-1 2'	8/5/2013 GZ-2 2'	8/6/2013 GZ-4 2'	8/6/2013 GZ-6 2'	8/6/2013 GZ-6 6'	8/7/2013 GZ-10 2'	8/7/2013 GZ-10 6'	8/6/2013 GZ-19 4'	8/6/2013 GZ-19 6'-8'	8/8/2013 GZ-14 2'	8/9/2013 GZ-14 7'	8/9/2013 GZ-17 2'	8/9/2013 GZ-17 6'-7'	8/9/2013 GZ-20 1'-3'	8/9/2013 GZ-20 6'-8'
VOCs	Tetrachloroethene			10	1	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Toluene			500	30	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.032	<0.054	<0.028	<0.03	<0.027	<0.026
	trans-1,2-Dichloroethene			1	0.3	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Trichloroethene			2	0.3	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Vinyl chloride			0.6	0.6	mg/Kg	---	---	---	<0.074	<0.052	<0.041	<0.22	<0.073	<0.048	<0.065	<0.11	<0.056	<0.061	<0.053	<0.053
	Xylene Total			300	300	mg/Kg	---	---	---	<0.074	<0.052	<0.041	0.88	0.035	0.016	0.018	0.04	0.019	<0.03	<0.027	<0.026
SVOCs	1,2,4-Trichlorobenzene			70	2	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	1,2-Dichlorobenzene			30	9	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	1,3-Dichlorobenzene			40	1	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	1,4-Dichlorobenzene			4	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	2,4,5-Trichlorophenol			1000	4	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	2,4,6-Trichlorophenol			20	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	2,4-Dichlorophenol			60	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	2,4-Dimethylphenol			400	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	2,4-Dinitrophenol			50	3	mg/Kg	---	---	---	<0.52	<0.61	<0.53	<0.56	<0.59	<0.59	<0.54	<0.67	<1.1	<1.1	<0.57	<0.56
	2,4-Dinitrotoluene			2	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	2-Chlorophenol			100	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	2-Methylnaphthalene			80	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	**54**	0.45	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	3,3´-Dichlorobenzidine			1	1	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	4-Chloroaniline			100	1	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Acenaphthene			1000	4	mg/Kg	---	---	---	<0.26	<0.3	<0.27	**4.1**	0.92	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Acenaphthylene			600	1	mg/Kg	---	---	---	<0.26	<0.3	0.49	<0.28	<0.29	<0.29	0.81	<0.34	<0.56	<0.56	<0.28	<0.28
	Anthracene			1000	1000	mg/Kg	---	---	---	<0.26	<0.3	0.37	1.8	3	<0.29	0.79	<0.34	<0.56	<0.56	<0.28	<0.28
	Benz(a)anthracene			7	7	mg/Kg	---	---	---	<0.26	<0.3	1	0.33	6.5	<0.29	1.7	<0.34	<0.56	0.88	0.55	<0.28
	Benzo(a)pyrene			2	2	mg/Kg	---	---	---	<0.26	<0.3	0.91	<0.28	**5.6**	<0.29	1.5	<0.34	0.68	0.95	0.62	<0.28
	Benzo(b)fluoranthene	100 (Total)	100 (Total)	7	7	mg/Kg	---	---	---	<0.26	<0.3	0.68	<0.28	5.5	<0.29	1.2	<0.34	0.68	0.89	0.52	<0.28
	Benzo(g,h,i)perylene			1000	1000	mg/Kg	---	---	---	<0.26	<0.3	0.53	<0.28	3.3	<0.29	0.88	<0.34	<0.56	0.6	0.4	<0.28
	Benzo(k)fluoranthene			70	70	mg/Kg	---	---	---	<0.26	<0.3	0.63	<0.28	4.2	<0.29	1.2	<0.34	<0.56	0.8	0.53	<0.28
	Bis(2-chloroethyl)ether			0.7	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Bis(2-ethylhexyl)phthalate			200	200	mg/Kg	---	---	---	<0.26	<0.3	0.51	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Chrysene			70	70	mg/Kg	---	---	---	<0.26	<0.3	1.2	0.38	6.5	<0.29	1.9	<0.34	0.62	1	0.65	<0.28
	Dibenz(a,h)anthracene			0.7	0.7	mg/Kg	---	---	---	<0.26	<0.3	0.29	<0.28	**1.7**	<0.29	0.32	<0.34	<0.56	<0.56	<0.28	<0.28
	Diethyl phthalate			200	10	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Dimethyl phthalate			50	30	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Fluoranthene			1000	1000	mg/Kg	---	---	---	<0.26	<0.3	1.4	1.2	13	<0.29	3.1	<0.34	0.75	1.4	1.1	<0.28
	Fluorene			1000	1000	mg/Kg	---	---	---	<0.26	<0.3	<0.27	4.7	1.4	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Hexachlorobenzene			0.7	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Hexachlorobutadiene			6	6	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Hexachloroethane			3	0.7	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Indeno(1,2,3-cd)pyrene			7	7	mg/Kg	---	---	---	<0.26	<0.3	0.48	<0.28	3.2	<0.29	0.8	<0.34	<0.56	0.57	0.36	<0.28
	Naphthalene			40	4	mg/Kg	---	---	---	<0.26	<0.3	<0.27	**9.1**	1.3	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Pentachlorophenol			10	3	mg/Kg	---	---	---	<0.52	<0.61	<0.53	<0.56	<0.59	<0.59	<0.54	<0.67	<1.1	<1.1	<0.57	<0.56
	Phenanthrene			500	10	mg/Kg	---	---	---	<0.26	<0.3	0.57	**19**	**10**	<0.29	2	<0.34	<0.56	0.64	0.64	<0.28
	Phenol			50	1	mg/Kg	---	---	---	<0.26	<0.3	<0.27	<0.28	<0.29	<0.29	<0.27	<0.34	<0.56	<0.56	<0.28	<0.28
	Pyrene			1000	1000	mg/Kg	---	---	---	<0.26	<0.3	2.1	1.3	11	<0.29	3.4	<0.34	0.82	1.3	1.1	<0.28
	VPH Ranges																				
	C5-C8 Aliphatic Hydrocarbons			100	100	mg/Kg	<3.1	<3.8	<2.6	<3.3	<2.6	<2.1	23	2.6	2.7	<2.5	<3.3	<2.7	<3.8	<2.6	<2.3
	C9-C10 Aromatic Hydrocarbons			100	100	mg/Kg	<3.1	<3.8	<2.6	<3.3	<2.6	<2.1	**130**	<2.5	<2.6	<2.5	<3.3	<2.7	<3.8	<2.6	<2.3
	C9-C12 Aliphatic Hydrocarbons			1000	1000	mg/Kg	<3.1	<3.8	<2.6	<3.3	<2.6	<2.1	120	<2.5	<2.6	<2.5	<3.3	<2.7	<3.8	<2.6	<2.3
	VPH Target Analytes																				
	Benzene			30	2	mg/Kg	<0.063	<0.076	<0.053	---	---	---	---	---	---	---	---	---	---	---	---
	Ethylbenzene			500	40	mg/Kg	<0.063	<0.076	<0.053	---	---	---	---	---	---	---	---	---	---	---	---
	Methyl tert-butyl ether			100	0.1	mg/Kg	<0.063	<0.076	<0.053	---	---	---	---	---	---	---	---	---	---	---	---
	Naphthalene			40	4	mg/Kg	<0.063	<0.076	<0.053	---	---	---	---	---	---	---	---	---	---	---	---
	Toluene			500	30	mg/Kg	<0.063	<0.076	<0.053	---	---	---	---	---	---	---	---	---	---	---	---
	Inorganic Disposal Parameters																				
	Flashpoint			NA	NA	°F	---	---	---	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200	>200
	Reactive Cyanide			NA	NA	mg/Kg	---	---	---	<21	<23	<21	<22	<23	<23	<22	<26	<22	<22	<22	<22
	Reactive Sulfide			NA	NA	mg/Kg	---	---	---	<110	<120	<100	<110	<110	<120	<110	<130	<110	<110	<110	<110
	pH			NA	NA	S.U.	---	---	---	8.3	7.3	7	6.9	7.3	7.0	7.6	6.2	7.3	7.2	7	6.6
	Conductivity	8,000	4,000	NA	NA	µmhos/cm	---	---	---	1,400	480	140	250	790	320	230	1,100	1,900	1,700	570	350

Concentrations in **bold** indicate detections above the regulatory standard
MassDEP Regulatory Standards from 310 CMR 40.0974Table 2 and 310 CMR 1796 Table 1.
MassDEP Comm 97 Regulatory Standards from Policy # COMM-97-001.

		MassDEP RCGW-2	MassDEP GW-2	Units	8/16/2013 MW-1 West Lot	8/16/2013 MW-2 East Lot	8/16/2013 Trip Blank
EPH	2-Methylnaphthalene	2,000	2000	µg/l	<2	<2	-
	Acenaphthene	6,000	No Limit	µg/l	<2	<2	-
	Acenaphthylene	40	10000	µg/l	<2	<2	-
	Anthracene	30	No Limit	µg/l	<2	<2	-
	Benz(a)anthracene	1,000	No Limit	µg/l	<2	<2	-
	Benzo(a)pyrene	500	No Limit	µg/l	<2	<2	-
	Benzo(b)fluoranthene	400	No Limit	µg/l	<2	<2	-
	Benzo(g,h,i)perylene	20	No Limit	µg/l	<2	<2	-
	Benzo(k)fluoranthene	100	No Limit	µg/l	<2	<2	-
	C11-C22 Aromatic Hydrocarbons	5,000	50000	µg/l	<100	<100	-
	C19-C36 Aliphatic Hydrocarbons	50,000	No Limit	µg/l	<100	<100	-
	C9-C18 Aliphatic Hydrocarbons	5,000	5000	µg/l	<100	<100	-
	Chrysene	70	No Limit	µg/l	<2	<2	-
	Dibenz(a,h)anthracene	40	No Limit	µg/l	<2	<2	-
	Fluoranthene	200	No Limit	µg/l	<2	<2	-
	Fluorene	40	No Limit	µg/l	<2	<2	-
	Indeno(1,2,3-cd)pyrene	100	No Limit	µg/l	<2	<2	-
	Naphthalene	1,000	1000	µg/l	<2	<2	-
	Phenanthrene	10,000	No Limit	µg/l	<2	<2	-
	Pyrene	20	No Limit	µg/l	<2	<2	-
VPH	Benzene	2,000	2000	µg/l	<1	<1	<1
	C5-C8 Aliphatic Hydrocarbons	3,000	3000	µg/l	<100	<100	<100
	C9-C10 Aromatic Hydrocarbons	7,000	7000	µg/l	<100	<100	<100
	C9-C12 Aliphatic Hydrocarbons	5,000	5000	µg/l	<100	<100	<100
	Ethylbenzene	5,000	20000	µg/l	<1	<1	<1
	Methyl tert-butyl ether	5,000	50000	µg/l	<1	<1	<1
	Naphthalene	1,000	1000	µg/l	<2	<2	<2
	Toluene	40,000	50000	µg/l	<1	<1	<1
	Xylene Total	5,000	9000	µg/l	<1	<1	<1

MassDEP RC Standards from 310 CMR 1796 Table 1.
MassDEP Method 1 Standards from 310 CMR 40.0974 Table 1.

APPENDIX F

LABORATORY ANALYTICAL REPORTS

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 • FAX: (603) 429-8496
www.amrolabs.com

August 20, 2013

ANALYTICAL TEST RESULTS

Matthew Steele
GZA GeoEnvironmental, Inc.
372 Merrimac Street
Newburyport, MA 01950
TEL: (781) 278-4805
FAX:

Subject: 18.0171593.00 NRA

Workorder No.: 1308011

Dear Matthew Steele:

AMRO Environmental Laboratories Corp. received 7 samples on 8/6/2013 for the analyses presented in the following report.

AMRO is accredited in accordance with NELAC and certifies that these test results meet all the requirements of NELAC, where applicable, unless otherwise noted in the case narrative.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of 60 days from sample receipt date (90 days for samples from New York). After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 87 pages. This letter is an integral part of your data report. All results in this project relate only to the sample(s) as received by the laboratory and documented in the Chain-of-Custody. This report shall not be reproduced except in full, without the written approval of the laboratory. If you have any questions regarding this project in the future, please refer to the Workorder Number above.

Sincerely,

Nancy Stewart
Vice President

State Certifications: NH (NELAC): 1001, MA: M-NH012, CT: PH-0758, NY: 11278 (NELAC), ME: NH012 and 1001.

Hard copy of the State Certification is available upon request.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011
Date Received: 8/6/2013

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date	Collection Time
1308011-01A	GZ 1	8/5/2013	12:06 PM
1308011-01B	GZ 1	8/5/2013	12:06 PM
1308011-02A	GZ 2	8/5/2013	1:58 PM
1308011-02B	GZ 2	8/5/2013	1:58 PM
1308011-03A	GZ 4	8/6/2013	7:56 AM
1308011-03B	GZ 4	8/6/2013	7:56 AM
1308011-04A	GZ 6 2'	8/6/2013	9:14 AM
1308011-04B	GZ 6 2'	8/6/2013	9:14 AM
1308011-04C	GZ 6 2'	8/6/2013	9:14 AM
1308011-05A	GZ 6 6'	8/6/2013	9:41 AM
1308011-05B	GZ 6 6'	8/6/2013	9:41 AM
1308011-05C	GZ 6 6'	8/6/2013	9:41 AM
1308011-06A	GZ 19 4'	8/6/2013	2:16 PM
1308011-06B	GZ 19 4'	8/6/2013	2:16 PM
1308011-06C	GZ 19 4'	8/6/2013	2:16 PM
1308011-07A	GZ 19 6'-8'	8/6/2013	2:23 PM
1308011-07B	GZ 19 6'-8'	8/6/2013	2:23 PM
1308011-07C	GZ 19 6'-8'	8/6/2013	2:23 PM

AMRO Environmental Laboratories Corp.

14-Aug-13

Lab Order: 1308011
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308011-01A	GZ 1	8/5/2013 12:06:00 PM	Soil	Volatile Petroleum Hydrocarbons 1.1		8/8/2013	
					8/5/2013	R51571	
1308011-01B				EPA 6010B ICP METALS, 3051/6010		8/8/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/8/2013	23455	
				EPA 7471 MERCURY, Soil		8/7/2013	
				EPA 7471 HG Soil Prep	8/7/2013	23451	
				EPH 1.1, Soil, Full List		8/9/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	
				EPH 1.1, Soil, Full List		8/8/2013	
					8/7/2013	23449	
				Percent Moisture		8/8/2013	
						R51565	
1308011-02A	GZ 2	8/5/2013 1:58:00 PM		Volatile Petroleum Hydrocarbons 1.1		8/9/2013	
					8/5/2013	R51571	
1308011-02B				EPA 6010B ICP METALS, 3051/6010		8/8/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/8/2013	23455	
				EPA 7471 MERCURY, Soil		8/7/2013	
				EPA 7471 HG Soil Prep	8/7/2013	23451	
				EPH 1.1, Soil, Full List		8/8/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	
				EPH 1.1, Soil, Full List		8/9/2013	
					8/7/2013	23449	
				Percent Moisture		8/8/2013	
						R51565	

AMRO Environmental Laboratories Corp.

14-Aug-13

Lab Order: 1308011
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308011-03A	GZ 4	8/6/2013 7:56:00 AM	Soil	Volatile Petroleum Hydrocarbons 1.1		8/8/2013	
					8/6/2013	R51571	
1308011-03B				EPA 6010B ICP METALS, 3051/6010		8/8/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/8/2013	23455	
				EPA 7471 MERCURY, Soil		8/7/2013	
				EPA 7471 HG Soil Prep	8/7/2013	23451	
				EPH 1.1, Soil, Full List		8/8/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	
				EPH 1.1, Soil, Full List		8/8/2013	
					8/7/2013	23449	
				Percent Moisture		8/8/2013	
						R51565	
1308011-04A	GZ 6 2'	8/6/2013 9:14:00 AM		MCP 8260B, EPA 5035 MeOH preserved		8/9/2013	
				EPA 5035,methanol preserved	8/5/2013	R51572	
				Volatile Petroleum Hydrocarbons 1.1		8/8/2013	
					8/6/2013	R51571	
1308011-04B				EPA 6010B ICP METALS, 3051/6010		8/8/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/8/2013	23455	
				EPA 7471 MERCURY, Soil		8/7/2013	
				EPA 7471 HG Soil Prep	8/7/2013	23451	
				EPA 8082 PCBS IN SOIL/SOLIDS		8/9/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/8/2013	23456	
				EPH 1.1, Soil, Diesel Targets		8/8/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	

AMRO Environmental Laboratories Corp.

14-Aug-13

Lab Order: 1308011
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308011-04B	GZ 6 2'	8/6/2013 9:14:00 AM	Soil	EPH 1.1, Soil, Diesel Targets		8/8/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
1308011-04C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 7.3.3.2 Cyanide, Reactive		8/7/2013	
						R51589	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/7/2013	
						R51586	
				EPA 9045C pH/Corrosivity in Soil		8/7/2013	
						R51556	
				EPA 9050ASpecific Conductance (modified for soil))		8/8/2013	
						R51566	
				Percent Moisture		8/8/2013	
						R51565	
1308011-05A	GZ 6 6'	8/6/2013 9:41:00 AM		MCP 8260B, EPA 5035 MeOH preserved		8/9/2013	
				EPA 5035,methanol preserved	8/5/2013	R51572	
				Volatile Petroleum Hydrocarbons 1.1		8/8/2013	
					8/6/2013	R51571	
1308011-05B				EPA 6010B ICP METALS, 3051/6010		8/8/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/8/2013	23455	
				EPA 7471 MERCURY, Soil		8/7/2013	
				EPA 7471 HG Soil Prep	8/7/2013	23451	

AMRO Environmental Laboratories Corp.

14-Aug-13

Lab Order: 1308011
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308011-05B	GZ 6 6'	8/6/2013 9:41:00 AM	Soil	EPA 8082 PCBS IN SOIL/SOLIDS		8/9/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/8/2013	23456	
				EPH 1.1, Soil, Diesel Targets		8/8/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	
				EPH 1.1, Soil, Diesel Targets		8/8/2013	
					8/7/2013	23449	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
1308011-05C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 7.3.3.2 Cyanide, Reactive		8/7/2013	
						R51589	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/7/2013	
						R51586	
				EPA 9045C pH/Corrosivity in Soil		8/7/2013	
						R51556	
				EPA 9050ASpecific Conductance (modified for soil))		8/8/2013	
						R51566	
				Percent Moisture		8/8/2013	
						R51565	
1308011-06A	GZ 19 4'	8/6/2013 2:16:00 PM		MCP 8260B, EPA 5035 MeOH preserved		8/9/2013	
				EPA 5035,methanol preserved	8/5/2013	R51572	
				Volatile Petroleum Hydrocarbons 1.1		8/8/2013	
					8/6/2013	R51571	

AMRO Environmental Laboratories Corp.

14-Aug-13

Lab Order: 1308011
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308011-06B	GZ 19 4'	8/6/2013 2:16:00 PM	Soil	EPA 6010B ICP METALS, 3051/6010		8/8/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/8/2013	23455	
				EPA 7471 MERCURY, Soil		8/7/2013	
				EPA 7471 HG Soil Prep	8/7/2013	23451	
				EPA 8082 PCBS IN SOIL/SOLIDS		8/9/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/8/2013	23456	
				EPH 1.1, Soil, Diesel Targets		8/8/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	
				EPH 1.1, Soil, Diesel Targets		8/9/2013	
					8/7/2013	23449	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
1308011-06C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 7.3.3.2 Cyanide, Reactive		8/7/2013	
						R51589	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/7/2013	
						R51586	
				EPA 9045C pH/Corrosivity in Soil		8/7/2013	
						R51556	
				EPA 9050ASpecific Conductance (modified for soil))		8/8/2013	
						R51566	
				Percent Moisture		8/8/2013	
						R51565	

AMRO Environmental Laboratories Corp.

14-Aug-13

Lab Order: 1308011
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308011-07A	GZ 19 6'-8'	8/6/2013 2:23:00 PM	Soil	MCP 8260B, EPA 5035 MeOH preserved		8/9/2013	
				EPA 5035,methanol preserved	8/5/2013	R51572	
				Volatile Petroleum Hydrocarbons 1.1		8/8/2013	
					8/6/2013	R51571	
1308011-07B				EPA 6010B ICP METALS, 3051/6010		8/8/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/8/2013	23455	
				EPA 7471 MERCURY, Soil		8/7/2013	
				EPA 7471 HG Soil Prep	8/7/2013	23451	
				EPA 8082 PCBS IN SOIL/SOLIDS		8/9/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/8/2013	23456	
				EPH 1.1, Soil, Diesel Targets		8/8/2013	
				SOPREP AUTOSOXHLET: EPH	8/7/2013	23449	
				EPH 1.1, Soil, Diesel Targets		8/8/2013	
					8/7/2013	23449	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
1308011-07C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 7.3.3.2 Cyanide, Reactive		8/7/2013	
						R51589	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/7/2013	
						R51586	
				EPA 9045C pH/Corrosivity in Soil		8/7/2013	
						R51556	

AMRO Environmental Laboratories Corp.

14-Aug-13

Lab Order: 1308011
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308011-07C	GZ 19 6'-8'	8/6/2013 2:23:00 PM	Soil	EPA 9050ASpecific Conductance (modified for soil))		8/8/2013 R51566	
				Percent Moisture		8/8/2013 R51565	

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

NO: 63087

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
10.0171593.00	NRA	MA	M. Steele		130801

P.O.#:	Results Needed by:

QUOTE #:	Seal Intact? Yes No N/A

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	EPH	VPH	RCRA 8 Metals	pH	Flashpoint	PCB's	reactivity/conductivity	SVOCs	TPH	VOCs	TCLP Metals - Hold						Remarks
GZ 1	8-5-13 1206	SL	3 4oz/4A		X	X	X	X														HOLD ALL TCLP METALS
GZ 2	8/5/13 1358	SL	3 4oz/4A		X	X	X	X														
GZ 4	8/6/13 0756	SL	3 4oz/4A		X	X	X	X														
GZ 6 2'	0914	SL	4		X			X	X	X	X	X	X	X	X	X						
GZ 6 6'	0941	SL	4		X			X	X	X	X	X	X	X	X	X						
GZ 19 4'	1416	SL	4		X			X	X	X	X	X	X	X	X	X						
GZ 19 6'-8'	1423	SL	4		X			X	X	X	X	X	X	X	X	X						

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

REQUESTED ANALYSES

Send Results To:	PRIORITY TURNAROUND TIME AUTHORIZATION	METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Matt Steele	Before submitting samples for expedited TAT, you must *have a coded AUTHORIZATION NUMBER*	Method: 6010 ☐ 200.7 ☐ Other Metals:
matthew.steele@gza.com	AUTHORIZATION No.: BY:	Dissolved Metals Field Filtered? YES ☐ NO ☐
PHONE #: 781-278-4805 FAX #:		MCP Presumptive Certainty Required? YES ☐ NO ☐
E-mail: matthew.steele@gza.com		MCP Methods Needed: YES ☒ NO ☐

Relinquished By:	Date/Time	Received By
	8/6/13 1505	
	8/6/13 16:00	

AMRO report package level needed:

EDD required:

Required Reporting Limits:
S-1 ☐ GW-1 ☐
S-2 ☐ GW-2 ☐
S-3 ☐ GW-3 ☐
Other:

KNOWN SITE CONTAMINATION: Metals

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

White: Lab Copy Yellow: Client Copy

SHEET OF

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

NO: 63087

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
5.0171593.00	NRA	MA	M. Steele		

P.O.#:	Results Needed by:	QUOTE #:	Seal Intact? Yes No N/A

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	EPH	VPH	RCRA 8 Metals	PH	Flashpoint	PCB's	Reactivity/Conductivity	SVOCs	EPH w/o targets	VOCs	TCLP Metals - HOLD	VPH w/o targets	Remarks
B9 1	5-5-13/1206	SL	3/4 oz jar		X	X	X	X										HOLD ALL - TCLP METALS
B2 2	5/5/13 1358	SL	3/4 oz jar		X	X	X	X										
B2 4	5/6/13 0756	SL	3/4 oz jar		X	X	X	X										
B2 6 2'	0914	SL	4		X			X	X	X	X	X	X	X	X	X	X	
B2 6 6'	0941	SL	4		X			X	X	X	X	X	X	X	X	X	X	
B2 19 4'	1416	SL	4		X			X	X	X	X	X	X	X	X	X	X	
B2 19 6'-8'	1423	SL	4		X			X	X	X	X	X	X	X	X	X	X	

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

Send Results To: Matt Steele
Matthew.Steele@aja.com

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must have a coded AUTHORIZATION NUMBER
AUTHORIZATION No.: BY:

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:
Dissolved Metals Field Filtered? YES ☐ NO ☐

PHONE #: 781-278-4705 FAX #:
Email: matthew.steele@aja.com

MCP Presumptive Certainty Required? YES ☐ NO ☐
MCP Methods Needed: YES ☒ NO ☐
AMRO report package level needed:
EDD required:
Required Reporting Limits: S-1 ☐ GW-1 ☐ S-2 ☐ GW-2 ☐ S-3 ☐ GW-3 ☐ Other:

Relinquished By:	Date/Time	Received By
	5/6/13 1505	

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

KNOWN SITE CONTAMINATION: Metals

White: Lab Copy Yellow: Client Copy

SHEET OF

AMROCOC2004 Rev 3 08/18/04

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: GZA
Project Name: 18.0171593.00 NRA
Ship via: (circle one) Fed Ex., UPS, ~~AMRO Courier,~~
Hand Del., Other Courier, Other:

AMRO ID: 1308011
Date Rec.: 8-6-13
Date Due: 8-13-13

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 4° Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled? Is client temperature = or <6°C ? **If no obtain authorization from the client for the analyses. Client authorization from: Date: Obtained by:**	✓	✓		Sampled 8-5/6-13
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			See Revised COC
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?	✓			
17. Were the sample volumes sufficient for requested analysis?			✓	
18. Were all samples received?	✓			
19. VPH and VOA Soils only:	✓			
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil? **If NO then client must be faxed.**	✓			
Does preservation level come close to the fill line on the vial? **If NO then client must be faxed.**	✓			
Were vials provided by AMRO? **If NO then weights MUST be obtained from client**	✓			
Was dry weight aliquot provided? **If NO then fax client and inform the VOA lab ASAP.**			✓	
20. Subcontracted Samples:				
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: NS Date: 8-6-13
Labeled By: MG Date: 8-7-13
Logged in By: MG Date: 8-7-13
Checked By: [signature] Date: 8-7-13

NA= Not Applicable

GC/MS VOLATILES: 8260B:

1. 1,4-Dioxane, Bromoform, Diisopropyl ether and Tertiary Amyl Methyl Ether recovered outside the control limits (+/-20%) in the Continuing Ca libration Verification Standard analyzed on 08/09/13.

2. The minimum response factor was not met for Acetone, 2-Butanone, and 4-Methyl-2-pentanone on 08/09/13.

3. A quadratic regression was used for Dibromochloromethane, Acetone and 1,1,1,2,-Tetrachloroethane in the Initial Calibration analyzed on 06/21/13.

MA-DEP VPH 1.1:

1. A quadratic regression was used for the C9-C12 aliphatic range and n-Decane in the Initial Calibration analyzed on 05/02/13.

GC/MS SEMIVOLATILES: 8270C:

1. No QC deviations were noted.

GC/ECD-PCBs: 8082:

1. No QC deviations were noted.

MA-DEP EPH 1.1:

1. AMRO Laboratory analyzed EPH using the GC/MS option as indicated in the MADEP EPH Rev.1.1, Section 9.10 May 2004.

2. The C11-C22 Aromatic Hydrocarbons range result has been adjusted to exclude the concentration of Target PAH Analytes for samples GZ 1 (1308011-01), GZ 2 (1308011-02), and GZ 4 (1308011-03).

3. The C11-C22 Aromatic Hydrocarbons range result has not been adjusted to exclude the concentration of Target PAH Analytes for samples GZ 6 2' (1308011-04), GZ 6 6' (1308011-05), GZ 19 4' (1308011-06), and GZ 19 6'-8' (1308011-07).

4. Only ranges are reported per client request for samples GZ 6 2' (1308011-04), GZ 6 6' (1308011-05), GZ 19 4' (1308011-06), and GZ 19 6'-8' (1308011-07).

5. No QC deviations were noted.

METALS:

1. The RCRA-8 metals were analyzed at the request of the client.

2. The % RPD for Arsenic, Barium, Chromium, Lead, and Silver exceeded MCP limits suggesting non-homogeneaty for those elements. The % RPD between the Matrix Spike and the Matrix Spike Duplicate was within MCP limits for all elements.

3. No other QC deviations were noted.

WET CHEMISTRY:

1. No QC deviations were noted.

MassDEP Analytical Protocol Certification Form

Laboratory Name: AMRO Environmental Lab. Corp. Project #: 18.0171593.00

Project Location: NRA RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):

1308011-01→07

Matrices: ☐ Groundwater/Surface Water ☑ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A ☑	7470/7471 Hg CAM III B ☑	MassDEP VPH CAM IV A ☑	8081 Pesticides CAM V B ☐	7196 Hex Cr CAM VI B ☐	MassDEP APH CAM IX A ☐
8270 SVOC CAM II B ☑	7010 Metals CAM III C ☐	MassDEP EPH CAM IV B ☑	8151 Herbicides CAM V C ☐	8330 Explosives CAM VIII A ☐	TO-15 VOC CAM IX B ☐
6010 Metals CAM III A ☑	6020 Metals CAM III D ☐	8082 PCB CAM V A ☑	9014 Total Cyanide/PAC CAM VI A ☐	6860 Perchlorate CAM VIII B ☐	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes ☐ No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	☑ Yes ☐ No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes ☐ No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☑ Yes ☐ No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☑ Yes ☐ No ☐ Yes ☐ No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	☑ Yes ☐ No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes ☐ No[1]

***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	☐ Yes ☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes ☑ No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Nancy Stewart **Position:** Vice President

Printed Name: Nancy Stewart **Date:** 8-20-13

DATA COMMENT PAGE

Organic Data Qualifiers

ND	Indicates compound was analyzed for, but not detected at or above the reporting limit.
J	Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than the method detection limit.
H	Method prescribed holding time exceeded.
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
B	This flag is used when the analyte is found in the associated blank as well as in the sample.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
#	See Case Narrative

Micro Data Qualifiers

TNTC	Too numerous to count

Inorganic Data Qualifiers

ND or U	Indicates element was analyzed for, but not detected at or above the reporting limit.
J	Indicates a value greater than or equal to the method detection limit, but less than the quantitation limit.
H	Indicates analytical holding time exceedance.
B	Indicates that the analyte is found in the associated blank, as well as in the sample.
MSA	Indicates value determined by the Method of Standard Addition
+	Indicates the correlation coefficient for the Method of Standard Addition is less than 0.995
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
PS	The analyte was below the Reporting Limit but has significant matrix interference as noted by the poor recovery of the Post Digestion Spike.
#	See Case Narrative
*	MCL Exceeded

Report Comments:

1. Soil, sediment and sludge sample results are reported on a "dry weight" basis.
2. Reporting limits are adjusted for sample size used, dilutions and moisture content, if applicable.

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ 6 2'
Lab Order:	1308011	**Collection Date:**	8/6/2013 9:14:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308011-04A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	370		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Tertiary Amyl Methyl Ether	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Benzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Bromobenzene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Bromochloromethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Bromodichloromethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Bromoform	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Bromomethane	ND	150		µg/Kg-dry	1	8/9/2013 2:02:00 PM
sec-Butylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
n-Butylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
tert-Butylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Carbon disulfide	ND	150		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Carbon tetrachloride	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Chlorobenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Dibromochloromethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Chloroethane	ND	150		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Chloroform	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Chloromethane	ND	150		µg/Kg-dry	1	8/9/2013 2:02:00 PM
2-Chlorotoluene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
4-Chlorotoluene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2-Dibromo-3-chloropropane	ND	190		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2-Dibromoethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Dibromomethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,3-Dichlorobenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2-Dichlorobenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,4-Dichlorobenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Dichlorodifluoromethane	ND	150		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,1-Dichloroethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2-Dichloroethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,1-Dichloroethene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
cis-1,2-Dichloroethene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
trans-1,2-Dichloroethene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2-Dichloropropane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,3-Dichloropropane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
2,2-Dichloropropane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,1-Dichloropropene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
cis-1,3-Dichloropropene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
trans-1,3-Dichloropropene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Diethyl ether	ND	370		µg/Kg-dry	1	8/9/2013 2:02:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-04A

Client Sample ID: GZ 6 2'
Collection Date: 8/6/2013 9:14:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,4-Dioxane	ND	1,900		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Ethyl Tertiary Butyl Ether	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Ethylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Hexachlorobutadiene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
2-Hexanone	ND	370		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Isopropylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
4-Isopropyltoluene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
2-Butanone	ND	370		µg/Kg-dry	1	8/9/2013 2:02:00 PM
4-Methyl-2-pentanone	ND	370		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Methyl tert-butyl ether	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Methylene chloride	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Naphthalene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
n-Propylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Styrene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,1,1,2-Tetrachloroethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,1,2,2-Tetrachloroethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Tetrachloroethene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Tetrahydrofuran	ND	370		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Toluene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2,4-Trichlorobenzene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2,3-Trichlorobenzene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,1,1-Trichloroethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,1,2-Trichloroethane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Trichloroethene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Trichlorofluoromethane	ND	150		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2,3-Trichloropropane	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,2,4-Trimethylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
1,3,5-Trimethylbenzene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Vinyl chloride	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
o-Xylene	ND	37		µg/Kg-dry	1	8/9/2013 2:02:00 PM
m,p-Xylene	ND	74		µg/Kg-dry	1	8/9/2013 2:02:00 PM
Surr: Dibromofluoromethane	103	70-130		%REC	1	8/9/2013 2:02:00 PM
Surr: 1,2-Dichloroethane-d4	90.0	70-130		%REC	1	8/9/2013 2:02:00 PM
Surr: Toluene-d8	110	70-130		%REC	1	8/9/2013 2:02:00 PM
Surr: 4-Bromofluorobenzene	95.2	70-130		%REC	1	8/9/2013 2:02:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ 6 6'
Lab Order:	1308011	**Collection Date:**	8/6/2013 9:41:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308011-05A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	260		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Tertiary Amyl Methyl Ether	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Benzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Bromobenzene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Bromochloromethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Bromodichloromethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Bromoform	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Bromomethane	ND	100		µg/Kg-dry	1	8/9/2013 2:37:00 PM
sec-Butylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
n-Butylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
tert-Butylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Carbon disulfide	ND	100		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Carbon tetrachloride	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Chlorobenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Dibromochloromethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Chloroethane	ND	100		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Chloroform	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Chloromethane	ND	100		µg/Kg-dry	1	8/9/2013 2:37:00 PM
2-Chlorotoluene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
4-Chlorotoluene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2-Dibromo-3-chloropropane	ND	130		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2-Dibromoethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Dibromomethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,3-Dichlorobenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2-Dichlorobenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,4-Dichlorobenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Dichlorodifluoromethane	ND	100		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,1-Dichloroethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2-Dichloroethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,1-Dichloroethene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
cis-1,2-Dichloroethene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
trans-1,2-Dichloroethene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2-Dichloropropane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,3-Dichloropropane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
2,2-Dichloropropane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,1-Dichloropropene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
cis-1,3-Dichloropropene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
trans-1,3-Dichloropropene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Diethyl ether	ND	260		µg/Kg-dry	1	8/9/2013 2:37:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-05A

Client Sample ID: GZ 6 6'
Collection Date: 8/6/2013 9:41:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,4-Dioxane	ND	1,300		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Ethyl Tertiary Butyl Ether	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Ethylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Hexachlorobutadiene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
2-Hexanone	ND	260		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Isopropylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
4-Isopropyltoluene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
2-Butanone	ND	260		µg/Kg-dry	1	8/9/2013 2:37:00 PM
4-Methyl-2-pentanone	ND	260		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Methyl tert-butyl ether	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Methylene chloride	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Naphthalene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
n-Propylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Styrene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,1,1,2-Tetrachloroethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,1,2,2-Tetrachloroethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Tetrachloroethene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Tetrahydrofuran	ND	260		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Toluene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2,4-Trichlorobenzene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2,3-Trichlorobenzene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,1,1-Trichloroethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,1,2-Trichloroethane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Trichloroethene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Trichlorofluoromethane	ND	100		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2,3-Trichloropropane	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,2,4-Trimethylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
1,3,5-Trimethylbenzene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Vinyl chloride	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
o-Xylene	ND	26		µg/Kg-dry	1	8/9/2013 2:37:00 PM
m,p-Xylene	ND	52		µg/Kg-dry	1	8/9/2013 2:37:00 PM
Surr: Dibromofluoromethane	106	70-130		%REC	1	8/9/2013 2:37:00 PM
Surr: 1,2-Dichloroethane-d4	93.8	70-130		%REC	1	8/9/2013 2:37:00 PM
Surr: Toluene-d8	120	70-130		%REC	1	8/9/2013 2:37:00 PM
Surr: 4-Bromofluorobenzene	97.1	70-130		%REC	1	8/9/2013 2:37:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ 19 4'
Lab Order:	1308011	**Collection Date:**	8/6/2013 2:16:00 PM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308011-06A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	360		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Tertiary Amyl Methyl Ether	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Benzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Bromobenzene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Bromochloromethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Bromodichloromethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Bromoform	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Bromomethane	ND	150		µg/Kg-dry	1	8/9/2013 3:13:00 PM
sec-Butylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
n-Butylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
tert-Butylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Carbon disulfide	ND	150		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Carbon tetrachloride	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Chlorobenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Dibromochloromethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Chloroethane	ND	150		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Chloroform	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Chloromethane	ND	150		µg/Kg-dry	1	8/9/2013 3:13:00 PM
2-Chlorotoluene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
4-Chlorotoluene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2-Dibromo-3-chloropropane	ND	180		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2-Dibromoethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Dibromomethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,3-Dichlorobenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2-Dichlorobenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,4-Dichlorobenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Dichlorodifluoromethane	ND	150		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,1-Dichloroethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2-Dichloroethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,1-Dichloroethene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
cis-1,2-Dichloroethene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
trans-1,2-Dichloroethene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2-Dichloropropane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,3-Dichloropropane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
2,2-Dichloropropane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,1-Dichloropropene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
cis-1,3-Dichloropropene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
trans-1,3-Dichloropropene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Diethyl ether	ND	360		µg/Kg-dry	1	8/9/2013 3:13:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-06A

Client Sample ID: GZ 19 4'
Collection Date: 8/6/2013 2:16:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,4-Dioxane	ND	1,800		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Ethyl Tertiary Butyl Ether	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Ethylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Hexachlorobutadiene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
2-Hexanone	ND	360		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Isopropylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
4-Isopropyltoluene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
2-Butanone	ND	360		µg/Kg-dry	1	8/9/2013 3:13:00 PM
4-Methyl-2-pentanone	ND	360		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Methyl tert-butyl ether	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Methylene chloride	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Naphthalene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
n-Propylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Styrene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,1,1,2-Tetrachloroethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,1,2,2-Tetrachloroethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Tetrachloroethene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Tetrahydrofuran	ND	360		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Toluene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2,4-Trichlorobenzene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2,3-Trichlorobenzene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,1,1-Trichloroethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,1,2-Trichloroethane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Trichloroethene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Trichlorofluoromethane	ND	150		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2,3-Trichloropropane	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,2,4-Trimethylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
1,3,5-Trimethylbenzene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Vinyl chloride	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
o-Xylene	ND	36		µg/Kg-dry	1	8/9/2013 3:13:00 PM
m,p-Xylene	ND	73		µg/Kg-dry	1	8/9/2013 3:13:00 PM
Surr: Dibromofluoromethane	104	70-130		%REC	1	8/9/2013 3:13:00 PM
Surr: 1,2-Dichloroethane-d4	91.3	70-130		%REC	1	8/9/2013 3:13:00 PM
Surr: Toluene-d8	113	70-130		%REC	1	8/9/2013 3:13:00 PM
Surr: 4-Bromofluorobenzene	91.8	70-130		%REC	1	8/9/2013 3:13:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-07A

Client Sample ID: GZ 19 6'-8'
Collection Date: 8/6/2013 2:23:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	240		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Tertiary Amyl Methyl Ether	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Benzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Bromobenzene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Bromochloromethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Bromodichloromethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Bromoform	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Bromomethane	ND	97		µg/Kg-dry	1	8/9/2013 3:47:00 PM
sec-Butylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
n-Butylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
tert-Butylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Carbon disulfide	ND	97		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Carbon tetrachloride	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Chlorobenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Dibromochloromethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Chloroethane	ND	97		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Chloroform	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Chloromethane	ND	97		µg/Kg-dry	1	8/9/2013 3:47:00 PM
2-Chlorotoluene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
4-Chlorotoluene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2-Dibromo-3-chloropropane	ND	120		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2-Dibromoethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Dibromomethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,3-Dichlorobenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2-Dichlorobenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,4-Dichlorobenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Dichlorodifluoromethane	ND	97		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,1-Dichloroethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2-Dichloroethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,1-Dichloroethene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
cis-1,2-Dichloroethene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
trans-1,2-Dichloroethene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2-Dichloropropane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,3-Dichloropropane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
2,2-Dichloropropane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,1-Dichloropropene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
cis-1,3-Dichloropropene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
trans-1,3-Dichloropropene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Diethyl ether	ND	240		µg/Kg-dry	1	8/9/2013 3:47:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-07A

Client Sample ID: GZ 19 6'-8'
Collection Date: 8/6/2013 2:23:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,4-Dioxane	ND	1,200		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Ethyl Tertiary Butyl Ether	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Ethylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Hexachlorobutadiene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
2-Hexanone	ND	240		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Isopropylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
4-Isopropyltoluene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
2-Butanone	ND	240		µg/Kg-dry	1	8/9/2013 3:47:00 PM
4-Methyl-2-pentanone	ND	240		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Methyl tert-butyl ether	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Methylene chloride	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Naphthalene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
n-Propylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Styrene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,1,1,2-Tetrachloroethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,1,2,2-Tetrachloroethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Tetrachloroethene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Tetrahydrofuran	ND	240		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Toluene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2,4-Trichlorobenzene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2,3-Trichlorobenzene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,1,1-Trichloroethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,1,2-Trichloroethane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Trichloroethene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Trichlorofluoromethane	ND	97		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2,3-Trichloropropane	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,2,4-Trimethylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
1,3,5-Trimethylbenzene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Vinyl chloride	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
o-Xylene	ND	24		µg/Kg-dry	1	8/9/2013 3:47:00 PM
m,p-Xylene	ND	48		µg/Kg-dry	1	8/9/2013 3:47:00 PM
Surr: Dibromofluoromethane	105	70-130		%REC	1	8/9/2013 3:47:00 PM
Surr: 1,2-Dichloroethane-d4	92.6	70-130		%REC	1	8/9/2013 3:47:00 PM
Surr: Toluene-d8	114	70-130		%REC	1	8/9/2013 3:47:00 PM
Surr: 4-Bromofluorobenzene	101	70-130		%REC	1	8/9/2013 3:47:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **mb-08/09/13** Batch ID: **R51572** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/9/2013 12:51:00 PM** Prep Date: **8/9/2013**
Client ID: Run ID: **V-2_130809A** SeqNo: **858665**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	ND	250	µg/Kg									
Tertiary Amyl Methyl Ether	ND	50	µg/Kg									
Benzene	ND	25	µg/Kg									
Bromobenzene	ND	50	µg/Kg									
Bromochloromethane	ND	50	µg/Kg									
Bromodichloromethane	ND	50	µg/Kg									
Bromoform	ND	50	µg/Kg									
Bromomethane	ND	100	µg/Kg									
sec-Butylbenzene	ND	25	µg/Kg									
n-Butylbenzene	ND	25	µg/Kg									
tert-Butylbenzene	ND	25	µg/Kg									
Carbon disulfide	ND	100	µg/Kg									
Carbon tetrachloride	ND	50	µg/Kg									
Chlorobenzene	ND	25	µg/Kg									
Dibromochloromethane	ND	50	µg/Kg									
Chloroethane	ND	100	µg/Kg									
Chloroform	ND	50	µg/Kg									
Chloromethane	ND	100	µg/Kg									
2-Chlorotoluene	ND	50	µg/Kg									
4-Chlorotoluene	ND	50	µg/Kg									
1,2-Dibromo-3-chloropropane	ND	120	µg/Kg									
1,2-Dibromoethane	ND	50	µg/Kg									
Dibromomethane	ND	50	µg/Kg									
1,3-Dichlorobenzene	ND	25	µg/Kg									
1,2-Dichlorobenzene	ND	25	µg/Kg									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
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CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

1,4-Dichlorobenzene	ND	25	µg/Kg
Dichlorodifluoromethane	ND	100	µg/Kg
1,1-Dichloroethane	ND	50	µg/Kg
1,2-Dichloroethane	ND	50	µg/Kg
1,1-Dichloroethene	ND	50	µg/Kg
cis-1,2-Dichloroethene	ND	50	µg/Kg
trans-1,2-Dichloroethene	ND	50	µg/Kg
1,2-Dichloropropane	ND	50	µg/Kg
1,3-Dichloropropane	ND	50	µg/Kg
2,2-Dichloropropane	ND	50	µg/Kg
1,1-Dichloropropene	ND	50	µg/Kg
cis-1,3-Dichloropropene	ND	50	µg/Kg
trans-1,3-Dichloropropene	ND	50	µg/Kg
Diethyl ether	ND	250	µg/Kg
Diisopropyl ether	ND	50	µg/Kg
1,4-Dioxane	ND	1,200	µg/Kg
Ethyl Tertiary Butyl Ether	ND	50	µg/Kg
Ethylbenzene	ND	25	µg/Kg
Hexachlorobutadiene	ND	50	µg/Kg
2-Hexanone	ND	250	µg/Kg
Isopropylbenzene	ND	25	µg/Kg
4-Isopropyltoluene	ND	25	µg/Kg
2-Butanone	ND	250	µg/Kg
4-Methyl-2-pentanone	ND	250	µg/Kg
Methyl tert-butyl ether	ND	25	µg/Kg
Methylene chloride	ND	50	µg/Kg
Naphthalene	ND	50	µg/Kg
n-Propylbenzene	ND	25	µg/Kg
Styrene	ND	50	µg/Kg
1,1,1,2-Tetrachloroethane	ND	50	µg/Kg
1,1,2,2-Tetrachloroethane	ND	50	µg/Kg

Qualifiers:
ND - Not Detected at the Reporting Limit
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R - RPD outside accepted recovery limits
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NA - Not applicable where J values or ND results occur
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CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

Tetrachloroethene	ND	50	µg/Kg						
Tetrahydrofuran	ND	250	µg/Kg						
Toluene	ND	50	µg/Kg						
1,2,4-Trichlorobenzene	ND	50	µg/Kg						
1,2,3-Trichlorobenzene	ND	50	µg/Kg						
1,1,1-Trichloroethane	ND	50	µg/Kg						
1,1,2-Trichloroethane	ND	50	µg/Kg						
Trichloroethene	ND	50	µg/Kg						
Trichlorofluoromethane	ND	100	µg/Kg						
1,2,3-Trichloropropane	ND	50	µg/Kg						
1,2,4-Trimethylbenzene	ND	25	µg/Kg						
1,3,5-Trimethylbenzene	ND	25	µg/Kg						
Vinyl chloride	ND	50	µg/Kg						
o-Xylene	ND	25	µg/Kg						
m,p-Xylene	ND	50	µg/Kg						
Surr: Dibromofluoromethane	2528	25	µg/Kg	2500	0	101	70	130	0
Surr: 1,2-Dichloroethane-d4	2259	25	µg/Kg	2500	0	90.4	70	130	0
Surr: Toluene-d8	2768	25	µg/Kg	2500	0	111	70	130	0
Surr: 4-Bromofluorobenzene	2327	25	µg/Kg	2500	0	93.1	70	130	0

Qualifiers: ND - Not Detected at the Reporting Limit
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R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **lcs-08/09/13** Batch ID: **R51572** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/9/2013 11:05:00 AM** Prep Date: **8/9/2013**
Client ID: Run ID: **V-2_130809A** SeqNo: **858667**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	367.5	250	µg/Kg	500	0	73.5	40	160	0			
Tertiary Amyl Methyl Ether	541.2	50	µg/Kg	500	0	108	70	130	0			
Benzene	545.2	25	µg/Kg	500	0	109	70	130	0			
Bromobenzene	510	50	µg/Kg	500	0	102	70	130	0			
Bromochloromethane	501.2	50	µg/Kg	500	0	100	70	130	0			
Bromodichloromethane	479.5	50	µg/Kg	500	0	95.9	70	130	0			
Bromoform	602.5	50	µg/Kg	500	0	120	70	130	0			
Bromomethane	611	100	µg/Kg	500	0	122	40	160	0			
sec-Butylbenzene	547.5	25	µg/Kg	500	0	110	70	130	0			
n-Butylbenzene	503.5	25	µg/Kg	500	0	101	70	130	0			
tert-Butylbenzene	538	25	µg/Kg	500	0	108	70	130	0			
Carbon disulfide	436.8	100	µg/Kg	500	0	87.4	70	130	0			
Carbon tetrachloride	539.8	50	µg/Kg	500	0	108	70	130	0			
Chlorobenzene	478.2	25	µg/Kg	500	0	95.6	70	130	0			
Dibromochloromethane	565	50	µg/Kg	500	0	113	70	130	0			
Chloroethane	485.2	100	µg/Kg	500	0	97	70	130	0			
Chloroform	460.5	50	µg/Kg	500	0	92.1	70	130	0			
Chloromethane	497.5	100	µg/Kg	500	0	99.5	40	160	0			
2-Chlorotoluene	478.8	50	µg/Kg	500	0	95.8	70	130	0			
4-Chlorotoluene	472.5	50	µg/Kg	500	0	94.5	70	130	0			
1,2-Dibromo-3-chloropropane	649.5	120	µg/Kg	500	0	130	70	130	0			
1,2-Dibromoethane	476	50	µg/Kg	500	0	95.2	70	130	0			
Dibromomethane	497	50	µg/Kg	500	0	99.4	70	130	0			
1,3-Dichlorobenzene	496.5	25	µg/Kg	500	0	99.3	70	130	0			
1,2-Dichlorobenzene	489	25	µg/Kg	500	0	97.8	70	130	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

1,4-Dichlorobenzene	493.8	25	µg/Kg	500	0	98.8	70	130	0
Dichlorodifluoromethane	425	100	µg/Kg	500	0	85	40	160	0
1,1-Dichloroethane	541.2	50	µg/Kg	500	0	108	70	130	0
1,2-Dichloroethane	455	50	µg/Kg	500	0	91	70	130	0
1,1-Dichloroethene	522.5	50	µg/Kg	500	0	104	70	130	0
cis-1,2-Dichloroethene	529.8	50	µg/Kg	500	0	106	70	130	0
trans-1,2-Dichloroethene	486	50	µg/Kg	500	0	97.2	70	130	0
1,2-Dichloropropane	529.2	50	µg/Kg	500	0	106	70	130	0
1,3-Dichloropropane	435	50	µg/Kg	500	0	87	70	130	0
2,2-Dichloropropane	561.2	50	µg/Kg	500	0	112	70	130	0
1,1-Dichloropropene	534.2	50	µg/Kg	500	0	107	70	130	0
cis-1,3-Dichloropropene	500.5	50	µg/Kg	500	0	100	70	130	0
trans-1,3-Dichloropropene	531.8	50	µg/Kg	500	0	106	70	130	0
Diethyl ether	502.5	250	µg/Kg	500	0	100	70	130	0
Diisopropyl ether	570.2	50	µg/Kg	500	0	114	70	130	0
1,4-Dioxane	2876	1,200	µg/Kg	2500	0	115	40	160	0
Ethyl Tertiary Butyl Ether	538.8	50	µg/Kg	500	0	108	70	130	0
Ethylbenzene	450.8	25	µg/Kg	500	0	90.2	70	130	0
Hexachlorobutadiene	512.5	50	µg/Kg	500	0	103	70	130	0
2-Hexanone	340.8	250	µg/Kg	500	0	68.2	40	160	0
Isopropylbenzene	522.8	25	µg/Kg	500	0	105	70	130	0
4-Isopropyltoluene	533.2	25	µg/Kg	500	0	107	70	130	0
2-Butanone	385.5	250	µg/Kg	500	0	77.1	40	160	0
4-Methyl-2-pentanone	467.8	250	µg/Kg	500	0	93.6	40	160	0
Methyl tert-butyl ether	476.5	25	µg/Kg	500	0	95.3	70	130	0
Methylene chloride	490.2	50	µg/Kg	500	0	98	70	130	0
Naphthalene	419	50	µg/Kg	500	0	83.8	70	130	0
n-Propylbenzene	506.5	25	µg/Kg	500	0	101	70	130	0
Styrene	434.8	50	µg/Kg	500	0	87	70	130	0
1,1,1,2-Tetrachloroethane	591	50	µg/Kg	500	0	118	70	130	0
1,1,2,2-Tetrachloroethane	383.2	50	µg/Kg	500	0	76.7	70	130	0

Qualifiers: ND - Not Detected at the Reporting Limit
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R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
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CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Tetrachloroethene	454	50	µg/Kg	500	0	90.8	70	130	0
Tetrahydrofuran	527.2	250	µg/Kg	500	0	105	70	130	0
Toluene	496	50	µg/Kg	500	0	99.2	70	130	0
1,2,4-Trichlorobenzene	553	50	µg/Kg	500	0	111	70	130	0
1,2,3-Trichlorobenzene	539.8	50	µg/Kg	500	0	108	70	130	0
1,1,1-Trichloroethane	494.2	50	µg/Kg	500	0	98.8	70	130	0
1,1,2-Trichloroethane	489	50	µg/Kg	500	0	97.8	70	130	0
Trichloroethene	539.5	50	µg/Kg	500	0	108	70	130	0
Trichlorofluoromethane	467.8	100	µg/Kg	500	0	93.6	70	130	0
1,2,3-Trichloropropane	433.8	50	µg/Kg	500	0	86.8	70	130	0
1,2,4-Trimethylbenzene	515.5	25	µg/Kg	500	0	103	70	130	0
1,3,5-Trimethylbenzene	494.8	25	µg/Kg	500	0	99	70	130	0
Vinyl chloride	544.8	50	µg/Kg	500	0	109	70	130	0
o-Xylene	467	25	µg/Kg	500	0	93.4	70	130	0
m,p-Xylene	886	50	µg/Kg	1000	0	88.6	70	130	0
Surr: Dibromofluoromethane	2462	25	µg/Kg	2500	0	98.5	70	130	0
Surr: 1,2-Dichloroethane-d4	2141	25	µg/Kg	2500	0	85.6	70	130	0
Surr: Toluene-d8	2578	25	µg/Kg	2500	0	103	70	130	0
Surr: 4-Bromofluorobenzene	2187	25	µg/Kg	2500	0	87.5	70	130	0

Qualifiers:
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R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
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CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **lcsd-08/09/13** Batch ID: **R51572** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/9/2013 11:41:00 AM** Prep Date: **8/9/2013**

Client ID: Run ID: **V-2_130809A** SeqNo: **858666**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	328.2	250	µg/Kg	500	0	65.7	40	160	367.5	11.3	20	
Tertiary Amyl Methyl Ether	579.5	50	µg/Kg	500	0	116	70	130	541.2	6.83	20	
Benzene	557.5	25	µg/Kg	500	0	112	70	130	545.2	2.22	20	
Bromobenzene	530.8	50	µg/Kg	500	0	106	70	130	510	3.99	20	
Bromochloromethane	507.5	50	µg/Kg	500	0	102	70	130	501.2	1.24	20	
Bromodichloromethane	497.8	50	µg/Kg	500	0	99.6	70	130	479.5	3.73	20	
Bromoform	628.2	50	µg/Kg	500	0	126	70	130	602.5	4.18	20	
Bromomethane	576	100	µg/Kg	500	0	115	40	160	611	5.9	20	
sec-Butylbenzene	570.5	25	µg/Kg	500	0	114	70	130	547.5	4.11	20	
n-Butylbenzene	515.5	25	µg/Kg	500	0	103	70	130	503.5	2.36	20	
tert-Butylbenzene	571.5	25	µg/Kg	500	0	114	70	130	538	6.04	20	
Carbon disulfide	420	100	µg/Kg	500	0	84	70	130	436.8	3.91	20	
Carbon tetrachloride	548.2	50	µg/Kg	500	0	110	70	130	539.8	1.56	20	
Chlorobenzene	515.8	25	µg/Kg	500	0	103	70	130	478.2	7.55	20	
Dibromochloromethane	593.8	50	µg/Kg	500	0	119	70	130	565	4.96	20	
Chloroethane	489.8	100	µg/Kg	500	0	98	70	130	485.2	0.923	20	
Chloroform	490.2	50	µg/Kg	500	0	98	70	130	460.5	6.26	20	
Chloromethane	486.5	100	µg/Kg	500	0	97.3	40	160	497.5	2.24	20	
2-Chlorotoluene	500.8	50	µg/Kg	500	0	100	70	130	478.8	4.49	20	
4-Chlorotoluene	492.2	50	µg/Kg	500	0	98.4	70	130	472.5	4.09	20	
1,2-Dibromo-3-chloropropane	625.5	120	µg/Kg	500	0	125	70	130	649.5	3.76	20	
1,2-Dibromoethane	476.5	50	µg/Kg	500	0	95.3	70	130	476	0.105	20	
Dibromomethane	514.8	50	µg/Kg	500	0	103	70	130	497	3.51	20	
1,3-Dichlorobenzene	530.5	25	µg/Kg	500	0	106	70	130	496.5	6.62	20	
1,2-Dichlorobenzene	525.5	25	µg/Kg	500	0	105	70	130	489	7.2	20	

Qualifiers:
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CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

1,4-Dichlorobenzene	510.8	25	µg/Kg	500	0	102	70	130	493.8	3.38	20
Dichlorodifluoromethane	440.2	100	µg/Kg	500	0	88	40	160	425	3.52	20
1,1-Dichloroethane	548.8	50	µg/Kg	500	0	110	70	130	541.2	1.38	20
1,2-Dichloroethane	496.8	50	µg/Kg	500	0	99.4	70	130	455	8.77	20
1,1-Dichloroethene	513.8	50	µg/Kg	500	0	103	70	130	522.5	1.69	20
cis-1,2-Dichloroethene	546.5	50	µg/Kg	500	0	109	70	130	529.8	3.11	20
trans-1,2-Dichloroethene	499.5	50	µg/Kg	500	0	99.9	70	130	486	2.74	20
1,2-Dichloropropane	546	50	µg/Kg	500	0	109	70	130	529.2	3.12	20
1,3-Dichloropropane	464	50	µg/Kg	500	0	92.8	70	130	435	6.45	20
2,2-Dichloropropane	585	50	µg/Kg	500	0	117	70	130	561.2	4.14	20
1,1-Dichloropropene	530	50	µg/Kg	500	0	106	70	130	534.2	0.799	20
cis-1,3-Dichloropropene	521.8	50	µg/Kg	500	0	104	70	130	500.5	4.16	20
trans-1,3-Dichloropropene	565.5	50	µg/Kg	500	0	113	70	130	531.8	6.15	20
Diethyl ether	527.2	250	µg/Kg	500	0	105	70	130	502.5	4.81	20
Diisopropyl ether	600.2	50	µg/Kg	500	0	120	70	130	570.2	5.13	20
1,4-Dioxane	3230	1,200	µg/Kg	2500	0	129	40	160	2876	11.6	20
Ethyl Tertiary Butyl Ether	555.5	50	µg/Kg	500	0	111	70	130	538.8	3.06	20
Ethylbenzene	488	25	µg/Kg	500	0	97.6	70	130	450.8	7.94	20
Hexachlorobutadiene	518	50	µg/Kg	500	0	104	70	130	512.5	1.07	20
2-Hexanone	369.8	250	µg/Kg	500	0	74	40	160	340.8	8.16	20
Isopropylbenzene	559	25	µg/Kg	500	0	112	70	130	522.8	6.7	20
4-Isopropyltoluene	565.8	25	µg/Kg	500	0	113	70	130	533.2	5.91	20
2-Butanone	409.5	250	µg/Kg	500	0	81.9	40	160	385.5	6.04	20
4-Methyl-2-pentanone	474.8	250	µg/Kg	500	0	95	40	160	467.8	1.49	20
Methyl tert-butyl ether	500.5	25	µg/Kg	500	0	100	70	130	476.5	4.91	20
Methylene chloride	481.5	50	µg/Kg	500	0	96.3	70	130	490.2	1.8	20
Naphthalene	435.5	50	µg/Kg	500	0	87.1	70	130	419	3.86	20
n-Propylbenzene	532.5	25	µg/Kg	500	0	106	70	130	506.5	5	20
Styrene	462	50	µg/Kg	500	0	92.4	70	130	434.8	6.08	20
1,1,1,2-Tetrachloroethane	616.8	50	µg/Kg	500	0	123	70	130	591	4.26	20
1,1,2,2-Tetrachloroethane	420.3	50	µg/Kg	500	0	84	70	130	383.2	9.21	20

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Tetrachloroethene	506.5	50	µg/Kg	500	0	101	70	130	454	10.9	20
Tetrahydrofuran	514.2	250	µg/Kg	500	0	103	70	130	527.2	2.5	20
Toluene	529	50	µg/Kg	500	0	106	70	130	496	6.44	20
1,2,4-Trichlorobenzene	561.8	50	µg/Kg	500	0	112	70	130	553	1.57	20
1,2,3-Trichlorobenzene	533.2	50	µg/Kg	500	0	107	70	130	539.8	1.21	20
1,1,1-Trichloroethane	518.2	50	µg/Kg	500	0	104	70	130	494.2	4.74	20
1,1,2-Trichloroethane	531.2	50	µg/Kg	500	0	106	70	130	489	8.28	20
Trichloroethene	543.8	50	µg/Kg	500	0	109	70	130	539.5	0.785	20
Trichlorofluoromethane	467	100	µg/Kg	500	0	93.4	70	130	467.8	0.16	20
1,2,3-Trichloropropane	475	50	µg/Kg	500	0	95	70	130	433.8	9.08	20
1,2,4-Trimethylbenzene	542.8	25	µg/Kg	500	0	109	70	130	515.5	5.15	20
1,3,5-Trimethylbenzene	525.8	25	µg/Kg	500	0	105	70	130	494.8	6.08	20
Vinyl chloride	577	50	µg/Kg	500	0	115	70	130	544.8	5.75	20
o-Xylene	509	25	µg/Kg	500	0	102	70	130	467	8.61	20
m,p-Xylene	985.5	50	µg/Kg	1000	0	98.6	70	130	886	10.6	20
Surr: Dibromofluoromethane	2623	25	µg/Kg	2500	0	105	70	130	0	0	0
Surr: 1,2-Dichloroethane-d4	2284	25	µg/Kg	2500	0	91.4	70	130	0	0	0
Surr: Toluene-d8	2778	25	µg/Kg	2500	0	111	70	130	0	0	0
Surr: 4-Bromofluorobenzene	2401	25	µg/Kg	2500	0	96	70	130	0	0	0

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308011
Project: 18.0171593.00 NRA

Lab ID: 1308011-01 **Collection Date:** 8/5/2013 12:06:00 PM
Collection Time:
Client Sample ID: GZ 1 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	3.1		mg/Kg-dry	1	8/8/2013 7:49:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	3.1		mg/Kg-dry	1	8/8/2013 7:49:00 PM
C9-C10 Aromatic Hydrocarbons	ND	3.1		mg/Kg-dry	1	8/8/2013 7:49:00 PM
Benzene	ND	0.063		mg/Kg-dry	1	8/8/2013 7:49:00 PM
Ethylbenzene	ND	0.063		mg/Kg-dry	1	8/8/2013 7:49:00 PM
Methyl tert-butyl ether	ND	0.063		mg/Kg-dry	1	8/8/2013 7:49:00 PM
Naphthalene	ND	0.063		mg/Kg-dry	1	8/8/2013 7:49:00 PM
Toluene	ND	0.063		mg/Kg-dry	1	8/8/2013 7:49:00 PM
m,p-Xylene	ND	0.063		mg/Kg-dry	1	8/8/2013 7:49:00 PM
o-Xylene	ND	0.063		mg/Kg-dry	1	8/8/2013 7:49:00 PM
Surr: 2,5-Dibromotoluene-PID	105	70-130		%REC	1	8/8/2013 7:49:00 PM
Surr: 2,5-Dibromotoluene-FID	110	70-130		%REC	1	8/8/2013 7:49:00 PM

Lab ID: 1308011-02 **Collection Date:** 8/5/2013 1:58:00 PM
Collection Time:
Client Sample ID: GZ 2 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	3.8		mg/Kg-dry	1	8/9/2013 12:37:00 AM
C9-C12 Aliphatic Hydrocarbons	ND	3.8		mg/Kg-dry	1	8/9/2013 12:37:00 AM
C9-C10 Aromatic Hydrocarbons	ND	3.8		mg/Kg-dry	1	8/9/2013 12:37:00 AM
Benzene	ND	0.076		mg/Kg-dry	1	8/9/2013 12:37:00 AM
Ethylbenzene	ND	0.076		mg/Kg-dry	1	8/9/2013 12:37:00 AM
Methyl tert-butyl ether	ND	0.076		mg/Kg-dry	1	8/9/2013 12:37:00 AM
Naphthalene	ND	0.076		mg/Kg-dry	1	8/9/2013 12:37:00 AM
Toluene	ND	0.076		mg/Kg-dry	1	8/9/2013 12:37:00 AM
m,p-Xylene	ND	0.076		mg/Kg-dry	1	8/9/2013 12:37:00 AM
o-Xylene	ND	0.076		mg/Kg-dry	1	8/9/2013 12:37:00 AM
Surr: 2,5-Dibromotoluene-PID	111	70-130		%REC	1	8/9/2013 12:37:00 AM
Surr: 2,5-Dibromotoluene-FID	116	70-130		%REC	1	8/9/2013 12:37:00 AM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

Lab Order: 1308011

Lab ID: 1308011-03
Collection Date: 8/6/2013 7:56:00 AM
Collection Time:
Client Sample ID: GZ 4
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 11:40:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 11:40:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 11:40:00 PM
Benzene	ND	0.053		mg/Kg-dry	1	8/8/2013 11:40:00 PM
Ethylbenzene	ND	0.053		mg/Kg-dry	1	8/8/2013 11:40:00 PM
Methyl tert-butyl ether	ND	0.053		mg/Kg-dry	1	8/8/2013 11:40:00 PM
Naphthalene	ND	0.053		mg/Kg-dry	1	8/8/2013 11:40:00 PM
Toluene	ND	0.053		mg/Kg-dry	1	8/8/2013 11:40:00 PM
m,p-Xylene	ND	0.053		mg/Kg-dry	1	8/8/2013 11:40:00 PM
o-Xylene	ND	0.053		mg/Kg-dry	1	8/8/2013 11:40:00 PM
Surr: 2,5-Dibromotoluene-PID	115	70-130		%REC	1	8/8/2013 11:40:00 PM
Surr: 2,5-Dibromotoluene-FID	121	70-130		%REC	1	8/8/2013 11:40:00 PM

Lab ID: 1308011-04
Collection Date: 8/6/2013 9:14:00 AM
Collection Time:
Client Sample ID: GZ 6 2'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	3.3		mg/Kg-dry	1	8/8/2013 6:51:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	3.3		mg/Kg-dry	1	8/8/2013 6:51:00 PM
C9-C10 Aromatic Hydrocarbons	ND	3.3		mg/Kg-dry	1	8/8/2013 6:51:00 PM
Surr: 2,5-Dibromotoluene-PID	106	70-130		%REC	1	8/8/2013 6:51:00 PM
Surr: 2,5-Dibromotoluene-FID	112	70-130		%REC	1	8/8/2013 6:51:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308011
Project: 18.0171593.00 NRA

Lab ID: 1308011-05 **Collection Date:** 8/6/2013 9:41:00 AM
Collection Time:
Client Sample ID: GZ 6 6' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 9:45:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 9:45:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 9:45:00 PM
Surr: 2,5-Dibromotoluene-PID	110	70-130		%REC	1	8/8/2013 9:45:00 PM
Surr: 2,5-Dibromotoluene-FID	116	70-130		%REC	1	8/8/2013 9:45:00 PM

Lab ID: 1308011-06 **Collection Date:** 8/6/2013 2:16:00 PM
Collection Time:
Client Sample ID: GZ 19 4' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	2.6	2.5		mg/Kg-dry	1	8/8/2013 10:42:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.5		mg/Kg-dry	1	8/8/2013 10:42:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.5		mg/Kg-dry	1	8/8/2013 10:42:00 PM
Toluene	ND	0.050		mg/Kg-dry	1	8/8/2013 10:42:00 PM
Surr: 2,5-Dibromotoluene-PID	107	70-130		%REC	1	8/8/2013 10:42:00 PM
Surr: 2,5-Dibromotoluene-FID	112	70-130		%REC	1	8/8/2013 10:42:00 PM

Lab ID: 1308011-07 **Collection Date:** 8/6/2013 2:23:00 PM
Collection Time:
Client Sample ID: GZ 19 6'-8' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	2.7	2.6		mg/Kg-dry	1	8/8/2013 8:47:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 8:47:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/8/2013 8:47:00 PM
Surr: 2,5-Dibromotoluene-PID	105	70-130		%REC	1	8/8/2013 8:47:00 PM
Surr: 2,5-Dibromotoluene-FID	111	70-130		%REC	1	8/8/2013 8:47:00 PM

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

Sample ID: **mb-08/08/13** Batch ID: **R51571** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/8/2013 5:52:00 PM** Prep Date: **8/8/2013**

Client ID: Run ID: **V-6_130808A** SeqNo: **858640**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C12 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C10 Aromatic Hydrocarbons	ND	2.5	mg/Kg									
Benzene	ND	0.050	mg/Kg									
Ethylbenzene	ND	0.050	mg/Kg									
Methyl tert-butyl ether	ND	0.050	mg/Kg									
Naphthalene	ND	0.050	mg/Kg									
Toluene	ND	0.050	mg/Kg									
m,p-Xylene	ND	0.050	mg/Kg									
o-Xylene	ND	0.050	mg/Kg									
Surr: 2,5-Dibromotoluene-PID	2.595	0	mg/Kg	2.5	0	104	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.747	0	mg/Kg	2.5	0	110	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **lcs-08/08/13** Batch ID: **R51571** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/8/2013 1:55:00 PM** Prep Date: **8/8/2013**
Client ID: Run ID: **V-6_130808A** SeqNo: **858638**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	7.714	2.5	mg/Kg	7.5	0	103	70	130	0			
C9-C12 Aliphatic Hydrocarbons	7.341	2.5	mg/Kg	7.5	0	97.9	70	130	0			
C9-C10 Aromatic Hydrocarbons	2.461	2.5	mg/Kg	2.5	0	98.4	70	130	0			
Benzene	2.373	0.050	mg/Kg	2.5	0	94.9	70	130	0			J
Ethylbenzene	2.503	0.050	mg/Kg	2.5	0	100	70	130	0			
Methyl tert-butyl ether	2.424	0.050	mg/Kg	2.5	0	97	70	130	0			
Naphthalene	2.38	0.050	mg/Kg	2.5	0	95.2	70	130	0			
Toluene	2.439	0.050	mg/Kg	2.5	0	97.5	70	130	0			
m,p-Xylene	4.877	0.050	mg/Kg	5	0	97.5	70	130	0			
o-Xylene	2.461	0.050	mg/Kg	2.5	0	98.5	70	130	0			
n-Butylcyclohexane	2.407	0.12	mg/Kg	2.5	0	96.3	70	130	0			
n-Decane	2.434	0.12	mg/Kg	2.5	0	97.3	70	130	0			
n-Pentane	2.77	0.12	mg/Kg	2.5	0	111	70	130	0			
n-Nonane	2.933	0.12	mg/Kg	2.5	0	117	70	130	0			
Surr: 2,5-Dibromotoluene-PID	2.504	0	mg/Kg	2.5	0	100	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.613	0	mg/Kg	2.5	0	105	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **lcsd-08/08/13** Batch ID: **R51571** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/8/2013 2:54:00 PM** Prep Date: **8/8/2013**

Client ID: Run ID: **V-6_130808A** SeqNo: **858639**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	7.82	2.5	mg/Kg	7.5	0	104	70	130	7.714	1.36	25	
C9-C12 Aliphatic Hydrocarbons	7.863	2.5	mg/Kg	7.5	0	105	70	130	7.341	6.86	25	
C9-C10 Aromatic Hydrocarbons	2.48	2.5	mg/Kg	2.5	0	99.2	70	130	2.461	0.782	25	J
Benzene	2.389	0.050	mg/Kg	2.5	0	95.6	70	130	2.373	0.682	25	
Ethylbenzene	2.532	0.050	mg/Kg	2.5	0	101	70	130	2.503	1.13	25	
Methyl tert-butyl ether	2.369	0.050	mg/Kg	2.5	0	94.7	70	130	2.424	2.33	25	
Naphthalene	2.462	0.050	mg/Kg	2.5	0	98.5	70	130	2.38	3.37	25	
Toluene	2.447	0.050	mg/Kg	2.5	0	97.9	70	130	2.439	0.366	25	
m,p-Xylene	4.983	0.050	mg/Kg	5	0	99.7	70	130	4.877	2.15	25	
o-Xylene	2.46	0.050	mg/Kg	2.5	0	98.4	70	130	2.461	0.0496	25	
n-Butylcyclohexane	2.582	0.12	mg/Kg	2.5	0	103	70	130	2.407	7.04	25	
n-Decane	2.704	0.12	mg/Kg	2.5	0	108	70	130	2.434	10.5	25	
n-Pentane	2.844	0.12	mg/Kg	2.5	0	114	70	130	2.77	2.66	25	
n-Nonane	3.054	0.12	mg/Kg	2.5	0	122	70	130	2.933	4.03	25	
Surr: 2,5-Dibromotoluene-PID	2.538	0	mg/Kg	2.5	0	102	70	130	0	0	0	
Surr: 2,5-Dibromotoluene-FID	2.636	0	mg/Kg	2.5	0	105	70	130	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-04B

Client Sample ID: GZ 6 2'
Collection Date: 8/6/2013 9:14:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Acenaphthylene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Acetophenone	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Aniline	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Anthracene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Benz(a)anthracene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Benzo(a)pyrene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Benzo(b)fluoranthene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Benzo(k)fluoranthene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Benzo(g,h,i)perylene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
4-Bromophenyl phenyl ether	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Butyl benzyl phthalate	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Di-n-butyl phthalate	500	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
4-Chloroaniline	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Bis(2-chloroethoxy)methane	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Bis(2-chloroethyl)ether	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Bis(2-chloroisopropyl)ether	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2-Chloronaphthalene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2-Chlorophenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Chrysene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Dibenz(a,h)anthracene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Dibenzofuran	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
1,2-Dichlorobenzene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
1,3-Dichlorobenzene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
1,4-Dichlorobenzene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
3,3´-Dichlorobenzidine	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2,4-Dichlorophenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Diethyl phthalate	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Dimethyl phthalate	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2,4-Dimethylphenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2,4-Dinitrophenol	ND	520		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2,4-Dinitrotoluene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2,6-Dinitrotoluene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Bis(2-ethylhexyl)phthalate	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Fluoranthene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Fluorene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Hexachlorobenzene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-04B

Client Sample ID: GZ 6 2'
Collection Date: 8/6/2013 9:14:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Hexachloroethane	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Indeno(1,2,3-cd)pyrene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Isophorone	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2-Methylnaphthalene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2-Methylphenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
4-Methylphenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Naphthalene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Nitrobenzene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2-Nitrophenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
4-Nitrophenol	ND	520		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Di-n-octyl phthalate	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Pentachlorophenol	ND	520		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Phenanthrene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Phenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Pyrene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
1,2,4-Trichlorobenzene	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2,4,5-Trichlorophenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
2,4,6-Trichlorophenol	ND	260		µg/Kg-dry	1	8/13/2013 3:28:00 PM
Surr: 2-Fluorophenol	70.4	30-130		%REC	1	8/13/2013 3:28:00 PM
Surr: Phenol-d5	72.9	30-130		%REC	1	8/13/2013 3:28:00 PM
Surr: Nitrobenzene-d5	61.4	30-130		%REC	1	8/13/2013 3:28:00 PM
Surr: 2-Fluorobiphenyl	64.7	30-130		%REC	1	8/13/2013 3:28:00 PM
Surr: 2,4,6-Tribromophenol	81.1	30-130		%REC	1	8/13/2013 3:28:00 PM
Surr: 4-Terphenyl-d14	90.8	30-130		%REC	1	8/13/2013 3:28:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ 6 6'
Lab Order:	1308011	**Collection Date:**	8/6/2013 9:41:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308011-05B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Acenaphthylene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Acetophenone	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Aniline	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Anthracene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Benz(a)anthracene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Benzo(a)pyrene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Benzo(b)fluoranthene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Benzo(k)fluoranthene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Benzo(g,h,i)perylene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
4-Bromophenyl phenyl ether	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Butyl benzyl phthalate	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Di-n-butyl phthalate	490	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
4-Chloroaniline	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Bis(2-chloroethoxy)methane	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Bis(2-chloroethyl)ether	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Bis(2-chloroisopropyl)ether	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2-Chloronaphthalene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2-Chlorophenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Chrysene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Dibenz(a,h)anthracene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Dibenzofuran	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
1,2-Dichlorobenzene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
1,3-Dichlorobenzene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
1,4-Dichlorobenzene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
3,3'-Dichlorobenzidine	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2,4-Dichlorophenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Diethyl phthalate	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Dimethyl phthalate	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2,4-Dimethylphenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2,4-Dinitrophenol	ND	610		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2,4-Dinitrotoluene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2,6-Dinitrotoluene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Bis(2-ethylhexyl)phthalate	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Fluoranthene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Fluorene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Hexachlorobenzene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-05B

Client Sample ID: GZ 6 6'
Collection Date: 8/6/2013 9:41:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Hexachloroethane	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Indeno(1,2,3-cd)pyrene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Isophorone	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2-Methylnaphthalene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2-Methylphenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
4-Methylphenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Naphthalene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Nitrobenzene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2-Nitrophenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
4-Nitrophenol	ND	610		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Di-n-octyl phthalate	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Pentachlorophenol	ND	610		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Phenanthrene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Phenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Pyrene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
1,2,4-Trichlorobenzene	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2,4,5-Trichlorophenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
2,4,6-Trichlorophenol	ND	300		µg/Kg-dry	1	8/13/2013 3:54:00 PM
Surr: 2-Fluorophenol	71.7	30-130		%REC	1	8/13/2013 3:54:00 PM
Surr: Phenol-d5	70.3	30-130		%REC	1	8/13/2013 3:54:00 PM
Surr: Nitrobenzene-d5	57.1	30-130		%REC	1	8/13/2013 3:54:00 PM
Surr: 2-Fluorobiphenyl	57.1	30-130		%REC	1	8/13/2013 3:54:00 PM
Surr: 2,4,6-Tribromophenol	73.0	30-130		%REC	1	8/13/2013 3:54:00 PM
Surr: 4-Terphenyl-d14	80.0	30-130		%REC	1	8/13/2013 3:54:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ 19 4'
Lab Order:	1308011	**Collection Date:**	8/6/2013 2:16:00 PM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308011-06B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	920	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Acenaphthylene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Acetophenone	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Aniline	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Anthracene	3,000	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Benz(a)anthracene	6,500	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Benzo(a)pyrene	5,600	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Benzo(b)fluoranthene	5,500	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Benzo(k)fluoranthene	4,200	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Benzo(g,h,i)perylene	3,300	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
4-Bromophenyl phenyl ether	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Butyl benzyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Di-n-butyl phthalate	390	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
4-Chloroaniline	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Bis(2-chloroethoxy)methane	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Bis(2-chloroethyl)ether	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Bis(2-chloroisopropyl)ether	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2-Chloronaphthalene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2-Chlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Chrysene	6,500	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Dibenz(a,h)anthracene	1,700	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Dibenzofuran	900	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
1,2-Dichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
1,3-Dichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
1,4-Dichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
3,3'-Dichlorobenzidine	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2,4-Dichlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Diethyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Dimethyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2,4-Dimethylphenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2,4-Dinitrophenol	ND	590		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2,4-Dinitrotoluene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2,6-Dinitrotoluene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Bis(2-ethylhexyl)phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Fluoranthene	13,000	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Fluorene	1,400	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Hexachlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-06B

Client Sample ID: GZ 19 4'
Collection Date: 8/6/2013 2:16:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Hexachloroethane	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Indeno(1,2,3-cd)pyrene	3,200	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Isophorone	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2-Methylnaphthalene	450	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2-Methylphenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
4-Methylphenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Naphthalene	1,300	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Nitrobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2-Nitrophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
4-Nitrophenol	ND	590		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Di-n-octyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Pentachlorophenol	ND	590		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Phenanthrene	10,000	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Phenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Pyrene	11,000	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
1,2,4-Trichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2,4,5-Trichlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
2,4,6-Trichlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:20:00 PM
Surr: 2-Fluorophenol	75.5	30-130		%REC	1	8/13/2013 4:20:00 PM
Surr: Phenol-d5	75.7	30-130		%REC	1	8/13/2013 4:20:00 PM
Surr: Nitrobenzene-d5	66.6	30-130		%REC	1	8/13/2013 4:20:00 PM
Surr: 2-Fluorobiphenyl	64.9	30-130		%REC	1	8/13/2013 4:20:00 PM
Surr: 2,4,6-Tribromophenol	75.9	30-130		%REC	1	8/13/2013 4:20:00 PM
Surr: 4-Terphenyl-d14	83.9	30-130		%REC	1	8/13/2013 4:20:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-07B

Client Sample ID: GZ 19 6'-8'
Collection Date: 8/6/2013 2:23:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Acenaphthylene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Acetophenone	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Aniline	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Anthracene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Benz(a)anthracene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Benzo(a)pyrene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Benzo(b)fluoranthene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Benzo(k)fluoranthene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Benzo(g,h,i)perylene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
4-Bromophenyl phenyl ether	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Butyl benzyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Di-n-butyl phthalate	340	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
4-Chloroaniline	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Bis(2-chloroethoxy)methane	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Bis(2-chloroethyl)ether	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Bis(2-chloroisopropyl)ether	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2-Chloronaphthalene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2-Chlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Chrysene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Dibenz(a,h)anthracene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Dibenzofuran	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
1,2-Dichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
1,3-Dichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
1,4-Dichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
3,3'-Dichlorobenzidine	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2,4-Dichlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Diethyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Dimethyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2,4-Dimethylphenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2,4-Dinitrophenol	ND	590		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2,4-Dinitrotoluene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2,6-Dinitrotoluene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Bis(2-ethylhexyl)phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Fluoranthene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Fluorene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Hexachlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308011
Project: 18.0171593.00 NRA
Lab ID: 1308011-07B

Client Sample ID: GZ 19 6'-8'
Collection Date: 8/6/2013 2:23:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Hexachloroethane	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Indeno(1,2,3-cd)pyrene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Isophorone	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2-Methylnaphthalene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2-Methylphenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
4-Methylphenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Naphthalene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Nitrobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2-Nitrophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
4-Nitrophenol	ND	590		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Di-n-octyl phthalate	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Pentachlorophenol	ND	590		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Phenanthrene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Phenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Pyrene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
1,2,4-Trichlorobenzene	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2,4,5-Trichlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
2,4,6-Trichlorophenol	ND	290		µg/Kg-dry	1	8/13/2013 4:46:00 PM
Surr: 2-Fluorophenol	73.5	30-130		%REC	1	8/13/2013 4:46:00 PM
Surr: Phenol-d5	74.5	30-130		%REC	1	8/13/2013 4:46:00 PM
Surr: Nitrobenzene-d5	65.3	30-130		%REC	1	8/13/2013 4:46:00 PM
Surr: 2-Fluorobiphenyl	64.8	30-130		%REC	1	8/13/2013 4:46:00 PM
Surr: 2,4,6-Tribromophenol	82.1	30-130		%REC	1	8/13/2013 4:46:00 PM
Surr: 4-Terphenyl-d14	88.0	30-130		%REC	1	8/13/2013 4:46:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 2:10:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **SV-4_130813A** SeqNo: **858874**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	ND	250	µg/Kg									
Acenaphthylene	ND	250	µg/Kg									
Acetophenone	ND	250	µg/Kg									
Aniline	ND	250	µg/Kg									
Anthracene	ND	250	µg/Kg									
1,2-Diphenylhydrazine (as Azobe	ND	250	µg/Kg									
Benz(a)anthracene	ND	250	µg/Kg									
Benzo(a)pyrene	ND	250	µg/Kg									
Benzo(b)fluoranthene	ND	250	µg/Kg									
Benzo(k)fluoranthene	ND	250	µg/Kg									
Benzo(g,h,i)perylene	ND	250	µg/Kg									
4-Bromophenyl phenyl ether	ND	250	µg/Kg									
Butyl benzyl phthalate	ND	250	µg/Kg									
Di-n-butyl phthalate	ND	250	µg/Kg									
4-Chloroaniline	ND	250	µg/Kg									
Bis(2-chloroethoxy)methane	ND	250	µg/Kg									
Bis(2-chloroethyl)ether	ND	250	µg/Kg									
Bis(2-chloroisopropyl)ether	ND	250	µg/Kg									
2-Chloronaphthalene	ND	250	µg/Kg									
2-Chlorophenol	ND	250	µg/Kg									
Chrysene	ND	250	µg/Kg									
Dibenz(a,h)anthracene	ND	250	µg/Kg									
Dibenzofuran	ND	250	µg/Kg									
1,2-Dichlorobenzene	ND	250	µg/Kg									
1,3-Dichlorobenzene	ND	250	µg/Kg									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

1,4-Dichlorobenzene	ND	250	µg/Kg
3,3´-Dichlorobenzidine	ND	250	µg/Kg
2,4-Dichlorophenol	ND	250	µg/Kg
Diethyl phthalate	ND	250	µg/Kg
Dimethyl phthalate	ND	250	µg/Kg
2,4-Dimethylphenol	ND	250	µg/Kg
2,4-Dinitrophenol	ND	500	µg/Kg
2,4-Dinitrotoluene	ND	250	µg/Kg
2,6-Dinitrotoluene	ND	250	µg/Kg
Bis(2-ethylhexyl)phthalate	ND	250	µg/Kg
Fluoranthene	ND	250	µg/Kg
Fluorene	ND	250	µg/Kg
Hexachlorobenzene	ND	250	µg/Kg
Hexachlorobutadiene	ND	250	µg/Kg
Hexachloroethane	ND	250	µg/Kg
Indeno(1,2,3-cd)pyrene	ND	250	µg/Kg
Isophorone	ND	250	µg/Kg
2-Methylnaphthalene	ND	250	µg/Kg
2-Methylphenol	ND	250	µg/Kg
4-Methylphenol	ND	250	µg/Kg
Naphthalene	ND	250	µg/Kg
Nitrobenzene	ND	250	µg/Kg
2-Nitrophenol	ND	250	µg/Kg
4-Nitrophenol	ND	500	µg/Kg
Di-n-octyl phthalate	ND	250	µg/Kg
Pentachlorophenol	ND	500	µg/Kg
Phenanthrene	ND	250	µg/Kg
Phenol	ND	250	µg/Kg
Pyrene	ND	250	µg/Kg
1,2,4-Trichlorobenzene	ND	250	µg/Kg
2,4,5-Trichlorophenol	ND	250	µg/Kg

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

2,4,6-Trichlorophenol	ND	250	µg/Kg						
Surr: 2-Fluorophenol	2262	50	µg/Kg	3750	0	60.3	30	130	0
Surr: Phenol-d5	2285	50	µg/Kg	3750	0	60.9	30	130	0
Surr: Nitrobenzene-d5	1363	50	µg/Kg	2500	0	54.5	30	130	0
Surr: 2-Fluorobiphenyl	1356	50	µg/Kg	2500	0	54.3	30	130	0
Surr: 2,4,6-Tribromophenol	2518	50	µg/Kg	3750	0	67.2	30	130	0
Surr: 4-Terphenyl-d14	1980	50	µg/Kg	2500	0	79.2	30	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike - Full List

Sample ID: **LCS-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 2:36:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **SV-4_130813A** SeqNo: **858876**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	1833	250	µg/Kg	2500	0	73.3	40	140	0			
Acenaphthylene	1775	250	µg/Kg	2500	0	71	40	140	0			
Acetophenone	1576	250	µg/Kg	2500	0	63	40	140	0			
Aniline	1258	250	µg/Kg	2500	0	50.3	40	140	0			
Anthracene	1926	250	µg/Kg	2500	0	77	40	140	0			
1,2-Diphenylhydrazine (as Azobe	1706	250	µg/Kg	2500	0	68.3	40	140	0			
Benz(a)anthracene	1940	250	µg/Kg	2500	0	77.6	40	140	0			
Benzo(a)pyrene	1994	250	µg/Kg	2500	0	79.7	40	140	0			
Benzo(b)fluoranthene	2120	250	µg/Kg	2500	0	84.8	40	140	0			
Benzo(k)fluoranthene	1947	250	µg/Kg	2500	0	77.9	40	140	0			
Benzo(g,h,i)perylene	2024	250	µg/Kg	2500	0	80.9	40	140	0			
4-Bromophenyl phenyl ether	2012	250	µg/Kg	2500	0	80.5	40	140	0			
Butyl benzyl phthalate	1954	250	µg/Kg	2500	0	78.1	40	140	0			
Di-n-butyl phthalate	2368	250	µg/Kg	2500	0	94.7	40	140	0			
4-Chloroaniline	1665	250	µg/Kg	2500	0	66.6	40	140	0			
Bis(2-chloroethoxy)methane	1664	250	µg/Kg	2500	0	66.6	40	140	0			
Bis(2-chloroethyl)ether	1514	250	µg/Kg	2500	0	60.5	40	140	0			
Bis(2-chloroisopropyl)ether	1200	250	µg/Kg	2500	0	48	40	140	0			
2-Chloronaphthalene	1682	250	µg/Kg	2500	0	67.3	40	140	0			
2-Chlorophenol	2500	250	µg/Kg	3750	0	66.7	30	130	0			
Chrysene	2016	250	µg/Kg	2500	0	80.6	40	140	0			
Dibenz(a,h)anthracene	2026	250	µg/Kg	2500	0	81	40	140	0			
Dibenzofuran	1855	250	µg/Kg	2500	0	74.2	40	140	0			
1,2-Dichlorobenzene	1474	250	µg/Kg	2500	0	59	40	140	0			
1,3-Dichlorobenzene	1362	250	µg/Kg	2500	0	54.5	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.
NA - Not applicable where J values or ND results occur

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Laboratory Control Spike - Full List

1,4-Dichlorobenzene	1378	250	µg/Kg	2500	0	55.1	40	140	0
3,3´-Dichlorobenzidine	1765	250	µg/Kg	2500	0	70.6	40	140	0
2,4-Dichlorophenol	2851	250	µg/Kg	3750	0	76	30	130	0
Diethyl phthalate	1920	250	µg/Kg	2500	0	76.8	40	140	0
Dimethyl phthalate	1898	250	µg/Kg	2500	0	75.9	40	140	0
2,4-Dimethylphenol	2780	250	µg/Kg	3750	0	74.1	30	130	0
2,4-Dinitrophenol	2046	500	µg/Kg	3750	0	54.5	30	130	0
2,4-Dinitrotoluene	1946	250	µg/Kg	2500	0	77.8	40	140	0
2,6-Dinitrotoluene	2006	250	µg/Kg	2500	0	80.3	40	140	0
Bis(2-ethylhexyl)phthalate	2010	250	µg/Kg	2500	0	80.4	40	140	0
Fluoranthene	2034	250	µg/Kg	2500	0	81.3	40	140	0
Fluorene	1870	250	µg/Kg	2500	0	74.8	40	140	0
Hexachlorobenzene	2030	250	µg/Kg	2500	0	81.2	40	140	0
Hexachlorobutadiene	1584	250	µg/Kg	2500	0	63.4	40	140	0
Hexachloroethane	1388	250	µg/Kg	2500	0	55.5	40	140	0
Indeno(1,2,3-cd)pyrene	2050	250	µg/Kg	2500	0	82	40	140	0
Isophorone	1634	250	µg/Kg	2500	0	65.4	40	140	0
2-Methylnaphthalene	1667	250	µg/Kg	2500	0	66.7	40	140	0
2-Methylphenol	2662	250	µg/Kg	3750	0	71	30	130	0
4-Methylphenol	3646	250	µg/Kg	7500	0	48.6	30	130	0
Naphthalene	1613	250	µg/Kg	2500	0	64.5	40	140	0
Nitrobenzene	1563	250	µg/Kg	2500	0	62.5	40	140	0
2-Nitrophenol	2470	250	µg/Kg	3750	0	65.9	30	130	0
4-Nitrophenol	2836	500	µg/Kg	3750	0	75.6	30	130	0
Di-n-octyl phthalate	1978	250	µg/Kg	2500	0	79.1	40	140	0
Pentachlorophenol	2819	500	µg/Kg	3750	0	75.2	30	130	0
Phenanthrene	1944	250	µg/Kg	2500	0	77.8	40	140	0
Phenol	2374	250	µg/Kg	3750	0	63.3	30	130	0
Pyrene	2016	250	µg/Kg	2500	0	80.6	40	140	0
1,2,4-Trichlorobenzene	1633	250	µg/Kg	2500	0	65.3	40	140	0
2,4,5-Trichlorophenol	3058	250	µg/Kg	3750	0	81.5	30	130	0

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
NA - Not applicable where J values or ND results occur

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike - Full List

2,4,6-Trichlorophenol	2874	250	µg/Kg	3750	0	76.7	30	130	0
Surr: 2-Fluorophenol	2278	50	µg/Kg	3750	0	60.7	30	130	0
Surr: Phenol-d5	2380	50	µg/Kg	3750	0	63.5	30	130	0
Surr: Nitrobenzene-d5	1388	50	µg/Kg	2500	0	55.5	30	130	0
Surr: 2-Fluorobiphenyl	1466	50	µg/Kg	2500	0	58.7	30	130	0
Surr: 2,4,6-Tribromophenol	2796	50	µg/Kg	3750	0	74.5	30	130	0
Surr: 4-Terphenyl-d14	2050	50	µg/Kg	2500	0	82	30	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike Duplicate - Full List

Sample ID: **LCSD-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 3:02:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **SV-4_130813A** SeqNo: **858875**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	2094	250	µg/Kg	2500	0	83.8	40	140	1833	13.3	30	
Acenaphthylene	2076	250	µg/Kg	2500	0	83.1	40	140	1775	15.7	30	
Acetophenone	1908	250	µg/Kg	2500	0	76.3	40	140	1576	19	30	
Aniline	1114	250	µg/Kg	2500	0	44.6	40	140	1258	12.2	30	
Anthracene	2267	250	µg/Kg	2500	0	90.7	40	140	1926	16.3	30	
1,2-Diphenylhydrazine (as Azobe	1937	250	µg/Kg	2500	0	77.5	40	140	1706	12.6	30	
Benz(a)anthracene	2355	250	µg/Kg	2500	0	94.2	40	140	1940	19.4	30	
Benzo(a)pyrene	2376	250	µg/Kg	2500	0	95	40	140	1994	17.5	30	
Benzo(b)fluoranthene	2374	250	µg/Kg	2500	0	94.9	40	140	2120	11.3	30	
Benzo(k)fluoranthene	2532	250	µg/Kg	2500	0	101	40	140	1947	26.1	30	
Benzo(g,h,i)perylene	2376	250	µg/Kg	2500	0	95	40	140	2024	16	30	
4-Bromophenyl phenyl ether	2378	250	µg/Kg	2500	0	95.1	40	140	2012	16.7	30	
Butyl benzyl phthalate	2255	250	µg/Kg	2500	0	90.2	40	140	1954	14.3	30	
Di-n-butyl phthalate	2622	250	µg/Kg	2500	0	105	40	140	2368	10.2	30	
4-Chloroaniline	1596	250	µg/Kg	2500	0	63.9	40	140	1665	4.2	30	
Bis(2-chloroethoxy)methane	1866	250	µg/Kg	2500	0	74.6	40	140	1664	11.4	30	
Bis(2-chloroethyl)ether	1821	250	µg/Kg	2500	0	72.8	40	140	1514	18.4	30	
Bis(2-chloroisopropyl)ether	1454	250	µg/Kg	2500	0	58.2	40	140	1200	19.2	30	
2-Chloronaphthalene	1988	250	µg/Kg	2500	0	79.5	40	140	1682	16.7	30	
2-Chlorophenol	2976	250	µg/Kg	3750	0	79.4	30	130	2500	17.4	30	
Chrysene	2388	250	µg/Kg	2500	0	95.5	40	140	2016	16.9	30	
Dibenz(a,h)anthracene	2448	250	µg/Kg	2500	0	97.9	40	140	2026	18.9	30	
Dibenzofuran	2178	250	µg/Kg	2500	0	87.1	40	140	1855	16	30	
1,2-Dichlorobenzene	1782	250	µg/Kg	2500	0	71.3	40	140	1474	18.9	30	
1,3-Dichlorobenzene	1670	250	µg/Kg	2500	0	66.8	40	140	1362	20.3	30	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.
NA - Not applicable where J values or ND results occur

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

1,4-Dichlorobenzene	1676	250	µg/Kg	2500	0	67.1	40	140	1378	19.5	30
3,3´-Dichlorobenzidine	1804	250	µg/Kg	2500	0	72.1	40	140	1765	2.16	30
2,4-Dichlorophenol	3149	250	µg/Kg	3750	0	84	30	130	2851	9.93	30
Diethyl phthalate	2186	250	µg/Kg	2500	0	87.4	40	140	1920	13	30
Dimethyl phthalate	2159	250	µg/Kg	2500	0	86.4	40	140	1898	12.9	30
2,4-Dimethylphenol	3066	250	µg/Kg	3750	0	81.7	30	130	2780	9.79	30
2,4-Dinitrophenol	2505	500	µg/Kg	3750	0	66.8	30	130	2046	20.2	30
2,4-Dinitrotoluene	2248	250	µg/Kg	2500	0	89.9	40	140	1946	14.4	30
2,6-Dinitrotoluene	2250	250	µg/Kg	2500	0	90	40	140	2006	11.4	30
Bis(2-ethylhexyl)phthalate	2326	250	µg/Kg	2500	0	93	40	140	2010	14.6	30
Fluoranthene	2454	250	µg/Kg	2500	0	98.2	40	140	2034	18.8	30
Fluorene	2150	250	µg/Kg	2500	0	86	40	140	1870	14	30
Hexachlorobenzene	2400	250	µg/Kg	2500	0	96	40	140	2030	16.7	30
Hexachlorobutadiene	1929	250	µg/Kg	2500	0	77.2	40	140	1584	19.6	30
Hexachloroethane	1703	250	µg/Kg	2500	0	68.1	40	140	1388	20.3	30
Indeno(1,2,3-cd)pyrene	2440	250	µg/Kg	2500	0	97.6	40	140	2050	17.3	30
Isophorone	1659	250	µg/Kg	2500	0	66.4	40	140	1634	1.49	30
2-Methylnaphthalene	1956	250	µg/Kg	2500	0	78.3	40	140	1667	16	30
2-Methylphenol	2930	250	µg/Kg	3750	0	78.1	30	130	2662	9.57	30
4-Methylphenol	4088	250	µg/Kg	7500	0	54.5	30	130	3646	11.4	30
Naphthalene	1887	250	µg/Kg	2500	0	75.5	40	140	1613	15.6	30
Nitrobenzene	1887	250	µg/Kg	2500	0	75.5	40	140	1563	18.8	30
2-Nitrophenol	2873	250	µg/Kg	3750	0	76.6	30	130	2470	15.1	30
4-Nitrophenol	3378	500	µg/Kg	3750	0	90.1	30	130	2836	17.4	30
Di-n-octyl phthalate	2240	250	µg/Kg	2500	0	89.6	40	140	1978	12.4	30
Pentachlorophenol	3285	500	µg/Kg	3750	0	87.6	30	130	2819	15.3	30
Phenanthrene	2294	250	µg/Kg	2500	0	91.7	40	140	1944	16.5	30
Phenol	2782	250	µg/Kg	3750	0	74.2	30	130	2374	15.8	30
Pyrene	2354	250	µg/Kg	2500	0	94.2	40	140	2016	15.5	30
1,2,4-Trichlorobenzene	1950	250	µg/Kg	2500	0	78	40	140	1633	17.7	30
2,4,5-Trichlorophenol	3378	250	µg/Kg	3750	0	90.1	30	130	3058	9.96	30

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

2,4,6-Trichlorophenol	3151	250	µg/Kg	3750	0	84	30	130	2874	9.18	30
Surr: 2-Fluorophenol	2744	50	µg/Kg	3750	0	73.2	30	130	0	0	0
Surr: Phenol-d5	2706	50	µg/Kg	3750	0	72.2	30	130	0	0	0
Surr: Nitrobenzene-d5	1596	50	µg/Kg	2500	0	63.9	30	130	0	0	0
Surr: 2-Fluorobiphenyl	1645	50	µg/Kg	2500	0	65.8	30	130	0	0	0
Surr: 2,4,6-Tribromophenol	2954	50	µg/Kg	3750	0	78.8	30	130	0	0	0
Surr: 4-Terphenyl-d14	2200	50	µg/Kg	2500	0	88	30	130	0	0	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-04
Collection Date: 8/6/2013 9:14:00 AM
Client Sample ID: GZ 6 2'
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1221	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1232	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1242	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1248	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1254	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1260	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1262	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Aroclor 1268	ND	26		µg/Kg-dry	1	8/9/2013 2:09:00 PM
Surr: Tetrachloro-m-xylene	93.0	30-150		%REC	1	8/9/2013 2:09:00 PM
Surr: Decachlorobiphenyl	95.2	30-150		%REC	1	8/9/2013 2:09:00 PM

Lab ID: 1308011-05
Collection Date: 8/6/2013 9:41:00 AM
Client Sample ID: GZ 6 6'
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1221	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1232	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1242	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1248	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1254	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1260	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1262	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Aroclor 1268	ND	30		µg/Kg-dry	1	8/9/2013 2:35:00 PM
Surr: Tetrachloro-m-xylene	89.7	30-150		%REC	1	8/9/2013 2:35:00 PM
Surr: Decachlorobiphenyl	95.9	30-150		%REC	1	8/9/2013 2:35:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-06
Collection Date: 8/6/2013 2:16:00 PM
Client Sample ID: GZ 19 4'
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1221	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1232	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1242	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1248	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1254	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1260	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1262	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Aroclor 1268	ND	28		µg/Kg-dry	1	8/9/2013 3:02:00 PM
Surr: Tetrachloro-m-xylene	72.9	30-150		%REC	1	8/9/2013 3:02:00 PM
Surr: Decachlorobiphenyl	91.4	30-150		%REC	1	8/9/2013 3:02:00 PM

Lab ID: 1308011-07
Collection Date: 8/6/2013 2:23:00 PM
Client Sample ID: GZ 19 6'-8'
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1221	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1232	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1242	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1248	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1254	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1260	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1262	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Aroclor 1268	ND	29		µg/Kg-dry	1	8/9/2013 3:28:00 PM
Surr: Tetrachloro-m-xylene	86.6	30-150		%REC	1	8/9/2013 3:28:00 PM
Surr: Decachlorobiphenyl	93.2	30-150		%REC	1	8/9/2013 3:28:00 PM

AMRO Environmental Laboratories Corp.

Date: *12-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23456** Batch ID: **23456** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/9/2013 12:49:00 PM** Prep Date: **8/8/2013**
Client ID: Run ID: **GC-ELVIS_130809A** SeqNo: **858668**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	ND	25	µg/Kg									
Aroclor 1221	ND	25	µg/Kg									
Aroclor 1232	ND	25	µg/Kg									
Aroclor 1242	ND	25	µg/Kg									
Aroclor 1248	ND	25	µg/Kg									
Aroclor 1254	ND	25	µg/Kg									
Aroclor 1260	ND	25	µg/Kg									
Aroclor 1262	ND	25	µg/Kg									
Aroclor 1268	ND	25	µg/Kg									
Surr: Tetrachloro-m-xylene	7.237	0	µg/Kg	8	0	90.5	30	150	0			
Surr: Decachlorobiphenyl	7.404	0	µg/Kg	8	0	92.6	30	150	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *12-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23456** Batch ID: **23456** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/9/2013 1:16:00 PM** Prep Date: **8/8/2013**
Client ID: Run ID: **GC-ELVIS_130809A** SeqNo: **858669**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	482.4	25	µg/Kg	500	0	96.5	40	140	0			
Aroclor 1260	497.1	25	µg/Kg	500	0	99.4	40	140	0			
Surr: Tetrachloro-m-xylene	8.011	0	µg/Kg	8	0	100	30	150	0			
Surr: Decachlorobiphenyl	7.867	0	µg/Kg	8	0	98.3	30	150	0			

Sample ID: **LCSD-23456** Batch ID: **23456** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/9/2013 1:42:00 PM** Prep Date: **8/8/2013**
Client ID: Run ID: **GC-ELVIS_130809A** SeqNo: **858670**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	488.3	25	µg/Kg	500	0	97.7	40	140	482.4	1.22	30	
Aroclor 1260	492.3	25	µg/Kg	500	0	98.5	40	140	497.1	0.984	30	
Surr: Tetrachloro-m-xylene	8.094	0	µg/Kg	8	0	101	30	150	0	0	0	
Surr: Decachlorobiphenyl	7.839	0	µg/Kg	8	0	98	30	150	0	0	0	

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Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-01
Collection Date: 8/5/2013 12:06:00 PM
Collection Time:
Client Sample ID: GZ 1
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/9/2013 9:14:00 AM
C19-C36 Aliphatic Hydrocarbons	13	11		mg/Kg-dry	1	8/9/2013 9:14:00 AM
C11-C22 Aromatic Hydrocarbons	90	11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Naphthalene	0.16	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
2-Methylnaphthalene	0.12	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Acenaphthylene	ND	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Acenaphthene	0.49	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Fluorene	0.57	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Phenanthrene	5.0	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Anthracene	1.1	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Fluoranthene	7.3	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Pyrene	6.0	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Benz(a)anthracene	3.3	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Chrysene	3.2	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Benzo(b)fluoranthene	2.9	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Benzo(k)fluoranthene	1.8	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Benzo(a)pyrene	2.6	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Dibenz(a,h)anthracene	0.76	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Indeno(1,2,3-cd)pyrene	1.5	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Benzo(g,h,i)perylene	1.5	0.11		mg/Kg-dry	1	8/8/2013 4:59:00 PM
Surr: 1-Chlorooctadecane	66.5	40-140		%REC	1	8/9/2013 9:14:00 AM
Surr: 2-Bromonaphthalene	84.0	40-140		%REC	1	8/8/2013 4:59:00 PM
Surr: 2-Fluorobiphenyl	78.8	40-140		%REC	1	8/8/2013 4:59:00 PM
Surr: o-Terphenyl	78.6	40-140		%REC	1	8/8/2013 4:59:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-02
Collection Date: 8/5/2013 1:58:00 PM
Collection Time:
Client Sample ID: GZ 2
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/9/2013 10:59:00 AM
C19-C36 Aliphatic Hydrocarbons	66	11		mg/Kg-dry	1	8/9/2013 10:59:00 AM
C11-C22 Aromatic Hydrocarbons	55	11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Naphthalene	ND	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
2-Methylnaphthalene	ND	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Acenaphthylene	0.16	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Acenaphthene	0.22	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Fluorene	0.33	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Phenanthrene	3.2	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Anthracene	0.74	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Fluoranthene	4.0	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Pyrene	3.4	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Benz(a)anthracene	1.8	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Chrysene	1.7	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Benzo(b)fluoranthene	1.5	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Benzo(k)fluoranthene	1.2	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Benzo(a)pyrene	1.6	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Dibenz(a,h)anthracene	0.41	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Indeno(1,2,3-cd)pyrene	1.1	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Benzo(g,h,i)perylene	1.1	0.11		mg/Kg-dry	1	8/8/2013 6:08:00 PM
Surr: 1-Chlorooctadecane	50.9	40-140		%REC	1	8/9/2013 10:59:00 AM
Surr: 2-Bromonaphthalene	81.1	40-140		%REC	1	8/8/2013 6:08:00 PM
Surr: 2-Fluorobiphenyl	77.8	40-140		%REC	1	8/8/2013 6:08:00 PM
Surr: o-Terphenyl	75.6	40-140		%REC	1	8/8/2013 6:08:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-03
Collection Date: 8/6/2013 7:56:00 AM
Collection Time:
Client Sample ID: GZ 4
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	10		mg/Kg-dry	1	8/8/2013 6:43:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	10		mg/Kg-dry	1	8/8/2013 6:43:00 PM
C11-C22 Aromatic Hydrocarbons	ND	10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Naphthalene	ND	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
2-Methylnaphthalene	ND	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Acenaphthylene	ND	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Acenaphthene	ND	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Fluorene	ND	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Phenanthrene	0.18	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Anthracene	ND	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Fluoranthene	0.34	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Pyrene	0.34	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Benz(a)anthracene	0.23	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Chrysene	0.28	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Benzo(b)fluoranthene	0.32	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Benzo(k)fluoranthene	0.23	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Benzo(a)pyrene	0.27	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Dibenz(a,h)anthracene	0.11	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Indeno(1,2,3-cd)pyrene	0.24	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Benzo(g,h,i)perylene	0.29	0.10		mg/Kg-dry	1	8/8/2013 7:18:00 PM
Surr: 1-Chlorooctadecane	59.9	40-140		%REC	1	8/8/2013 6:43:00 PM
Surr: 2-Bromonaphthalene	84.1	40-140		%REC	1	8/8/2013 7:18:00 PM
Surr: 2-Fluorobiphenyl	81.2	40-140		%REC	1	8/8/2013 7:18:00 PM
Surr: o-Terphenyl	87.1	40-140		%REC	1	8/8/2013 7:18:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-04
Collection Date: 8/6/2013 9:14:00 AM
Client Sample ID: GZ 6 2'
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/8/2013 7:52:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/8/2013 7:52:00 PM
C11-C22 Aromatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/8/2013 8:27:00 PM
Surr: 1-Chlorooctadecane	54.4	40-140		%REC	1	8/8/2013 7:52:00 PM
Surr: 2-Bromonaphthalene	82.4	40-140		%REC	1	8/8/2013 8:27:00 PM
Surr: 2-Fluorobiphenyl	85.6	40-140		%REC	1	8/8/2013 8:27:00 PM
Surr: o-Terphenyl	88.0	40-140		%REC	1	8/8/2013 8:27:00 PM

Lab ID: 1308011-05
Collection Date: 8/6/2013 9:41:00 AM
Client Sample ID: GZ 6 6'
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	12		mg/Kg-dry	1	8/8/2013 9:02:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	12		mg/Kg-dry	1	8/8/2013 9:02:00 PM
C11-C22 Aromatic Hydrocarbons	ND	12		mg/Kg-dry	1	8/8/2013 9:37:00 PM
Surr: 1-Chlorooctadecane	54.0	40-140		%REC	1	8/8/2013 9:02:00 PM
Surr: 2-Bromonaphthalene	82.1	40-140		%REC	1	8/8/2013 9:37:00 PM
Surr: 2-Fluorobiphenyl	81.6	40-140		%REC	1	8/8/2013 9:37:00 PM
Surr: o-Terphenyl	84.3	40-140		%REC	1	8/8/2013 9:37:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-06
Collection Date: 8/6/2013 2:16:00 PM
Collection Time:
Client Sample ID: GZ 19 4'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	12		mg/Kg-dry	1	8/9/2013 10:24:00 AM
C19-C36 Aliphatic Hydrocarbons	64	12		mg/Kg-dry	1	8/9/2013 10:24:00 AM
C11-C22 Aromatic Hydrocarbons	130	12		mg/Kg-dry	1	8/8/2013 10:46:00 PM
Surr: 1-Chlorooctadecane	47.5	40-140		%REC	1	8/9/2013 10:24:00 AM
Surr: 2-Bromonaphthalene	68.8	40-140		%REC	1	8/8/2013 10:46:00 PM
Surr: 2-Fluorobiphenyl	67.7	40-140		%REC	1	8/8/2013 10:46:00 PM
Surr: o-Terphenyl	52.1	40-140		%REC	1	8/8/2013 10:46:00 PM

Lab ID: 1308011-07
Collection Date: 8/6/2013 2:23:00 PM
Collection Time:
Client Sample ID: GZ 19 6'-8'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	12		mg/Kg-dry	1	8/8/2013 11:21:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	12		mg/Kg-dry	1	8/8/2013 11:21:00 PM
C11-C22 Aromatic Hydrocarbons	ND	12		mg/Kg-dry	1	8/8/2013 11:56:00 PM
Surr: 1-Chlorooctadecane	73.3	40-140		%REC	1	8/8/2013 11:21:00 PM
Surr: 2-Bromonaphthalene	85.6	40-140		%REC	1	8/8/2013 11:56:00 PM
Surr: 2-Fluorobiphenyl	85.4	40-140		%REC	1	8/8/2013 11:56:00 PM
Surr: o-Terphenyl	77.7	40-140		%REC	1	8/8/2013 11:56:00 PM

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23449** Batch ID: **23449** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/8/2013 12:54:00 PM** Prep Date: **8/7/2013**
Client ID: Run ID: **SV-2_130808A** SeqNo: **858598**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C9-C18 Aliphatic Hydrocarbons	ND	10	mg/Kg									
C19-C36 Aliphatic Hydrocarbons	ND	10	mg/Kg									
Surr: 1-Chlorooctadecane	1.073	0.10	mg/Kg	2	0	53.6	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23449** Batch ID: **23449** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/8/2013 1:29:00 PM** Prep Date: **8/7/2013**
Client ID: Run ID: **SV-2_130808A** SeqNo: **858599**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C11-C22 Aromatic Hydrocarbons	ND	10	mg/Kg									
Naphthalene	ND	0.10	mg/Kg									
2-Methylnaphthalene	ND	0.10	mg/Kg									
Acenaphthylene	ND	0.10	mg/Kg									
Acenaphthene	ND	0.10	mg/Kg									
Fluorene	ND	0.10	mg/Kg									
Phenanthrene	ND	0.10	mg/Kg									
Anthracene	ND	0.10	mg/Kg									
Fluoranthene	ND	0.10	mg/Kg									
Pyrene	ND	0.10	mg/Kg									
Benz(a)anthracene	ND	0.10	mg/Kg									
Chrysene	ND	0.10	mg/Kg									
Benzo(b)fluoranthene	ND	0.10	mg/Kg									
Benzo(k)fluoranthene	ND	0.10	mg/Kg									
Benzo(a)pyrene	ND	0.10	mg/Kg									
Dibenz(a,h)anthracene	ND	0.10	mg/Kg									
Indeno(1,2,3-cd)pyrene	ND	0.10	mg/Kg									
Benzo(g,h,i)perylene	ND	0.10	mg/Kg									
Surr: 2-Bromonaphthalene	1.748	0.10	mg/Kg	2	0	87.4	40	140	0			
Surr: 2-Fluorobiphenyl	1.687	0.10	mg/Kg	2	0	84.4	40	140	0			
Surr: o-Terphenyl	1.621	0.10	mg/Kg	2	0	81	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23449** Batch ID: **23449** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/8/2013 2:04:00 PM** Prep Date: **8/7/2013**
Client ID: Run ID: **SV-2_130808A** SeqNo: **858600**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	1.572	0.10	mg/Kg	2.5	0	62.9	40	140	0			
n-Docosane	2.317	0.10	mg/Kg	2.5	0	92.7	40	140	0			
n-Dodecane	1.724	0.10	mg/Kg	2.5	0	69	40	140	0			
n-Eicosane	2.234	0.10	mg/Kg	2.5	0	89.4	40	140	0			
n-Hexacosane	2.471	0.10	mg/Kg	2.5	0	98.8	40	140	0			
n-Hexadecane	2.144	0.10	mg/Kg	2.5	0	85.8	40	140	0			
n-Hexatriacontane	1.992	0.10	mg/Kg	2.5	0	79.7	40	140	0			
n-Nonadecane	2.308	0.10	mg/Kg	2.5	0	92.3	40	140	0			
n-Nonane	1.179	0.10	mg/Kg	2.5	0	47.2	30	140	0			
n-Octacosane	2.222	0.10	mg/Kg	2.5	0	88.9	40	140	0			
n-Octadecane	2.255	0.10	mg/Kg	2.5	0	90.2	40	140	0			
n-Tetracosane	2.343	0.10	mg/Kg	2.5	0	93.7	40	140	0			
n-Tetradecane	1.959	0.10	mg/Kg	2.5	0	78.4	40	140	0			
n-Triacontane	2.116	0.10	mg/Kg	2.5	0	84.6	40	140	0			
Surr: 1-Chlorooctadecane	1.169	0.10	mg/Kg	2	0	58.4	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23449** Batch ID: **23449** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/8/2013 2:39:00 PM** Prep Date: **8/7/2013**
Client ID: Run ID: **SV-2_130808A** SeqNo: **858601**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Naphthalene	1.38	0.10	mg/Kg	2.5	0	55.2	40	140	0			
2-Methylnaphthalene	1.465	0.10	mg/Kg	2.5	0	58.6	40	140	0			
Acenaphthylene	1.649	0.10	mg/Kg	2.5	0	66	40	140	0			
Acenaphthene	1.702	0.10	mg/Kg	2.5	0	68.1	40	140	0			
Fluorene	1.85	0.10	mg/Kg	2.5	0	74	40	140	0			
Phenanthrene	1.944	0.10	mg/Kg	2.5	0	77.8	40	140	0			
Anthracene	2.016	0.10	mg/Kg	2.5	0	80.7	40	140	0			
Fluoranthene	2.019	0.10	mg/Kg	2.5	0	80.8	40	140	0			
Pyrene	1.973	0.10	mg/Kg	2.5	0	78.9	40	140	0			
Benz(a)anthracene	1.976	0.10	mg/Kg	2.5	0	79	40	140	0			
Chrysene	1.812	0.10	mg/Kg	2.5	0	72.5	40	140	0			
Benzo(b)fluoranthene	2.088	0.10	mg/Kg	2.5	0	83.5	40	140	0			
Benzo(k)fluoranthene	1.864	0.10	mg/Kg	2.5	0	74.5	40	140	0			
Benzo(a)pyrene	1.892	0.10	mg/Kg	2.5	0	75.7	40	140	0			
Dibenz(a,h)anthracene	2.074	0.10	mg/Kg	2.5	0	83	40	140	0			
Indeno(1,2,3-cd)pyrene	2.176	0.10	mg/Kg	2.5	0	87	40	140	0			
Benzo(g,h,i)perylene	2.144	0.10	mg/Kg	2.5	0	85.8	40	140	0			
Surr: 2-Bromonaphthalene	1.682	0.10	mg/Kg	2	0	84.1	40	140	0			
Surr: 2-Fluorobiphenyl	1.648	0.10	mg/Kg	2	0	82.4	40	140	0			
Surr: o-Terphenyl	1.658	0.10	mg/Kg	2	0	82.9	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike Duplicate

Sample ID: **LCSD-23449** Batch ID: **23449** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/8/2013 3:14:00 PM** Prep Date: **8/7/2013**
Client ID: Run ID: **SV-2_130808A** SeqNo: **858602**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	1.514	0.10	mg/Kg	2.5	0	60.5	40	140	1.572	3.82	25	
n-Docosane	2.429	0.10	mg/Kg	2.5	0	97.2	40	140	2.317	4.72	25	
n-Dodecane	1.762	0.10	mg/Kg	2.5	0	70.5	40	140	1.724	2.21	25	
n-Eicosane	2.314	0.10	mg/Kg	2.5	0	92.6	40	140	2.234	3.5	25	
n-Hexacosane	2.546	0.10	mg/Kg	2.5	0	102	40	140	2.471	2.99	25	
n-Hexadecane	2.17	0.10	mg/Kg	2.5	0	86.8	40	140	2.144	1.16	25	
n-Hexatriacontane	1.969	0.10	mg/Kg	2.5	0	78.8	40	140	1.992	1.19	25	
n-Nonadecane	2.336	0.10	mg/Kg	2.5	0	93.4	40	140	2.308	1.21	25	
n-Nonane	1.154	0.10	mg/Kg	2.5	0	46.1	30	140	1.179	2.19	25	
n-Octacosane	2.308	0.10	mg/Kg	2.5	0	92.3	40	140	2.222	3.77	25	
n-Octadecane	2.283	0.10	mg/Kg	2.5	0	91.3	40	140	2.255	1.23	25	
n-Tetracosane	2.45	0.10	mg/Kg	2.5	0	98	40	140	2.343	4.46	25	
n-Tetradecane	1.955	0.10	mg/Kg	2.5	0	78.2	40	140	1.959	0.204	25	
n-Triacontane	2.192	0.10	mg/Kg	2.5	0	87.7	40	140	2.116	3.55	25	
Surr: 1-Chlorooctadecane	1.244	0.10	mg/Kg	2	0	62.2	40	140	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *09-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike Duplicate

Sample ID: **LCSD-23449** Batch ID: **23449** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/8/2013 3:49:00 PM** Prep Date: **8/7/2013**
Client ID: Run ID: **SV-2_130808A** SeqNo: **858603**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Naphthalene	1.344	0.10	mg/Kg	2.5	0	53.8	40	140	1.38	2.64	25	
2-Methylnaphthalene	1.431	0.10	mg/Kg	2.5	0	57.2	40	140	1.465	2.35	25	
Acenaphthylene	1.629	0.10	mg/Kg	2.5	0	65.2	40	140	1.649	1.22	25	
Acenaphthene	1.668	0.10	mg/Kg	2.5	0	66.7	40	140	1.702	2.02	25	
Fluorene	1.871	0.10	mg/Kg	2.5	0	74.8	40	140	1.85	1.13	25	
Phenanthrene	2.057	0.10	mg/Kg	2.5	0	82.3	40	140	1.944	5.62	25	
Anthracene	2.143	0.10	mg/Kg	2.5	0	85.7	40	140	2.016	6.08	25	
Fluoranthene	2.228	0.10	mg/Kg	2.5	0	89.1	40	140	2.019	9.84	25	
Pyrene	2.196	0.10	mg/Kg	2.5	0	87.9	40	140	1.973	10.7	25	
Benz(a)anthracene	2.325	0.10	mg/Kg	2.5	0	93	40	140	1.976	16.2	25	
Chrysene	2.106	0.10	mg/Kg	2.5	0	84.2	40	140	1.812	15	25	
Benzo(b)fluoranthene	2.426	0.10	mg/Kg	2.5	0	97	40	140	2.088	15	25	
Benzo(k)fluoranthene	2.149	0.10	mg/Kg	2.5	0	86	40	140	1.864	14.2	25	
Benzo(a)pyrene	2.244	0.10	mg/Kg	2.5	0	89.8	40	140	1.892	17	25	
Dibenz(a,h)anthracene	2.388	0.10	mg/Kg	2.5	0	95.5	40	140	2.074	14.1	25	
Indeno(1,2,3-cd)pyrene	2.466	0.10	mg/Kg	2.5	0	98.6	40	140	2.176	12.5	25	
Benzo(g,h,i)perylene	2.304	0.10	mg/Kg	2.5	0	92.1	40	140	2.144	7.17	25	
Surr: 2-Bromonaphthalene	1.596	0.10	mg/Kg	2	0	79.8	40	140	0	0	0	
Surr: 2-Fluorobiphenyl	1.55	0.10	mg/Kg	2	0	77.5	40	140	0	0	0	
Surr: o-Terphenyl	1.682	0.10	mg/Kg	2	0	84.1	40	140	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

Send to Database

Breakthrough Report

LIMS Sample ID: LCS-23449
Test Code: EPH1.1S
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\080813E\2B10729.D	27.6027
2-Methylnaphthalene	C:\HPCHEM\1\DATA\080813E\2B10729.D	29.299

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\080813E\2B10728.D	0.011703
2-Methylnaphthalene	C:\HPCHEM\1\DATA\080813E\2B10728.D	0

Naphthalene Breakthrough: 0.04237861 %

2-Methylnaphthalene Breakthrough: 0 %

Send to Database

Breakthrough Report

LIMS Sample ID: LCSD-23449
Test Code: EPH1.1S
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\080813E\2B10731.D	26.8848
2-Methylnaphthalene	C:\HPCHEM\1\DATA\080813E\2B10731.D	28.6221

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\080813E\2B10730.D	0.058368
2-Methylnaphthalene	C:\HPCHEM\1\DATA\080813E\2B10730.D	0

Naphthalene Breakthrough: 0.216632657 %

2-Methylnaphthalene Breakthrough: 0 %

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-01
Collection Date: 8/5/2013 12:06:00 PM
Client Sample ID: GZ 1
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	22.7	6.53		mg/Kg-dry	1	8/8/2013 8:52:59 PM
Barium	101	13.1		mg/Kg-dry	1	8/8/2013 8:52:59 PM
Cadmium	ND	0.653		mg/Kg-dry	1	8/8/2013 8:52:59 PM
Chromium	15.3	1.31		mg/Kg-dry	1	8/8/2013 8:52:59 PM
Lead	219	5.23		mg/Kg-dry	1	8/8/2013 8:52:59 PM
Selenium	ND	15.7		mg/Kg-dry	1	8/8/2013 8:52:59 PM
Silver	3.67	1.83		mg/Kg-dry	1	8/8/2013 8:52:59 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.0848	0.0534		mg/Kg-dry	1	8/7/2013 4:32:46 PM
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	7.8	0		wt%	1	8/8/2013

Lab ID: 1308011-02
Collection Date: 8/5/2013 1:58:00 PM
Client Sample ID: GZ 2
Collection Time:
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	21.2	7.11		mg/Kg-dry	1	8/8/2013 9:52:31 PM
Barium	102	14.2		mg/Kg-dry	1	8/8/2013 9:52:31 PM
Cadmium	ND	0.711		mg/Kg-dry	1	8/8/2013 9:52:31 PM
Chromium	26.7	1.42		mg/Kg-dry	1	8/8/2013 9:52:31 PM
Lead	479	5.69		mg/Kg-dry	1	8/8/2013 9:52:31 PM
Selenium	ND	17.1		mg/Kg-dry	1	8/8/2013 9:52:31 PM
Silver	ND	1.99		mg/Kg-dry	1	8/8/2013 9:52:31 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.682	0.0573		mg/Kg-dry	1	8/7/2013 4:36:04 PM
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	14.5	0		wt%	1	8/8/2013

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-03
Collection Date: 8/6/2013 7:56:00 AM
Collection Time:
Client Sample ID: GZ 4
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	17.6	6.17		mg/Kg-dry	1	8/8/2013 10:00:11 PM
Barium	66.9	12.3		mg/Kg-dry	1	8/8/2013 10:00:11 PM
Cadmium	ND	0.617		mg/Kg-dry	1	8/8/2013 10:00:11 PM
Chromium	30.3	1.23		mg/Kg-dry	1	8/8/2013 10:00:11 PM
Lead	31.8	4.94		mg/Kg-dry	1	8/8/2013 10:00:11 PM
Selenium	ND	14.8		mg/Kg-dry	1	8/8/2013 10:00:11 PM
Silver	ND	1.73		mg/Kg-dry	1	8/8/2013 10:00:11 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	ND	0.0483		mg/Kg-dry	1	8/7/2013 4:45:58 PM
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	3.8	0		wt%	1	8/8/2013

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-04
Collection Date: 8/6/2013 9:14:00 AM
Collection Time:
Client Sample ID: GZ 6 2'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	355	6.64		mg/Kg-dry	1	8/8/2013 10:08:01 PM
Barium	37.5	13.3		mg/Kg-dry	1	8/8/2013 10:08:01 PM
Cadmium	ND	0.664		mg/Kg-dry	1	8/8/2013 10:08:01 PM
Chromium	44.6	1.33		mg/Kg-dry	1	8/8/2013 10:08:01 PM
Lead	57.6	5.31		mg/Kg-dry	1	8/8/2013 10:08:01 PM
Selenium	ND	15.9		mg/Kg-dry	1	8/8/2013 10:08:01 PM
Silver	ND	1.86		mg/Kg-dry	1	8/8/2013 10:08:01 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.0972	0.0531		mg/Kg-dry	1	8/7/2013 4:49:17 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	6.3	0		wt%	1	8/8/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	21		mg/Kg-dry	1	8/7/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/7/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	8.3	0		pH Units	1	8/7/2013 11:10:00 AM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	1,400	1.0		µmhos/cm	1	8/8/2013

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-05
Collection Date: 8/6/2013 9:41:00 AM
Collection Time:
Client Sample ID: GZ 6 6'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	18.2	6.94		mg/Kg-dry	1	8/8/2013 10:15:31 PM
Barium	18.3	13.9		mg/Kg-dry	1	8/8/2013 10:15:31 PM
Cadmium	ND	0.694		mg/Kg-dry	1	8/8/2013 10:15:31 PM
Chromium	13.5	1.39		mg/Kg-dry	1	8/8/2013 10:15:31 PM
Lead	72.1	5.55		mg/Kg-dry	1	8/8/2013 10:15:31 PM
Selenium	ND	16.7		mg/Kg-dry	1	8/8/2013 10:15:31 PM
Silver	2.43	1.94		mg/Kg-dry	1	8/8/2013 10:15:31 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	ND	0.0587		mg/Kg-dry	1	8/7/2013 4:52:37 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	18.1	0		wt%	1	8/8/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	23		mg/Kg-dry	1	8/7/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	120		mg/Kg-dry	1	8/7/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	7.3	0		pH Units	1	8/7/2013 11:10:00 AM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	480	1.0		µmhos/cm	1	8/8/2013

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-06
Collection Date: 8/6/2013 2:16:00 PM
Collection Time:
Client Sample ID: GZ 19 4'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	19.7	6.83		mg/Kg-dry	1	8/8/2013 10:22:48 PM
Barium	55.9	13.7		mg/Kg-dry	1	8/8/2013 10:22:48 PM
Cadmium	ND	0.683		mg/Kg-dry	1	8/8/2013 10:22:48 PM
Chromium	21.5	1.37		mg/Kg-dry	1	8/8/2013 10:22:48 PM
Lead	242	5.46		mg/Kg-dry	1	8/8/2013 10:22:48 PM
Selenium	ND	16.4		mg/Kg-dry	1	8/8/2013 10:22:48 PM
Silver	ND	1.91		mg/Kg-dry	1	8/8/2013 10:22:48 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.496	0.0560		mg/Kg-dry	1	8/7/2013 4:55:56 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	15.6	0		wt%	1	8/8/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	23		mg/Kg-dry	1	8/7/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/7/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	7.3	0		pH Units	1	8/7/2013 11:10:00 AM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	790	1.0		µmhos/cm	1	8/8/2013

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308011

Lab ID: 1308011-07
Collection Date: 8/6/2013 2:23:00 PM
Collection Time:
Client Sample ID: GZ 19 6'-8'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	13.8	7.29		mg/Kg-dry	1	8/8/2013 10:30:33 PM
Barium	30.0	14.6		mg/Kg-dry	1	8/8/2013 10:30:33 PM
Cadmium	ND	0.729		mg/Kg-dry	1	8/8/2013 10:30:33 PM
Chromium	15.6	1.46		mg/Kg-dry	1	8/8/2013 10:30:33 PM
Lead	207	5.83		mg/Kg-dry	1	8/8/2013 10:30:33 PM
Selenium	ND	17.5		mg/Kg-dry	1	8/8/2013 10:30:33 PM
Silver	ND	2.04		mg/Kg-dry	1	8/8/2013 10:30:33 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.764	0.0549		mg/Kg-dry	1	8/7/2013 4:59:15 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	15.3	0		wt%	1	8/8/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	23		mg/Kg-dry	1	8/7/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	120		mg/Kg-dry	1	8/7/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	7.0	0		pH Units	1	8/7/2013 11:10:00 AM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	320	1.0		µmhos/cm	1	8/8/2013

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Method Blank

Sample ID **mb-23455** Batch ID: **23455** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/8/13 8:31:07 PM** Prep Date **8/8/13**
Client ID: Run ID: **ICP-OPTIMA_130808A** SeqNo: **858565**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	ND	6.2	mg/Kg									
Barium	ND	12	mg/Kg									
Cadmium	ND	0.62	mg/Kg									
Chromium	ND	1.2	mg/Kg									
Lead	ND	5.0	mg/Kg									
Selenium	ND	15	mg/Kg									
Silver	ND	1.8	mg/Kg									

Sample ID **mb-23451** Batch ID: **23451** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/7/13 4:06:41 PM** Prep Date **8/7/13**
Client ID: Run ID: **HG-FIMS_130807A** SeqNo: **858493**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	ND	0.050	mg/Kg									

Sample ID **MB-R51589** Batch ID: **R51589** Test Code: **SW7.3.3.2** Units: **mg/Kg** Analysis Date **8/7/13** Prep Date
Client ID: Run ID: **ING-WET_130807G** SeqNo: **858815**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Cyanide	ND	20	mg/Kg									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Method Blank

Sample ID **MB-R51586** Batch ID: **R51586** Test Code: **SW7.3.4.2** Units: **mg/Kg** Analysis Date **8/7/13** Prep Date

Client ID: Run ID: **ING-WET_130807F** SeqNo: **858753**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Sulfide	ND	100	mg/Kg									

Sample ID **MB-R51566** Batch ID: **R51566** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/8/13** Prep Date

Client ID: Run ID: **ING-WET_130808A** SeqNo: **858529**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	ND	1.0	µmhos/cm									

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **lcs-23455** Batch ID: **23455** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/8/13 8:36:40 PM** Prep Date **8/8/13**
Client ID: Run ID: **ICP-OPTIMA_130808A** SeqNo: **858566**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	243.4	6.2	mg/Kg	250	0	97.3	80	120	0			
Barium	430.1	12	mg/Kg	503.8	0	85.4	80	120	0			
Cadmium	94.38	0.62	mg/Kg	100	0	94.4	80	120	0			
Chromium	484.2	1.2	mg/Kg	500	0	96.8	80	120	0			
Lead	247	5.0	mg/Kg	249.8	0	98.9	80	120	0			
Selenium	177.2	15	mg/Kg	199.1	0	89	80	120	0			
Silver	49.09	1.8	mg/Kg	50	0	98.2	80	120	0			

Sample ID **lcsd-23455** Batch ID: **23455** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/8/13 8:44:49 PM** Prep Date **8/8/13**
Client ID: Run ID: **ICP-OPTIMA_130808A** SeqNo: **858567**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	243.5	6.2	mg/Kg	250	0	97.4	80	120	243.4	0.0791	20	
Barium	421.9	12	mg/Kg	503.8	0	83.8	80	120	430.1	1.92	20	
Cadmium	94.62	0.62	mg/Kg	100	0	94.6	80	120	94.38	0.26	20	
Chromium	482.2	1.2	mg/Kg	500	0	96.4	80	120	484.2	0.412	20	
Lead	248.3	5.0	mg/Kg	249.8	0	99.4	80	120	247	0.522	20	
Selenium	177.4	15	mg/Kg	199.1	0	89.1	80	120	177.2	0.109	20	
Silver	47.85	1.8	mg/Kg	50	0	95.7	80	120	49.09	2.56	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **lcs-23451** Batch ID: **23451** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/7/13 4:09:54 PM** Prep Date **8/7/13**
Client ID: Run ID: **HG-FIMS_130807A** SeqNo: **858494**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.8033	0.049	mg/Kg	0.8204	0	97.9	80	120	0			

Sample ID **lcsd-23451** Batch ID: **23451** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/7/13 4:13:08 PM** Prep Date **8/7/13**
Client ID: Run ID: **HG-FIMS_130807A** SeqNo: **858495**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.7924	0.048	mg/Kg	0.8004	0	99	80	120	0.8033	1.37	20	

Sample ID **PXYLENE** Batch ID: **R51594** Test Code: **SW1010** Units: **°F** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814A** SeqNo: **858938**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Ignitability	80	0	°F	81	0	98.8	97.5	102.5	0			

Sample ID **3% ACETONE** Batch ID: **R51594** Test Code: **SW1010** Units: **°F** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814A** SeqNo: **858939**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Ignitability	100	0	°F	100	0	100	98	102	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **LCS-R51556** Batch ID: **R51556** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/7/13 11:10:00 AM** Prep Date
Client ID: Run ID: **ING-WET_130807D** SeqNo: **858422**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	6.05	0	pH Units	6	0	101	99	101	0			

Sample ID **LCSD-R51556** Batch ID: **R51556** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/7/13 11:10:00 AM** Prep Date
Client ID: Run ID: **ING-WET_130807D** SeqNo: **858428**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	6.05	0	pH Units	6	0	101	99	101	6.05	0	5	

Sample ID **LCS-R51566** Batch ID: **R51566** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/8/13** Prep Date
Client ID: Run ID: **ING-WET_130808A** SeqNo: **858530**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1364	1.0	µmhos/cm	1413	0	96.5	95	105	0			

Sample ID **lcsd-R51566** Batch ID: **R51566** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/8/13** Prep Date
Client ID: Run ID: **ING-WET_130808A** SeqNo: **858535**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1358	1.0	µmhos/cm	1413	0	96.1	95	105	1364	0.441	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Sample Duplicate

Sample ID **1308011-01bd** Batch ID: **23455** Test Code: **SW6010B** Units: **mg/Kg-dry** Analysis Date **8/8/13 9:28:05 PM** Prep Date **8/8/13**
Client ID: **GZ 1** Run ID: **ICP-OPTIMA_130808A** SeqNo: **858572**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	30.26	6.7	mg/Kg-dry	0	0	0	0	0	22.69	28.6	20	R
Barium	152.2	13	mg/Kg-dry	0	0	0	0	0	101.4	40	20	R
Cadmium	0.3218	0.67	mg/Kg-dry	0	0	0	0	0	0.3864	18.3	20	J
Chromium	19.01	1.3	mg/Kg-dry	0	0	0	0	0	15.33	21.4	20	R
Lead	435.5	5.4	mg/Kg-dry	0	0	0	0	0	219.1	66.1	20	R
Selenium	ND	16	mg/Kg-dry	0	0	0	0	0	0	0	20	
Silver	4.503	1.9	mg/Kg-dry	0	0	0	0	0	3.666	20.5	20	R

Sample ID **1308011-04CD** Batch ID: **R51594** Test Code: **SW1010** Units: **°F** Analysis Date **8/14/13** Prep Date
Client ID: **GZ 6 2'** Run ID: **ING-WET_130814A** SeqNo: **858937**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Ignitability	ND	0	°F	0	0	0	0	0	0	0	20	

Sample ID **1308011-04CD** Batch ID: **R51589** Test Code: **SW7.3.3.2** Units: **mg/Kg-dry** Analysis Date **8/7/13** Prep Date
Client ID: **GZ 6 2'** Run ID: **ING-WET_130807G** SeqNo: **858834**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Cyanide	ND	21	mg/Kg-dry	0	0	0	0	0	0	0	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Sample Duplicate

Sample ID **1308011-04CD** Batch ID: **R51586** Test Code: **SW7.3.4.2** Units: **mg/Kg-dry** Analysis Date **8/7/13** Prep Date

Client ID: **GZ 6 2'** Run ID: **ING-WET_130807F** SeqNo: **858758**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Sulfide	ND	110	mg/Kg-dry	0	0	0	0	0	0	0	20	

Sample ID **1308011-04CD** Batch ID: **R51556** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/7/13 11:10:00 AM** Prep Date

Client ID: **GZ 6 2'** Run ID: **ING-WET_130807D** SeqNo: **858427**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	8.3	0	pH Units	0	0	0	0	0	8.31	0.12	5	

Sample ID **1308011-04CDUP** Batch ID: **R51566** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/8/13** Prep Date

Client ID: **GZ 6 2'** Run ID: **ING-WET_130808A** SeqNo: **858536**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1404	1.0	µmhos/cm	0	0	0	0	0	1376	2.01	20	

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308011
Project: 18.0171593.00 NRA

Date: *14-Aug-13*

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **1308011-01bms** Batch ID: **23455** Test Code: **SW6010B** Units: **mg/Kg-dry** Analysis Date **8/8/13 9:36:07 PM** Prep Date **8/8/13**
Client ID: **GZ 1** Run ID: **ICP-OPTIMA_130808A** SeqNo: **858573**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	258.2	6.6	mg/Kg-dry	263.9	22.69	89.3	75	125	0			
Barium	601	13	mg/Kg-dry	531.7	101.4	93.9	75	125	0			
Cadmium	91.48	0.66	mg/Kg-dry	105.6	0.3864	86.3	75	125	0			
Chromium	510.6	1.3	mg/Kg-dry	527.8	15.33	93.8	75	125	0			
Lead	468.4	5.3	mg/Kg-dry	263.6	219.1	94.5	75	125	0			
Selenium	173.9	16	mg/Kg-dry	210.2	0	82.7	75	125	0			
Silver	54.04	1.8	mg/Kg-dry	52.78	3.666	95.5	75	125	0			

Sample ID **1308011-01bmsd** Batch ID: **23455** Test Code: **SW6010B** Units: **mg/Kg-dry** Analysis Date **8/8/13 9:44:26 PM** Prep Date **8/8/13**
Client ID: **GZ 1** Run ID: **ICP-OPTIMA_130808A** SeqNo: **858574**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	269.4	6.6	mg/Kg-dry	263.3	22.69	93.7	75	125	258.2	4.23	20	
Barium	651	13	mg/Kg-dry	530.5	101.4	104	75	125	601	7.99	20	
Cadmium	96.23	0.66	mg/Kg-dry	105.3	0.3864	91	75	125	91.48	5.06	20	
Chromium	532.4	1.3	mg/Kg-dry	526.5	15.33	98.2	75	125	510.6	4.19	20	
Lead	450.7	5.3	mg/Kg-dry	263	219.1	88.1	75	125	468.4	3.84	20	
Selenium	183.1	16	mg/Kg-dry	209.7	0	87.3	75	125	173.9	5.16	20	
Silver	52.79	1.8	mg/Kg-dry	52.65	3.666	93.3	75	125	54.04	2.34	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
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www.amrolabs.com

August 20, 2013

ANALYTICAL TEST RESULTS

Matthew Steele
GZA GeoEnvironmental, Inc.
372 Merrimac Street
Newburyport, MA 01950
TEL: (781) 278-4805
FAX:

Subject: 18.0171593.00 NRA Workorder No.: 1308013

Dear Matthew Steele:

AMRO Environmental Laboratories Corp. received 2 samples on 8/8/2013 for the analyses presented in the following report.

AMRO is accredited in accordance with NELAC and certifies that these test results meet all the requirements of NELAC, where applicable, unless otherwise noted in the case narrative.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of 60 days from sample receipt date (90 days for samples from New York). After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 61 pages. This letter is an integral part of your data report. All results in this project relate only to the sample(s) as received by the laboratory and documented in the Chain-of-Custody. This report shall not be reproduced except in full, without the written approval of the laboratory. If you have any questions regarding this project in the future, please refer to the Workorder Number above.

Sincerely,

Nancy Stewart
Vice President

State Certifications: NH (NELAC): 1001, MA: M-NH012, CT: PH-0758, NY: 11278 (NELAC), ME: NH012 and 1001.

Hard copy of the State Certification is available upon request.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308013
Date Received: 8/8/2013

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date	Collection Time
1308013-01A	GZ-10 2'	8/7/2013	8:22 AM
1308013-01B	GZ-10 2'	8/7/2013	8:22 AM
1308013-01C	GZ-10 2'	8/7/2013	8:22 AM
1308013-02A	GZ-10 6'	8/7/2013	8:52 AM
1308013-02B	GZ-10 6'	8/7/2013	8:52 AM
1308013-02C	GZ-10 6'	8/7/2013	8:52 AM

1

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308013
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308013-01A	GZ-10 2'	8/7/2013 8:22:00 AM	Soil	MCP 8260B, EPA 5035 MeOH preserved		8/9/2013	
				EPA 5035,methanol preserved	8/7/2013	R51572	
				Volatile Petroleum Hydrocarbons 1.1		8/9/2013	
					8/7/2013	R51571	
1308013-01B				EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	
				EPA 8082 PCBS IN SOIL/SOLIDS		8/9/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/9/2013	23457	
				EPH 1.1, Soil, Diesel Targets		8/13/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				EPH 1.1, Soil, Diesel Targets		8/13/2013	
					8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
1308013-01C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013	
						R51613	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013	
						R51609	
				EPA 9045C pH/Corrosivity in Soil		8/9/2013	
						R51579	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308013
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308013-01C	GZ-10 2'	8/7/2013 8:22:00 AM	Soil	EPA 9050ASpecific Conductance (modified for soil))		8/14/2013	
						R51608	
				Percent Moisture		8/12/2013	
						R51585	
1308013-02A	GZ-10 6'	8/7/2013 8:52:00 AM		MCP 8260B, EPA 5035 MeOH preserved		8/9/2013	
				EPA 5035,methanol preserved	8/7/2013	R51572	
				Volatile Petroleum Hydrocarbons 1.1		8/9/2013	
					8/7/2013	R51571	
				Volatile Petroleum Hydrocarbons 1.1		8/13/2013	
					8/7/2013	R51590	
1308013-02B				EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	
				EPA 8082 PCBS IN SOIL/SOLIDS		8/9/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/9/2013	23457	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
					8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
				MCP SVOCs 8270C, EPA 3541		8/14/2013	
					8/13/2013	23462	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308013
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308013-02C	GZ-10 6'	8/7/2013 8:52:00 AM	Soil	EPA 1010 Ignitability		8/14/2013 R51594	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013 R51613	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013 R51609	
				EPA 9045C pH/Corrosivity in Soil		8/9/2013 R51579	
				EPA 9050ASpecific Conductance (modified for soil))		8/14/2013 R51608	
				Percent Moisture		8/12/2013 R51585	

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

NO: 63085

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
10.0171593.00	NRA	MA	MATT STEELE		1305013

P.O.#:	Results Needed by:
171593.00	

QUOTE #:	Seal Intact? Yes No N/A

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	EPH - RANGES	VPH - RANGES	RCRA 8 Metals	pH	Flashpoint	PCB's	reactivity/Conductivity	SVOCs	VOCs	TCLP - metals (HOLD)	Remarks
GZ-10 2'	8/7/13 0822	SL	4		X	X	X	X	X	X	X	X	X	X	X	HOLD TCLP Metals
GZ-10 6'	8/7/13 0852	SL	4		X	X	X	X	X	X	X	X	X	X	X	

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

Send Results To: Matt Steele
GZA GeoEnvironmental
Newburyport, MA

PHONE #: 781-278-4805 FAX #:
E-mail: matthew.steele@gza.com

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must *have a coded AUTHORIZATION NUMBER*
AUTHORIZATION No.: BY:

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:

Dissolved Metals Field Filtered? YES ☐ NO ☐

MCP Presumptive Certainty Required? YES ☐ NO ☐

MCP Methods Needed: YES ☒ NO ☐

AMRO report package level needed:

EDD required:

Required Reporting Limits:
S-1 ☒ GW-1 ☐
S-2 ☐ GW-2 ☒
S-3 ☐ GW-3 ☐
Other:

Relinquished By:	Date/Time	Received By
Matt Steele	8/8/13 1406	Leigh Lawson
Leigh Lawson	8/8/13 1530	Amber Hoff

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

KNOWN SITE CONTAMINATION: Lead

White: Lab Copy Yellow: Client Copy

SHEET OF

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: GZA-MA
Project Name: 18.0171593.00 NRA
Ship via: (circle one) Fed Ex., UPS, (AMRO Courier,)
Hand Del., Other Courier, Other:

AMRO ID: 1308013
Date Rec.: 8-8-13
Date Due: 8-15-13

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?			✓	
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 4°	✓			
Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?		✓		
Is client temperature = or <6°C ?	✓			
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓	✓		PH out of Holding Time
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?			✓	
17. Were the sample volumes sufficient for requested analysis?	✓			
18. Were all samples received?	✓			
19. VPH and VOA Soils only:				
Sampling Method (VPH) (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method (VOA) (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?	✓			
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?	✓			
If NO then client must be faxed.				
Were vials provided by AMRO?	✓			
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?	✓			
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:				
What samples sent:			✓	
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: MG Date: 8-8-13
Labeled By: MG Date: 8-8-13
Logged in By: MG Date: 8-8-13
Checked By: NS Date: 8-8-13

NA= Not Applicable

CASE NARRATIVE

GC/MS VOLATILES: 8260B:

1. 1,4-Dioxane, Bromoform, Diisopropyl ether and Tertiary Amyl Methyl Ether recovered outside the control limits (+/-20%) in the Continuing Calibration Verification Standard analyzed on 08/09/13.

2. The minimum response factor was not met for Acetone, 2-Butanone, and 4-Methyl-2-pentanone on 08/09/13.

3. A quadratic regression was used for Dibromochloromethane, Acetone and 1,1,1,2,-Tetrachloroethane in the Initial Calibration analyzed on 06/21/13.

MA-DEP VPH 1.1:

1. The recommended ratio of sample weight to volume of Methanol (1:1 ml/g (+/- 25%)) was out high for sample GZ-10 2' (1308013-01A).

2. The surrogate 2,5-Dibromotoluene recovered above the control limits in sample GZ-10 6' (1308013-02A) due to high sample matrix.

3. A quadratic regression was used for the C9-C12 aliphatic range and n-Decane in the Initial Calibration analyzed on 05/02/13.

GC/MS SEMIVOLATILES: 8270C:

1. No QC deviations were noted.

GC/ECD-PCBs: 8082:

1. No QC deviations were noted.

MA-DEP EPH 1.1:

1. AMRO Laboratory analyzed EPH using the GC/MS option as indicated in the MADEP EPH Rev.1.1, Section 9.10 May 2004.

2. The C11-C22 Aromatic Hydrocarbons range result has not been adjusted to exclude the concentration of Target PAH Analytes.

3. Only ranges are reported per client request.

CLIENT:	GZA GeoEnvironmental, Inc.
Project:	18.0171593.00 NRA
Lab Order:	1308013

CASE NARRATIVE

METALS:

1. The RCRA-8 metals were analyzed at the request of the client.

2. No QC deviations were noted.

WET CHEMISTRY:

1. The samples for pH were received past holding time and were analyzed at the request of the client.

2. No other QC deviations were noted.

MassDEP Analytical Protocol Certification Form

Laboratory Name: AMRO Environmental Lab. Corp. Project #: 18.0171593.00

Project Location: NRA RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):

1308013-01+02

Matrices: ☐ Groundwater/Surface Water ☑ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A ☑	7470/7471 Hg CAM III B ☑	MassDEP VPH CAM IV A ☑	8081 Pesticides CAM V B ☐	7196 Hex Cr CAM VI B ☐	MassDEP APH CAM IX A ☐
8270 SVOC CAM II B ☑	7010 Metals CAM III C ☐	MassDEP EPH CAM IV B ☑	8151 Herbicides CAM V C ☐	8330 Explosives CAM VIII A ☐	TO-15 VOC CAM IX B ☐
6010 Metals CAM III A ☑	6020 Metals CAM III D ☐	8082 PCB CAM V A ☑	9014 Total Cyanide/PAC CAM VI A ☐	6860 Perchlorate CAM VIII B ☐	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☐ Yes ☑ No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	☑ Yes ☐ No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes ☐ No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☑ Yes ☐ No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☑ Yes ☐ No ☐ Yes ☐ No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	☑ Yes ☐ No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes ☐ No[1]

***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	☐ Yes ☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes ☑ No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Nancy Stewart **Position:** Vice President

Printed Name: Nancy Stewart **Date:** 8-20-13

DATA COMMENT PAGE

Organic Data Qualifiers

ND	Indicates compound was analyzed for, but not detected at or above the reporting limit.
J	Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than the method detection limit.
H	Method prescribed holding time exceeded.
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
B	This flag is used when the analyte is found in the associated blank as well as in the sample.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
#	See Case Narrative

Micro Data Qualifiers

TNTC	Too numerous to count

Inorganic Data Qualifiers

ND or U	Indicates element was analyzed for, but not detected at or above the reporting limit.
J	Indicates a value greater than or equal to the method detection limit, but less than the quantitation limit.
H	Indicates analytical holding time exceedance.
B	Indicates that the analyte is found in the associated blank, as well as in the sample.
MSA	Indicates value determined by the Method of Standard Addition
+	Indicates the correlation coefficient for the Method of Standard Addition is less than 0.995
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
PS	The analyte was below the Reporting Limit but has significant matrix interference as noted by the poor recovery of the Post Digestion Spike.
#	See Case Narrative
*	MCL Exceeded

Report Comments:

1. Soil, sediment and sludge sample results are reported on a "dry weight" basis.
2. Reporting limits are adjusted for sample size used, dilutions and moisture content, if applicable.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-10 2'
Lab Order:	1308013	**Collection Date:**	8/7/2013 8:22:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308013-01A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	200		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Tertiary Amyl Methyl Ether	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Benzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Bromobenzene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Bromochloromethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Bromodichloromethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Bromoform	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Bromomethane	ND	82		µg/Kg-dry	1	8/9/2013 4:22:00 PM
sec-Butylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
n-Butylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
tert-Butylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Carbon disulfide	ND	82		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Carbon tetrachloride	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Chlorobenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Dibromochloromethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Chloroethane	ND	82		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Chloroform	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Chloromethane	ND	82		µg/Kg-dry	1	8/9/2013 4:22:00 PM
2-Chlorotoluene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
4-Chlorotoluene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2-Dibromo-3-chloropropane	ND	100		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2-Dibromoethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Dibromomethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,3-Dichlorobenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2-Dichlorobenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,4-Dichlorobenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Dichlorodifluoromethane	ND	82		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,1-Dichloroethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2-Dichloroethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,1-Dichloroethene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
cis-1,2-Dichloroethene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
trans-1,2-Dichloroethene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2-Dichloropropane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,3-Dichloropropane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
2,2-Dichloropropane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,1-Dichloropropene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
cis-1,3-Dichloropropene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
trans-1,3-Dichloropropene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Diethyl ether	ND	200		µg/Kg-dry	1	8/9/2013 4:22:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308013
Project: 18.0171593.00 NRA
Lab ID: 1308013-01A

Client Sample ID: GZ-10 2'
Collection Date: 8/7/2013 8:22:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,4-Dioxane	ND	1,000		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Ethyl Tertiary Butyl Ether	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Ethylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Hexachlorobutadiene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
2-Hexanone	ND	200		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Isopropylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
4-Isopropyltoluene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
2-Butanone	ND	200		µg/Kg-dry	1	8/9/2013 4:22:00 PM
4-Methyl-2-pentanone	ND	200		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Methyl tert-butyl ether	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Methylene chloride	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Naphthalene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
n-Propylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Styrene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,1,1,2-Tetrachloroethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,1,2,2-Tetrachloroethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Tetrachloroethene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Tetrahydrofuran	ND	200		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Toluene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2,4-Trichlorobenzene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2,3-Trichlorobenzene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,1,1-Trichloroethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,1,2-Trichloroethane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Trichloroethene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Trichlorofluoromethane	ND	82		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2,3-Trichloropropane	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,2,4-Trimethylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
1,3,5-Trimethylbenzene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Vinyl chloride	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
o-Xylene	ND	20		µg/Kg-dry	1	8/9/2013 4:22:00 PM
m,p-Xylene	ND	41		µg/Kg-dry	1	8/9/2013 4:22:00 PM
Surr: Dibromofluoromethane	110	70-130		%REC	1	8/9/2013 4:22:00 PM
Surr: 1,2-Dichloroethane-d4	99.4	70-130		%REC	1	8/9/2013 4:22:00 PM
Surr: Toluene-d8	122	70-130		%REC	1	8/9/2013 4:22:00 PM
Surr: 4-Bromofluorobenzene	104	70-130		%REC	1	8/9/2013 4:22:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308013
Project: 18.0171593.00 NRA
Lab ID: 1308013-02A

Client Sample ID: GZ-10 6'
Collection Date: 8/7/2013 8:52:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	1,100		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Tertiary Amyl Methyl Ether	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Benzene	ND	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Bromobenzene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Bromochloromethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Bromodichloromethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Bromoform	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Bromomethane	ND	440		µg/Kg-dry	5	8/9/2013 4:57:00 PM
sec-Butylbenzene	980	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
n-Butylbenzene	ND	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
tert-Butylbenzene	130	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Carbon disulfide	ND	440		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Carbon tetrachloride	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Chlorobenzene	ND	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Dibromochloromethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Chloroethane	ND	440		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Chloroform	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Chloromethane	ND	440		µg/Kg-dry	5	8/9/2013 4:57:00 PM
2-Chlorotoluene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
4-Chlorotoluene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2-Dibromo-3-chloropropane	ND	550		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2-Dibromoethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Dibromomethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,3-Dichlorobenzene	ND	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2-Dichlorobenzene	ND	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,4-Dichlorobenzene	ND	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Dichlorodifluoromethane	ND	440		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,1-Dichloroethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2-Dichloroethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,1-Dichloroethene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
cis-1,2-Dichloroethene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
trans-1,2-Dichloroethene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2-Dichloropropane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,3-Dichloropropane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
2,2-Dichloropropane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,1-Dichloropropene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
cis-1,3-Dichloropropene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
trans-1,3-Dichloropropene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Diethyl ether	ND	1,100		µg/Kg-dry	5	8/9/2013 4:57:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308013
Project: 18.0171593.00 NRA
Lab ID: 1308013-02A

Client Sample ID: GZ-10 6'
Collection Date: 8/7/2013 8:52:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,4-Dioxane	ND	5,500		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Ethyl Tertiary Butyl Ether	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Ethylbenzene	760	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Hexachlorobutadiene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
2-Hexanone	ND	1,100		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Isopropylbenzene	490	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
4-Isopropyltoluene	1,600	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
2-Butanone	ND	1,100		µg/Kg-dry	5	8/9/2013 4:57:00 PM
4-Methyl-2-pentanone	ND	1,100		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Methyl tert-butyl ether	ND	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Methylene chloride	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Naphthalene	6,500	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
n-Propylbenzene	1,400	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Styrene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,1,1,2-Tetrachloroethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,1,2,2-Tetrachloroethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Tetrachloroethene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Tetrahydrofuran	ND	1,100		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Toluene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2,4-Trichlorobenzene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2,3-Trichlorobenzene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,1,1-Trichloroethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,1,2-Trichloroethane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Trichloroethene	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Trichlorofluoromethane	ND	440		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2,3-Trichloropropane	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,2,4-Trimethylbenzene	11,000	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
1,3,5-Trimethylbenzene	3,700	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Vinyl chloride	ND	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
o-Xylene	170	110		µg/Kg-dry	5	8/9/2013 4:57:00 PM
m,p-Xylene	710	220		µg/Kg-dry	5	8/9/2013 4:57:00 PM
Surr: Dibromofluoromethane	113	70-130		%REC	5	8/9/2013 4:57:00 PM
Surr: 1,2-Dichloroethane-d4	104	70-130		%REC	5	8/9/2013 4:57:00 PM
Surr: Toluene-d8	124	70-130		%REC	5	8/9/2013 4:57:00 PM
Surr: 4-Bromofluorobenzene	109	70-130		%REC	5	8/9/2013 4:57:00 PM

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **mb-08/09/13** Batch ID: **R51572** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/9/2013 12:51:00 PM** Prep Date: **8/9/2013**
Client ID: Run ID: **V-2_130809A** SeqNo: **858665**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	ND	250	µg/Kg									
Tertiary Amyl Methyl Ether	ND	50	µg/Kg									
Benzene	ND	25	µg/Kg									
Bromobenzene	ND	50	µg/Kg									
Bromochloromethane	ND	50	µg/Kg									
Bromodichloromethane	ND	50	µg/Kg									
Bromoform	ND	50	µg/Kg									
Bromomethane	ND	100	µg/Kg									
sec-Butylbenzene	ND	25	µg/Kg									
n-Butylbenzene	ND	25	µg/Kg									
tert-Butylbenzene	ND	25	µg/Kg									
Carbon disulfide	ND	100	µg/Kg									
Carbon tetrachloride	ND	50	µg/Kg									
Chlorobenzene	ND	25	µg/Kg									
Dibromochloromethane	ND	50	µg/Kg									
Chloroethane	ND	100	µg/Kg									
Chloroform	ND	50	µg/Kg									
Chloromethane	ND	100	µg/Kg									
2-Chlorotoluene	ND	50	µg/Kg									
4-Chlorotoluene	ND	50	µg/Kg									
1,2-Dibromo-3-chloropropane	ND	120	µg/Kg									
1,2-Dibromoethane	ND	50	µg/Kg									
Dibromomethane	ND	50	µg/Kg									
1,3-Dichlorobenzene	ND	25	µg/Kg									
1,2-Dichlorobenzene	ND	25	µg/Kg									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

1,4-Dichlorobenzene	ND	25	µg/Kg
Dichlorodifluoromethane	ND	100	µg/Kg
1,1-Dichloroethane	ND	50	µg/Kg
1,2-Dichloroethane	ND	50	µg/Kg
1,1-Dichloroethene	ND	50	µg/Kg
cis-1,2-Dichloroethene	ND	50	µg/Kg
trans-1,2-Dichloroethene	ND	50	µg/Kg
1,2-Dichloropropane	ND	50	µg/Kg
1,3-Dichloropropane	ND	50	µg/Kg
2,2-Dichloropropane	ND	50	µg/Kg
1,1-Dichloropropene	ND	50	µg/Kg
cis-1,3-Dichloropropene	ND	50	µg/Kg
trans-1,3-Dichloropropene	ND	50	µg/Kg
Diethyl ether	ND	250	µg/Kg
Diisopropyl ether	ND	50	µg/Kg
1,4-Dioxane	ND	1,200	µg/Kg
Ethyl Tertiary Butyl Ether	ND	50	µg/Kg
Ethylbenzene	ND	25	µg/Kg
Hexachlorobutadiene	ND	50	µg/Kg
2-Hexanone	ND	250	µg/Kg
Isopropylbenzene	ND	25	µg/Kg
4-Isopropyltoluene	ND	25	µg/Kg
2-Butanone	ND	250	µg/Kg
4-Methyl-2-pentanone	ND	250	µg/Kg
Methyl tert-butyl ether	ND	25	µg/Kg
Methylene chloride	ND	50	µg/Kg
Naphthalene	ND	50	µg/Kg
n-Propylbenzene	ND	25	µg/Kg
Styrene	ND	50	µg/Kg
1,1,1,2-Tetrachloroethane	ND	50	µg/Kg
1,1,2,2-Tetrachloroethane	ND	50	µg/Kg

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Tetrachloroethene	ND	50	µg/Kg						
Tetrahydrofuran	ND	250	µg/Kg						
Toluene	ND	50	µg/Kg						
1,2,4-Trichlorobenzene	ND	50	µg/Kg						
1,2,3-Trichlorobenzene	ND	50	µg/Kg						
1,1,1-Trichloroethane	ND	50	µg/Kg						
1,1,2-Trichloroethane	ND	50	µg/Kg						
Trichloroethene	ND	50	µg/Kg						
Trichlorofluoromethane	ND	100	µg/Kg						
1,2,3-Trichloropropane	ND	50	µg/Kg						
1,2,4-Trimethylbenzene	ND	25	µg/Kg						
1,3,5-Trimethylbenzene	ND	25	µg/Kg						
Vinyl chloride	ND	50	µg/Kg						
o-Xylene	ND	25	µg/Kg						
m,p-Xylene	ND	50	µg/Kg						
Surr: Dibromofluoromethane	2528	25	µg/Kg	2500	0	101	70	130	0
Surr: 1,2-Dichloroethane-d4	2259	25	µg/Kg	2500	0	90.4	70	130	0
Surr: Toluene-d8	2768	25	µg/Kg	2500	0	111	70	130	0
Surr: 4-Bromofluorobenzene	2327	25	µg/Kg	2500	0	93.1	70	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **lcs-08/09/13** Batch ID: **R51572** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/9/2013 11:05:00 AM** Prep Date: **8/9/2013**
Client ID: Run ID: **V-2_130809A** SeqNo: **858667**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	367.5	250	µg/Kg	500	0	73.5	40	160	0			
Tertiary Amyl Methyl Ether	541.2	50	µg/Kg	500	0	108	70	130	0			
Benzene	545.2	25	µg/Kg	500	0	109	70	130	0			
Bromobenzene	510	50	µg/Kg	500	0	102	70	130	0			
Bromochloromethane	501.2	50	µg/Kg	500	0	100	70	130	0			
Bromodichloromethane	479.5	50	µg/Kg	500	0	95.9	70	130	0			
Bromoform	602.5	50	µg/Kg	500	0	120	70	130	0			
Bromomethane	611	100	µg/Kg	500	0	122	40	160	0			
sec-Butylbenzene	547.5	25	µg/Kg	500	0	110	70	130	0			
n-Butylbenzene	503.5	25	µg/Kg	500	0	101	70	130	0			
tert-Butylbenzene	538	25	µg/Kg	500	0	108	70	130	0			
Carbon disulfide	436.8	100	µg/Kg	500	0	87.4	70	130	0			
Carbon tetrachloride	539.8	50	µg/Kg	500	0	108	70	130	0			
Chlorobenzene	478.2	25	µg/Kg	500	0	95.6	70	130	0			
Dibromochloromethane	565	50	µg/Kg	500	0	113	70	130	0			
Chloroethane	485.2	100	µg/Kg	500	0	97	70	130	0			
Chloroform	460.5	50	µg/Kg	500	0	92.1	70	130	0			
Chloromethane	497.5	100	µg/Kg	500	0	99.5	40	160	0			
2-Chlorotoluene	478.8	50	µg/Kg	500	0	95.8	70	130	0			
4-Chlorotoluene	472.5	50	µg/Kg	500	0	94.5	70	130	0			
1,2-Dibromo-3-chloropropane	649.5	120	µg/Kg	500	0	130	70	130	0			
1,2-Dibromoethane	476	50	µg/Kg	500	0	95.2	70	130	0			
Dibromomethane	497	50	µg/Kg	500	0	99.4	70	130	0			
1,3-Dichlorobenzene	496.5	25	µg/Kg	500	0	99.3	70	130	0			
1,2-Dichlorobenzene	489	25	µg/Kg	500	0	97.8	70	130	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

1,4-Dichlorobenzene	493.8	25	µg/Kg	500	0	98.8	70	130	0
Dichlorodifluoromethane	425	100	µg/Kg	500	0	85	40	160	0
1,1-Dichloroethane	541.2	50	µg/Kg	500	0	108	70	130	0
1,2-Dichloroethane	455	50	µg/Kg	500	0	91	70	130	0
1,1-Dichloroethene	522.5	50	µg/Kg	500	0	104	70	130	0
cis-1,2-Dichloroethene	529.8	50	µg/Kg	500	0	106	70	130	0
trans-1,2-Dichloroethene	486	50	µg/Kg	500	0	97.2	70	130	0
1,2-Dichloropropane	529.2	50	µg/Kg	500	0	106	70	130	0
1,3-Dichloropropane	435	50	µg/Kg	500	0	87	70	130	0
2,2-Dichloropropane	561.2	50	µg/Kg	500	0	112	70	130	0
1,1-Dichloropropene	534.2	50	µg/Kg	500	0	107	70	130	0
cis-1,3-Dichloropropene	500.5	50	µg/Kg	500	0	100	70	130	0
trans-1,3-Dichloropropene	531.8	50	µg/Kg	500	0	106	70	130	0
Diethyl ether	502.5	250	µg/Kg	500	0	100	70	130	0
Diisopropyl ether	570.2	50	µg/Kg	500	0	114	70	130	0
1,4-Dioxane	2876	1,200	µg/Kg	2500	0	115	40	160	0
Ethyl Tertiary Butyl Ether	538.8	50	µg/Kg	500	0	108	70	130	0
Ethylbenzene	450.8	25	µg/Kg	500	0	90.2	70	130	0
Hexachlorobutadiene	512.5	50	µg/Kg	500	0	103	70	130	0
2-Hexanone	340.8	250	µg/Kg	500	0	68.2	40	160	0
Isopropylbenzene	522.8	25	µg/Kg	500	0	105	70	130	0
4-Isopropyltoluene	533.2	25	µg/Kg	500	0	107	70	130	0
2-Butanone	385.5	250	µg/Kg	500	0	77.1	40	160	0
4-Methyl-2-pentanone	467.8	250	µg/Kg	500	0	93.6	40	160	0
Methyl tert-butyl ether	476.5	25	µg/Kg	500	0	95.3	70	130	0
Methylene chloride	490.2	50	µg/Kg	500	0	98	70	130	0
Naphthalene	419	50	µg/Kg	500	0	83.8	70	130	0
n-Propylbenzene	506.5	25	µg/Kg	500	0	101	70	130	0
Styrene	434.8	50	µg/Kg	500	0	87	70	130	0
1,1,1,2-Tetrachloroethane	591	50	µg/Kg	500	0	118	70	130	0
1,1,2,2-Tetrachloroethane	383.2	50	µg/Kg	500	0	76.7	70	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Tetrachloroethene	454	50	µg/Kg	500	0	90.8	70	130	0
Tetrahydrofuran	527.2	250	µg/Kg	500	0	105	70	130	0
Toluene	496	50	µg/Kg	500	0	99.2	70	130	0
1,2,4-Trichlorobenzene	553	50	µg/Kg	500	0	111	70	130	0
1,2,3-Trichlorobenzene	539.8	50	µg/Kg	500	0	108	70	130	0
1,1,1-Trichloroethane	494.2	50	µg/Kg	500	0	98.8	70	130	0
1,1,2-Trichloroethane	489	50	µg/Kg	500	0	97.8	70	130	0
Trichloroethene	539.5	50	µg/Kg	500	0	108	70	130	0
Trichlorofluoromethane	467.8	100	µg/Kg	500	0	93.6	70	130	0
1,2,3-Trichloropropane	433.8	50	µg/Kg	500	0	86.8	70	130	0
1,2,4-Trimethylbenzene	515.5	25	µg/Kg	500	0	103	70	130	0
1,3,5-Trimethylbenzene	494.8	25	µg/Kg	500	0	99	70	130	0
Vinyl chloride	544.8	50	µg/Kg	500	0	109	70	130	0
o-Xylene	467	25	µg/Kg	500	0	93.4	70	130	0
m,p-Xylene	886	50	µg/Kg	1000	0	88.6	70	130	0
Surr: Dibromofluoromethane	2462	25	µg/Kg	2500	0	98.5	70	130	0
Surr: 1,2-Dichloroethane-d4	2141	25	µg/Kg	2500	0	85.6	70	130	0
Surr: Toluene-d8	2578	25	µg/Kg	2500	0	103	70	130	0
Surr: 4-Bromofluorobenzene	2187	25	µg/Kg	2500	0	87.5	70	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *13-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **lcsd-08/09/13** Batch ID: **R51572** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/9/2013 11:41:00 AM** Prep Date: **8/9/2013**

Client ID: Run ID: **V-2_130809A** SeqNo: **858666**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	328.2	250	µg/Kg	500	0	65.7	40	160	367.5	11.3	20	
Tertiary Amyl Methyl Ether	579.5	50	µg/Kg	500	0	116	70	130	541.2	6.83	20	
Benzene	557.5	25	µg/Kg	500	0	112	70	130	545.2	2.22	20	
Bromobenzene	530.8	50	µg/Kg	500	0	106	70	130	510	3.99	20	
Bromochloromethane	507.5	50	µg/Kg	500	0	102	70	130	501.2	1.24	20	
Bromodichloromethane	497.8	50	µg/Kg	500	0	99.6	70	130	479.5	3.73	20	
Bromoform	628.2	50	µg/Kg	500	0	126	70	130	602.5	4.18	20	
Bromomethane	576	100	µg/Kg	500	0	115	40	160	611	5.9	20	
sec-Butylbenzene	570.5	25	µg/Kg	500	0	114	70	130	547.5	4.11	20	
n-Butylbenzene	515.5	25	µg/Kg	500	0	103	70	130	503.5	2.36	20	
tert-Butylbenzene	571.5	25	µg/Kg	500	0	114	70	130	538	6.04	20	
Carbon disulfide	420	100	µg/Kg	500	0	84	70	130	436.8	3.91	20	
Carbon tetrachloride	548.2	50	µg/Kg	500	0	110	70	130	539.8	1.56	20	
Chlorobenzene	515.8	25	µg/Kg	500	0	103	70	130	478.2	7.55	20	
Dibromochloromethane	593.8	50	µg/Kg	500	0	119	70	130	565	4.96	20	
Chloroethane	489.8	100	µg/Kg	500	0	98	70	130	485.2	0.923	20	
Chloroform	490.2	50	µg/Kg	500	0	98	70	130	460.5	6.26	20	
Chloromethane	486.5	100	µg/Kg	500	0	97.3	40	160	497.5	2.24	20	
2-Chlorotoluene	500.8	50	µg/Kg	500	0	100	70	130	478.8	4.49	20	
4-Chlorotoluene	492.2	50	µg/Kg	500	0	98.4	70	130	472.5	4.09	20	
1,2-Dibromo-3-chloropropane	625.5	120	µg/Kg	500	0	125	70	130	649.5	3.76	20	
1,2-Dibromoethane	476.5	50	µg/Kg	500	0	95.3	70	130	476	0.105	20	
Dibromomethane	514.8	50	µg/Kg	500	0	103	70	130	497	3.51	20	
1,3-Dichlorobenzene	530.5	25	µg/Kg	500	0	106	70	130	496.5	6.62	20	
1,2-Dichlorobenzene	525.5	25	µg/Kg	500	0	105	70	130	489	7.2	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

1,4-Dichlorobenzene	510.8	25	µg/Kg	500	0	102	70	130	493.8	3.38	20
Dichlorodifluoromethane	440.2	100	µg/Kg	500	0	88	40	160	425	3.52	20
1,1-Dichloroethane	548.8	50	µg/Kg	500	0	110	70	130	541.2	1.38	20
1,2-Dichloroethane	496.8	50	µg/Kg	500	0	99.4	70	130	455	8.77	20
1,1-Dichloroethene	513.8	50	µg/Kg	500	0	103	70	130	522.5	1.69	20
cis-1,2-Dichloroethene	546.5	50	µg/Kg	500	0	109	70	130	529.8	3.11	20
trans-1,2-Dichloroethene	499.5	50	µg/Kg	500	0	99.9	70	130	486	2.74	20
1,2-Dichloropropane	546	50	µg/Kg	500	0	109	70	130	529.2	3.12	20
1,3-Dichloropropane	464	50	µg/Kg	500	0	92.8	70	130	435	6.45	20
2,2-Dichloropropane	585	50	µg/Kg	500	0	117	70	130	561.2	4.14	20
1,1-Dichloropropene	530	50	µg/Kg	500	0	106	70	130	534.2	0.799	20
cis-1,3-Dichloropropene	521.8	50	µg/Kg	500	0	104	70	130	500.5	4.16	20
trans-1,3-Dichloropropene	565.5	50	µg/Kg	500	0	113	70	130	531.8	6.15	20
Diethyl ether	527.2	250	µg/Kg	500	0	105	70	130	502.5	4.81	20
Diisopropyl ether	600.2	50	µg/Kg	500	0	120	70	130	570.2	5.13	20
1,4-Dioxane	3230	1,200	µg/Kg	2500	0	129	40	160	2876	11.6	20
Ethyl Tertiary Butyl Ether	555.5	50	µg/Kg	500	0	111	70	130	538.8	3.06	20
Ethylbenzene	488	25	µg/Kg	500	0	97.6	70	130	450.8	7.94	20
Hexachlorobutadiene	518	50	µg/Kg	500	0	104	70	130	512.5	1.07	20
2-Hexanone	369.8	250	µg/Kg	500	0	74	40	160	340.8	8.16	20
Isopropylbenzene	559	25	µg/Kg	500	0	112	70	130	522.8	6.7	20
4-Isopropyltoluene	565.8	25	µg/Kg	500	0	113	70	130	533.2	5.91	20
2-Butanone	409.5	250	µg/Kg	500	0	81.9	40	160	385.5	6.04	20
4-Methyl-2-pentanone	474.8	250	µg/Kg	500	0	95	40	160	467.8	1.49	20
Methyl tert-butyl ether	500.5	25	µg/Kg	500	0	100	70	130	476.5	4.91	20
Methylene chloride	481.5	50	µg/Kg	500	0	96.3	70	130	490.2	1.8	20
Naphthalene	435.5	50	µg/Kg	500	0	87.1	70	130	419	3.86	20
n-Propylbenzene	532.5	25	µg/Kg	500	0	106	70	130	506.5	5	20
Styrene	462	50	µg/Kg	500	0	92.4	70	130	434.8	6.08	20
1,1,1,2-Tetrachloroethane	616.8	50	µg/Kg	500	0	123	70	130	591	4.26	20
1,1,2,2-Tetrachloroethane	420.3	50	µg/Kg	500	0	84	70	130	383.2	9.21	20

Qualifiers: ND - Not Detected at the Reporting Limit

S - Spike Recovery outside accepted recovery limits

B - Analyte detected in the associated Method Blank

J - Analyte detected below quantitation limits

R - RPD outside accepted recovery limits

NA - Not applicable where J values or ND results occur

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Tetrachloroethene	506.5	50	µg/Kg	500	0	101	70	130	454	10.9	20
Tetrahydrofuran	514.2	250	µg/Kg	500	0	103	70	130	527.2	2.5	20
Toluene	529	50	µg/Kg	500	0	106	70	130	496	6.44	20
1,2,4-Trichlorobenzene	561.8	50	µg/Kg	500	0	112	70	130	553	1.57	20
1,2,3-Trichlorobenzene	533.2	50	µg/Kg	500	0	107	70	130	539.8	1.21	20
1,1,1-Trichloroethane	518.2	50	µg/Kg	500	0	104	70	130	494.2	4.74	20
1,1,2-Trichloroethane	531.2	50	µg/Kg	500	0	106	70	130	489	8.28	20
Trichloroethene	543.8	50	µg/Kg	500	0	109	70	130	539.5	0.785	20
Trichlorofluoromethane	467	100	µg/Kg	500	0	93.4	70	130	467.8	0.16	20
1,2,3-Trichloropropane	475	50	µg/Kg	500	0	95	70	130	433.8	9.08	20
1,2,4-Trimethylbenzene	542.8	25	µg/Kg	500	0	109	70	130	515.5	5.15	20
1,3,5-Trimethylbenzene	525.8	25	µg/Kg	500	0	105	70	130	494.8	6.08	20
Vinyl chloride	577	50	µg/Kg	500	0	115	70	130	544.8	5.75	20
o-Xylene	509	25	µg/Kg	500	0	102	70	130	467	8.61	20
m,p-Xylene	985.5	50	µg/Kg	1000	0	98.6	70	130	886	10.6	20
Surr: Dibromofluoromethane	2623	25	µg/Kg	2500	0	105	70	130	0	0	0
Surr: 1,2-Dichloroethane-d4	2284	25	µg/Kg	2500	0	91.4	70	130	0	0	0
Surr: Toluene-d8	2778	25	µg/Kg	2500	0	111	70	130	0	0	0
Surr: 4-Bromofluorobenzene	2401	25	µg/Kg	2500	0	96	70	130	0	0	0

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308013
Project: 18.0171593.00 NRA

Lab ID: 1308013-01 **Collection Date:** 8/7/2013 8:22:00 AM
Collection Time:
Client Sample ID: GZ-10 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	2.1		mg/Kg-dry	1	8/9/2013 8:51:00 AM
C9-C12 Aliphatic Hydrocarbons	ND	2.1		mg/Kg-dry	1	8/9/2013 8:51:00 AM
C9-C10 Aromatic Hydrocarbons	ND	2.1		mg/Kg-dry	1	8/9/2013 8:51:00 AM
Surr: 2,5-Dibromotoluene-PID	106	70-130		%REC	1	8/9/2013 8:51:00 AM
Surr: 2,5-Dibromotoluene-FID	113	70-130		%REC	1	8/9/2013 8:51:00 AM

Lab ID: 1308013-02 **Collection Date:** 8/7/2013 8:52:00 AM
Collection Time:
Client Sample ID: GZ-10 6' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	23	13		mg/Kg-dry	5	8/9/2013 11:41:00 AM
C9-C12 Aliphatic Hydrocarbons	120	26		mg/Kg-dry	10	8/13/2013 12:45:00 AM
C9-C10 Aromatic Hydrocarbons	130	26		mg/Kg-dry	10	8/13/2013 12:45:00 AM
Surr: 2,5-Dibromotoluene-PID	166	70-130	S	%REC	5	8/9/2013 11:41:00 AM
Surr: 2,5-Dibromotoluene-FID	341	70-130	S	%REC	5	8/9/2013 11:41:00 AM

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **mb-08/08/13** Batch ID: **R51571** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/8/2013 5:52:00 PM** Prep Date: **8/8/2013**
Client ID: Run ID: **V-6_130808A** SeqNo: **858640**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C12 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C10 Aromatic Hydrocarbons	ND	2.5	mg/Kg									
Surr: 2,5-Dibromotoluene-PID	2.595	0	mg/Kg	2.5	0	104	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.747	0	mg/Kg	2.5	0	110	70	130	0			

Sample ID: **mb-08/12/13** Batch ID: **R51590** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/12/2013 4:10:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **V-6_130812A** SeqNo: **858823**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C12 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C10 Aromatic Hydrocarbons	ND	2.5	mg/Kg									
Surr: 2,5-Dibromotoluene-PID	2.571	0	mg/Kg	2.5	0	103	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.731	0	mg/Kg	2.5	0	109	70	130	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *13-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID: **lcs-08/08/13** Batch ID: **R51571** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/8/2013 1:55:00 PM** Prep Date: **8/8/2013**
Client ID: Run ID: **V-6_130808A** SeqNo: **858638**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	7.714	2.5	mg/Kg	7.5	0	103	70	130	0			
C9-C12 Aliphatic Hydrocarbons	7.341	2.5	mg/Kg	7.5	0	97.9	70	130	0			
C9-C10 Aromatic Hydrocarbons	2.461	2.5	mg/Kg	2.5	0	98.4	70	130	0			J
Surr: 2,5-Dibromotoluene-PID	2.504	0	mg/Kg	2.5	0	100	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.613	0	mg/Kg	2.5	0	105	70	130	0			

Sample ID: **lcsd-08/08/13** Batch ID: **R51571** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/8/2013 2:54:00 PM** Prep Date: **8/8/2013**
Client ID: Run ID: **V-6_130808A** SeqNo: **858639**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	7.82	2.5	mg/Kg	7.5	0	104	70	130	7.714	1.36	25	
C9-C12 Aliphatic Hydrocarbons	7.863	2.5	mg/Kg	7.5	0	105	70	130	7.341	6.86	25	
C9-C10 Aromatic Hydrocarbons	2.48	2.5	mg/Kg	2.5	0	99.2	70	130	2.461	0.782	25	J
Surr: 2,5-Dibromotoluene-PID	2.538	0	mg/Kg	2.5	0	102	70	130	0	0	0	
Surr: 2,5-Dibromotoluene-FID	2.636	0	mg/Kg	2.5	0	105	70	130	0	0	0	

Qualifiers:
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RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **lcs-08/12/13** Batch ID: **R51590** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/12/2013 12:20:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **V-6_130812A** SeqNo: **858821**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	8.154	2.5	mg/Kg	7.5	0	109	70	130	0			
C9-C12 Aliphatic Hydrocarbons	7.38	2.5	mg/Kg	7.5	0	98.4	70	130	0			
C9-C10 Aromatic Hydrocarbons	2.612	2.5	mg/Kg	2.5	0	104	70	130	0			
Surr: 2,5-Dibromotoluene-PID	2.524	0	mg/Kg	2.5	0	101	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.708	0	mg/Kg	2.5	0	108	70	130	0			

Sample ID: **lcsd-08/12/13** Batch ID: **R51590** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/12/2013 1:17:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **V-6_130812A** SeqNo: **858822**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	7.623	2.5	mg/Kg	7.5	0	102	70	130	8.154	6.73	25	
C9-C12 Aliphatic Hydrocarbons	7.045	2.5	mg/Kg	7.5	0	93.9	70	130	7.38	4.64	25	
C9-C10 Aromatic Hydrocarbons	2.501	2.5	mg/Kg	2.5	0	100	70	130	2.612	4.33	25	
Surr: 2,5-Dibromotoluene-PID	2.475	0	mg/Kg	2.5	0	99	70	130	0	0	0	
Surr: 2,5-Dibromotoluene-FID	2.629	0	mg/Kg	2.5	0	105	70	130	0	0	0	

Qualifiers:
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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-10 2'
Lab Order:	1308013	**Collection Date:**	8/7/2013 8:22:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308013-01B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Acenaphthylene	490	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Acetophenone	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Aniline	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Anthracene	370	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Benz(a)anthracene	1,000	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Benzo(a)pyrene	910	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Benzo(b)fluoranthene	680	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Benzo(k)fluoranthene	630	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Benzo(g,h,i)perylene	530	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
4-Bromophenyl phenyl ether	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Butyl benzyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Di-n-butyl phthalate	560	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
4-Chloroaniline	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Bis(2-chloroethoxy)methane	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Bis(2-chloroethyl)ether	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Bis(2-chloroisopropyl)ether	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2-Chloronaphthalene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2-Chlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Chrysene	1,200	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Dibenz(a,h)anthracene	290	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Dibenzofuran	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
1,2-Dichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
1,3-Dichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
1,4-Dichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
3,3'-Dichlorobenzidine	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2,4-Dichlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Diethyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Dimethyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2,4-Dimethylphenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2,4-Dinitrophenol	ND	530		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2,4-Dinitrotoluene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2,6-Dinitrotoluene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Bis(2-ethylhexyl)phthalate	510	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Fluoranthene	1,400	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Fluorene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Hexachlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308013
Project: 18.0171593.00 NRA
Lab ID: 1308013-01B

Client Sample ID: GZ-10 2'
Collection Date: 8/7/2013 8:22:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Hexachloroethane	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Indeno(1,2,3-cd)pyrene	480	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Isophorone	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2-Methylnaphthalene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2-Methylphenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
4-Methylphenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Naphthalene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Nitrobenzene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2-Nitrophenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
4-Nitrophenol	ND	530		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Di-n-octyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Pentachlorophenol	ND	530		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Phenanthrene	570	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Phenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Pyrene	2,100	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
1,2,4-Trichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2,4,5-Trichlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
2,4,6-Trichlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 5:12:00 PM
Surr: 2-Fluorophenol	72.9	30-130		%REC	1	8/13/2013 5:12:00 PM
Surr: Phenol-d5	75.0	30-130		%REC	1	8/13/2013 5:12:00 PM
Surr: Nitrobenzene-d5	64.0	30-130		%REC	1	8/13/2013 5:12:00 PM
Surr: 2-Fluorobiphenyl	65.5	30-130		%REC	1	8/13/2013 5:12:00 PM
Surr: 2,4,6-Tribromophenol	77.9	30-130		%REC	1	8/13/2013 5:12:00 PM
Surr: 4-Terphenyl-d14	89.6	30-130		%REC	1	8/13/2013 5:12:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-10 6'
Lab Order:	1308013	**Collection Date:**	8/7/2013 8:52:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308013-02B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	4,100	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Acenaphthylene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Acetophenone	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Aniline	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Anthracene	1,800	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Benz(a)anthracene	330	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Benzo(a)pyrene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Benzo(b)fluoranthene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Benzo(k)fluoranthene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Benzo(g,h,i)perylene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
4-Bromophenyl phenyl ether	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Butyl benzyl phthalate	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Di-n-butyl phthalate	370	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
4-Chloroaniline	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Bis(2-chloroethoxy)methane	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Bis(2-chloroethyl)ether	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Bis(2-chloroisopropyl)ether	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2-Chloronaphthalene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2-Chlorophenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Chrysene	380	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Dibenz(a,h)anthracene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Dibenzofuran	760	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
1,2-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
1,3-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
1,4-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
3,3´-Dichlorobenzidine	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2,4-Dichlorophenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Diethyl phthalate	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Dimethyl phthalate	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2,4-Dimethylphenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2,4-Dinitrophenol	ND	560		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2,4-Dinitrotoluene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2,6-Dinitrotoluene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Bis(2-ethylhexyl)phthalate	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Fluoranthene	1,200	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Fluorene	4,700	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Hexachlorobenzene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308013
Project: 18.0171593.00 NRA
Lab ID: 1308013-02B

Client Sample ID: GZ-10 6'
Collection Date: 8/7/2013 8:52:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Hexachloroethane	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Indeno(1,2,3-cd)pyrene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Isophorone	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2-Methylnaphthalene	54,000	2,800		µg/Kg-dry	10	8/14/2013 11:44:00 AM
2-Methylphenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
4-Methylphenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Naphthalene	9,100	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Nitrobenzene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2-Nitrophenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
4-Nitrophenol	ND	560		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Di-n-octyl phthalate	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Pentachlorophenol	ND	560		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Phenanthrene	19,000	2,800		µg/Kg-dry	10	8/14/2013 11:44:00 AM
Phenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Pyrene	1,300	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
1,2,4-Trichlorobenzene	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2,4,5-Trichlorophenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
2,4,6-Trichlorophenol	ND	280		µg/Kg-dry	1	8/13/2013 5:38:00 PM
Surr: 2-Fluorophenol	70.6	30-130		%REC	1	8/13/2013 5:38:00 PM
Surr: Phenol-d5	74.9	30-130		%REC	1	8/13/2013 5:38:00 PM
Surr: Nitrobenzene-d5	77.0	30-130		%REC	1	8/13/2013 5:38:00 PM
Surr: 2-Fluorobiphenyl	79.6	30-130		%REC	1	8/13/2013 5:38:00 PM
Surr: 2,4,6-Tribromophenol	89.6	30-130		%REC	1	8/13/2013 5:38:00 PM
Surr: 4-Terphenyl-d14	84.9	30-130		%REC	1	8/13/2013 5:38:00 PM

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 2:10:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **SV-4_130813A** SeqNo: **858874**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	ND	250	µg/Kg									
Acenaphthylene	ND	250	µg/Kg									
Acetophenone	ND	250	µg/Kg									
Aniline	ND	250	µg/Kg									
Anthracene	ND	250	µg/Kg									
1,2-Diphenylhydrazine (as Azobe	ND	250	µg/Kg									
Benz(a)anthracene	ND	250	µg/Kg									
Benzo(a)pyrene	ND	250	µg/Kg									
Benzo(b)fluoranthene	ND	250	µg/Kg									
Benzo(k)fluoranthene	ND	250	µg/Kg									
Benzo(g,h,i)perylene	ND	250	µg/Kg									
4-Bromophenyl phenyl ether	ND	250	µg/Kg									
Butyl benzyl phthalate	ND	250	µg/Kg									
Di-n-butyl phthalate	ND	250	µg/Kg									
4-Chloroaniline	ND	250	µg/Kg									
Bis(2-chloroethoxy)methane	ND	250	µg/Kg									
Bis(2-chloroethyl)ether	ND	250	µg/Kg									
Bis(2-chloroisopropyl)ether	ND	250	µg/Kg									
2-Chloronaphthalene	ND	250	µg/Kg									
2-Chlorophenol	ND	250	µg/Kg									
Chrysene	ND	250	µg/Kg									
Dibenz(a,h)anthracene	ND	250	µg/Kg									
Dibenzofuran	ND	250	µg/Kg									
1,2-Dichlorobenzene	ND	250	µg/Kg									
1,3-Dichlorobenzene	ND	250	µg/Kg									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

1,4-Dichlorobenzene	ND	250	µg/Kg
3,3´-Dichlorobenzidine	ND	250	µg/Kg
2,4-Dichlorophenol	ND	250	µg/Kg
Diethyl phthalate	ND	250	µg/Kg
Dimethyl phthalate	ND	250	µg/Kg
2,4-Dimethylphenol	ND	250	µg/Kg
2,4-Dinitrophenol	ND	500	µg/Kg
2,4-Dinitrotoluene	ND	250	µg/Kg
2,6-Dinitrotoluene	ND	250	µg/Kg
Bis(2-ethylhexyl)phthalate	ND	250	µg/Kg
Fluoranthene	ND	250	µg/Kg
Fluorene	ND	250	µg/Kg
Hexachlorobenzene	ND	250	µg/Kg
Hexachlorobutadiene	ND	250	µg/Kg
Hexachloroethane	ND	250	µg/Kg
Indeno(1,2,3-cd)pyrene	ND	250	µg/Kg
Isophorone	ND	250	µg/Kg
2-Methylnaphthalene	ND	250	µg/Kg
2-Methylphenol	ND	250	µg/Kg
4-Methylphenol	ND	250	µg/Kg
Naphthalene	ND	250	µg/Kg
Nitrobenzene	ND	250	µg/Kg
2-Nitrophenol	ND	250	µg/Kg
4-Nitrophenol	ND	500	µg/Kg
Di-n-octyl phthalate	ND	250	µg/Kg
Pentachlorophenol	ND	500	µg/Kg
Phenanthrene	ND	250	µg/Kg
Phenol	ND	250	µg/Kg
Pyrene	ND	250	µg/Kg
1,2,4-Trichlorobenzene	ND	250	µg/Kg
2,4,5-Trichlorophenol	ND	250	µg/Kg

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

2,4,6-Trichlorophenol	ND	250	µg/Kg						
Surr: 2-Fluorophenol	2262	50	µg/Kg	3750	0	60.3	30	130	0
Surr: Phenol-d5	2285	50	µg/Kg	3750	0	60.9	30	130	0
Surr: Nitrobenzene-d5	1363	50	µg/Kg	2500	0	54.5	30	130	0
Surr: 2-Fluorobiphenyl	1356	50	µg/Kg	2500	0	54.3	30	130	0
Surr: 2,4,6-Tribromophenol	2518	50	µg/Kg	3750	0	67.2	30	130	0
Surr: 4-Terphenyl-d14	1980	50	µg/Kg	2500	0	79.2	30	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike - Full List

Sample ID: **LCS-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 2:36:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **SV-4_130813A** SeqNo: **858876**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	1833	250	µg/Kg	2500	0	73.3	40	140	0			
Acenaphthylene	1775	250	µg/Kg	2500	0	71	40	140	0			
Acetophenone	1576	250	µg/Kg	2500	0	63	40	140	0			
Aniline	1258	250	µg/Kg	2500	0	50.3	40	140	0			
Anthracene	1926	250	µg/Kg	2500	0	77	40	140	0			
1,2-Diphenylhydrazine (as Azobe	1706	250	µg/Kg	2500	0	68.3	40	140	0			
Benz(a)anthracene	1940	250	µg/Kg	2500	0	77.6	40	140	0			
Benzo(a)pyrene	1994	250	µg/Kg	2500	0	79.7	40	140	0			
Benzo(b)fluoranthene	2120	250	µg/Kg	2500	0	84.8	40	140	0			
Benzo(k)fluoranthene	1947	250	µg/Kg	2500	0	77.9	40	140	0			
Benzo(g,h,i)perylene	2024	250	µg/Kg	2500	0	80.9	40	140	0			
4-Bromophenyl phenyl ether	2012	250	µg/Kg	2500	0	80.5	40	140	0			
Butyl benzyl phthalate	1954	250	µg/Kg	2500	0	78.1	40	140	0			
Di-n-butyl phthalate	2368	250	µg/Kg	2500	0	94.7	40	140	0			
4-Chloroaniline	1665	250	µg/Kg	2500	0	66.6	40	140	0			
Bis(2-chloroethoxy)methane	1664	250	µg/Kg	2500	0	66.6	40	140	0			
Bis(2-chloroethyl)ether	1514	250	µg/Kg	2500	0	60.5	40	140	0			
Bis(2-chloroisopropyl)ether	1200	250	µg/Kg	2500	0	48	40	140	0			
2-Chloronaphthalene	1682	250	µg/Kg	2500	0	67.3	40	140	0			
2-Chlorophenol	2500	250	µg/Kg	3750	0	66.7	30	130	0			
Chrysene	2016	250	µg/Kg	2500	0	80.6	40	140	0			
Dibenz(a,h)anthracene	2026	250	µg/Kg	2500	0	81	40	140	0			
Dibenzofuran	1855	250	µg/Kg	2500	0	74.2	40	140	0			
1,2-Dichlorobenzene	1474	250	µg/Kg	2500	0	59	40	140	0			
1,3-Dichlorobenzene	1362	250	µg/Kg	2500	0	54.5	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike - Full List

1,4-Dichlorobenzene	1378	250	µg/Kg	2500	0	55.1	40	140	0
3,3´-Dichlorobenzidine	1765	250	µg/Kg	2500	0	70.6	40	140	0
2,4-Dichlorophenol	2851	250	µg/Kg	3750	0	76	30	130	0
Diethyl phthalate	1920	250	µg/Kg	2500	0	76.8	40	140	0
Dimethyl phthalate	1898	250	µg/Kg	2500	0	75.9	40	140	0
2,4-Dimethylphenol	2780	250	µg/Kg	3750	0	74.1	30	130	0
2,4-Dinitrophenol	2046	500	µg/Kg	3750	0	54.5	30	130	0
2,4-Dinitrotoluene	1946	250	µg/Kg	2500	0	77.8	40	140	0
2,6-Dinitrotoluene	2006	250	µg/Kg	2500	0	80.3	40	140	0
Bis(2-ethylhexyl)phthalate	2010	250	µg/Kg	2500	0	80.4	40	140	0
Fluoranthene	2034	250	µg/Kg	2500	0	81.3	40	140	0
Fluorene	1870	250	µg/Kg	2500	0	74.8	40	140	0
Hexachlorobenzene	2030	250	µg/Kg	2500	0	81.2	40	140	0
Hexachlorobutadiene	1584	250	µg/Kg	2500	0	63.4	40	140	0
Hexachloroethane	1388	250	µg/Kg	2500	0	55.5	40	140	0
Indeno(1,2,3-cd)pyrene	2050	250	µg/Kg	2500	0	82	40	140	0
Isophorone	1634	250	µg/Kg	2500	0	65.4	40	140	0
2-Methylnaphthalene	1667	250	µg/Kg	2500	0	66.7	40	140	0
2-Methylphenol	2662	250	µg/Kg	3750	0	71	30	130	0
4-Methylphenol	3646	250	µg/Kg	7500	0	48.6	30	130	0
Naphthalene	1613	250	µg/Kg	2500	0	64.5	40	140	0
Nitrobenzene	1563	250	µg/Kg	2500	0	62.5	40	140	0
2-Nitrophenol	2470	250	µg/Kg	3750	0	65.9	30	130	0
4-Nitrophenol	2836	500	µg/Kg	3750	0	75.6	30	130	0
Di-n-octyl phthalate	1978	250	µg/Kg	2500	0	79.1	40	140	0
Pentachlorophenol	2819	500	µg/Kg	3750	0	75.2	30	130	0
Phenanthrene	1944	250	µg/Kg	2500	0	77.8	40	140	0
Phenol	2374	250	µg/Kg	3750	0	63.3	30	130	0
Pyrene	2016	250	µg/Kg	2500	0	80.6	40	140	0
1,2,4-Trichlorobenzene	1633	250	µg/Kg	2500	0	65.3	40	140	0
2,4,5-Trichlorophenol	3058	250	µg/Kg	3750	0	81.5	30	130	0

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike - Full List

2,4,6-Trichlorophenol	2874	250	µg/Kg	3750	0	76.7	30	130	0
Surr: 2-Fluorophenol	2278	50	µg/Kg	3750	0	60.7	30	130	0
Surr: Phenol-d5	2380	50	µg/Kg	3750	0	63.5	30	130	0
Surr: Nitrobenzene-d5	1388	50	µg/Kg	2500	0	55.5	30	130	0
Surr: 2-Fluorobiphenyl	1466	50	µg/Kg	2500	0	58.7	30	130	0
Surr: 2,4,6-Tribromophenol	2796	50	µg/Kg	3750	0	74.5	30	130	0
Surr: 4-Terphenyl-d14	2050	50	µg/Kg	2500	0	82	30	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

Sample ID: **LCSD-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 3:02:00 PM** Prep Date: **8/13/2013**

Client ID: Run ID: **SV-4_130813A** SeqNo: **858875**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	2094	250	µg/Kg	2500	0	83.8	40	140	1833	13.3	30	
Acenaphthylene	2076	250	µg/Kg	2500	0	83.1	40	140	1775	15.7	30	
Acetophenone	1908	250	µg/Kg	2500	0	76.3	40	140	1576	19	30	
Aniline	1114	250	µg/Kg	2500	0	44.6	40	140	1258	12.2	30	
Anthracene	2267	250	µg/Kg	2500	0	90.7	40	140	1926	16.3	30	
1,2-Diphenylhydrazine (as Azobe	1937	250	µg/Kg	2500	0	77.5	40	140	1706	12.6	30	
Benz(a)anthracene	2355	250	µg/Kg	2500	0	94.2	40	140	1940	19.4	30	
Benzo(a)pyrene	2376	250	µg/Kg	2500	0	95	40	140	1994	17.5	30	
Benzo(b)fluoranthene	2374	250	µg/Kg	2500	0	94.9	40	140	2120	11.3	30	
Benzo(k)fluoranthene	2532	250	µg/Kg	2500	0	101	40	140	1947	26.1	30	
Benzo(g,h,i)perylene	2376	250	µg/Kg	2500	0	95	40	140	2024	16	30	
4-Bromophenyl phenyl ether	2378	250	µg/Kg	2500	0	95.1	40	140	2012	16.7	30	
Butyl benzyl phthalate	2255	250	µg/Kg	2500	0	90.2	40	140	1954	14.3	30	
Di-n-butyl phthalate	2622	250	µg/Kg	2500	0	105	40	140	2368	10.2	30	
4-Chloroaniline	1596	250	µg/Kg	2500	0	63.9	40	140	1665	4.2	30	
Bis(2-chloroethoxy)methane	1866	250	µg/Kg	2500	0	74.6	40	140	1664	11.4	30	
Bis(2-chloroethyl)ether	1821	250	µg/Kg	2500	0	72.8	40	140	1514	18.4	30	
Bis(2-chloroisopropyl)ether	1454	250	µg/Kg	2500	0	58.2	40	140	1200	19.2	30	
2-Chloronaphthalene	1988	250	µg/Kg	2500	0	79.5	40	140	1682	16.7	30	
2-Chlorophenol	2976	250	µg/Kg	3750	0	79.4	30	130	2500	17.4	30	
Chrysene	2388	250	µg/Kg	2500	0	95.5	40	140	2016	16.9	30	
Dibenz(a,h)anthracene	2448	250	µg/Kg	2500	0	97.9	40	140	2026	18.9	30	
Dibenzofuran	2178	250	µg/Kg	2500	0	87.1	40	140	1855	16	30	
1,2-Dichlorobenzene	1782	250	µg/Kg	2500	0	71.3	40	140	1474	18.9	30	
1,3-Dichlorobenzene	1670	250	µg/Kg	2500	0	66.8	40	140	1362	20.3	30	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

1,4-Dichlorobenzene	1676	250	µg/Kg	2500	0	67.1	40	140	1378	19.5	30
3,3´-Dichlorobenzidine	1804	250	µg/Kg	2500	0	72.1	40	140	1765	2.16	30
2,4-Dichlorophenol	3149	250	µg/Kg	3750	0	84	30	130	2851	9.93	30
Diethyl phthalate	2186	250	µg/Kg	2500	0	87.4	40	140	1920	13	30
Dimethyl phthalate	2159	250	µg/Kg	2500	0	86.4	40	140	1898	12.9	30
2,4-Dimethylphenol	3066	250	µg/Kg	3750	0	81.7	30	130	2780	9.79	30
2,4-Dinitrophenol	2505	500	µg/Kg	3750	0	66.8	30	130	2046	20.2	30
2,4-Dinitrotoluene	2248	250	µg/Kg	2500	0	89.9	40	140	1946	14.4	30
2,6-Dinitrotoluene	2250	250	µg/Kg	2500	0	90	40	140	2006	11.4	30
Bis(2-ethylhexyl)phthalate	2326	250	µg/Kg	2500	0	93	40	140	2010	14.6	30
Fluoranthene	2454	250	µg/Kg	2500	0	98.2	40	140	2034	18.8	30
Fluorene	2150	250	µg/Kg	2500	0	86	40	140	1870	14	30
Hexachlorobenzene	2400	250	µg/Kg	2500	0	96	40	140	2030	16.7	30
Hexachlorobutadiene	1929	250	µg/Kg	2500	0	77.2	40	140	1584	19.6	30
Hexachloroethane	1703	250	µg/Kg	2500	0	68.1	40	140	1388	20.3	30
Indeno(1,2,3-cd)pyrene	2440	250	µg/Kg	2500	0	97.6	40	140	2050	17.3	30
Isophorone	1659	250	µg/Kg	2500	0	66.4	40	140	1634	1.49	30
2-Methylnaphthalene	1956	250	µg/Kg	2500	0	78.3	40	140	1667	16	30
2-Methylphenol	2930	250	µg/Kg	3750	0	78.1	30	130	2662	9.57	30
4-Methylphenol	4088	250	µg/Kg	7500	0	54.5	30	130	3646	11.4	30
Naphthalene	1887	250	µg/Kg	2500	0	75.5	40	140	1613	15.6	30
Nitrobenzene	1887	250	µg/Kg	2500	0	75.5	40	140	1563	18.8	30
2-Nitrophenol	2873	250	µg/Kg	3750	0	76.6	30	130	2470	15.1	30
4-Nitrophenol	3378	500	µg/Kg	3750	0	90.1	30	130	2836	17.4	30
Di-n-octyl phthalate	2240	250	µg/Kg	2500	0	89.6	40	140	1978	12.4	30
Pentachlorophenol	3285	500	µg/Kg	3750	0	87.6	30	130	2819	15.3	30
Phenanthrene	2294	250	µg/Kg	2500	0	91.7	40	140	1944	16.5	30
Phenol	2782	250	µg/Kg	3750	0	74.2	30	130	2374	15.8	30
Pyrene	2354	250	µg/Kg	2500	0	94.2	40	140	2016	15.5	30
1,2,4-Trichlorobenzene	1950	250	µg/Kg	2500	0	78	40	140	1633	17.7	30
2,4,5-Trichlorophenol	3378	250	µg/Kg	3750	0	90.1	30	130	3058	9.96	30

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

2,4,6-Trichlorophenol	3151	250	µg/Kg	3750	0	84	30	130	2874	9.18	30
Surr: 2-Fluorophenol	2744	50	µg/Kg	3750	0	73.2	30	130	0	0	0
Surr: Phenol-d5	2706	50	µg/Kg	3750	0	72.2	30	130	0	0	0
Surr: Nitrobenzene-d5	1596	50	µg/Kg	2500	0	63.9	30	130	0	0	0
Surr: 2-Fluorobiphenyl	1645	50	µg/Kg	2500	0	65.8	30	130	0	0	0
Surr: 2,4,6-Tribromophenol	2954	50	µg/Kg	3750	0	78.8	30	130	0	0	0
Surr: 4-Terphenyl-d14	2200	50	µg/Kg	2500	0	88	30	130	0	0	0

Qualifiers:
ND - Not Detected at the Reporting Limit
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S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308013
Project: 18.0171593.00 NRA

Lab ID: 1308013-01 **Collection Date:** 8/7/2013 8:22:00 AM
Collection Time:
Client Sample ID: GZ-10 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1221	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1232	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1242	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1248	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1254	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1260	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1262	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Aroclor 1268	ND	27		µg/Kg-dry	1	8/9/2013 5:14:00 PM
Surr: Tetrachloro-m-xylene	87.6	30-150		%REC	1	8/9/2013 5:14:00 PM
Surr: Decachlorobiphenyl	96.0	30-150		%REC	1	8/9/2013 5:14:00 PM

Lab ID: 1308013-02 **Collection Date:** 8/7/2013 8:52:00 AM
Collection Time:
Client Sample ID: GZ-10 6' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1221	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1232	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1242	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1248	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1254	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1260	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1262	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Aroclor 1268	ND	28		µg/Kg-dry	1	8/9/2013 5:41:00 PM
Surr: Tetrachloro-m-xylene	61.8	30-150		%REC	1	8/9/2013 5:41:00 PM
Surr: Decachlorobiphenyl	98.3	30-150		%REC	1	8/9/2013 5:41:00 PM

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23457** Batch ID: **23457** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/9/2013 3:55:00 PM** Prep Date: **8/9/2013**
Client ID: Run ID: **GC-ELVIS_130809A** SeqNo: **858675**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	ND	25	µg/Kg									
Aroclor 1221	ND	25	µg/Kg									
Aroclor 1232	ND	25	µg/Kg									
Aroclor 1242	ND	25	µg/Kg									
Aroclor 1248	ND	25	µg/Kg									
Aroclor 1254	ND	25	µg/Kg									
Aroclor 1260	ND	25	µg/Kg									
Aroclor 1262	ND	25	µg/Kg									
Aroclor 1268	ND	25	µg/Kg									
Surr: Tetrachloro-m-xylene	7.573	0	µg/Kg	8	0	94.7	30	150	0			
Surr: Decachlorobiphenyl	7.737	0	µg/Kg	8	0	96.7	30	150	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23457** Batch ID: **23457** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/9/2013 4:21:00 PM** Prep Date: **8/9/2013**
Client ID: Run ID: **GC-ELVIS_130809A** SeqNo: **858676**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	514.9	25	µg/Kg	500	0	103	40	140	0			
Aroclor 1260	526.9	25	µg/Kg	500	0	105	40	140	0			
Surr: Tetrachloro-m-xylene	8.154	0	µg/Kg	8	0	102	30	150	0			
Surr: Decachlorobiphenyl	7.98	0	µg/Kg	8	0	99.8	30	150	0			

Sample ID: **LCSD-23457** Batch ID: **23457** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/9/2013 4:48:00 PM** Prep Date: **8/9/2013**
Client ID: Run ID: **GC-ELVIS_130809A** SeqNo: **858677**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	540.9	25	µg/Kg	500	0	108	40	140	514.9	4.92	30	
Aroclor 1260	551.9	25	µg/Kg	500	0	110	40	140	526.9	4.64	30	
Surr: Tetrachloro-m-xylene	8.133	0	µg/Kg	8	0	102	30	150	0	0	0	
Surr: Decachlorobiphenyl	8.178	0	µg/Kg	8	0	102	30	150	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308013
Project: 18.0171593.00 NRA

Lab ID: 1308013-01 **Collection Date:** 8/7/2013 8:22:00 AM
Collection Time:
Client Sample ID: GZ-10 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/13/2013 5:29:00 PM
C19-C36 Aliphatic Hydrocarbons	16	11		mg/Kg-dry	1	8/13/2013 5:29:00 PM
C11-C22 Aromatic Hydrocarbons	61	11		mg/Kg-dry	1	8/13/2013 6:03:00 PM
Surr: 1-Chlorooctadecane	69.9	40-140		%REC	1	8/13/2013 5:29:00 PM
Surr: 2-Bromonaphthalene	88.4	40-140		%REC	1	8/13/2013 6:03:00 PM
Surr: 2-Fluorobiphenyl	88.1	40-140		%REC	1	8/13/2013 6:03:00 PM
Surr: o-Terphenyl	81.4	40-140		%REC	1	8/13/2013 6:03:00 PM

Lab ID: 1308013-02 **Collection Date:** 8/7/2013 8:52:00 AM
Collection Time:
Client Sample ID: GZ-10 6' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	2,900	110		mg/Kg-dry	10	8/14/2013 10:59:00 AM
C19-C36 Aliphatic Hydrocarbons	500	110		mg/Kg-dry	10	8/14/2013 10:59:00 AM
C11-C22 Aromatic Hydrocarbons	1,700	110		mg/Kg-dry	10	8/14/2013 11:34:00 AM
Surr: 1-Chlorooctadecane	52.0	40-140		%REC	10	8/14/2013 10:59:00 AM
Surr: 2-Bromonaphthalene	79.0	40-140		%REC	10	8/14/2013 11:34:00 AM
Surr: 2-Fluorobiphenyl	92.0	40-140		%REC	10	8/14/2013 11:34:00 AM
Surr: o-Terphenyl	71.5	40-140		%REC	10	8/14/2013 11:34:00 AM

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

Sample ID: **MB-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 1:59:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858950**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C11-C22 Aromatic Hydrocarbons	ND	10	mg/Kg									
Surr: 2-Bromonaphthalene	1.663	0.10	mg/Kg	2	0	83.2	40	140	0			
Surr: 2-Fluorobiphenyl	1.678	0.10	mg/Kg	2	0	83.9	40	140	0			
Surr: o-Terphenyl	1.621	0.10	mg/Kg	2	0	81	40	140	0			

Sample ID: **MB-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 3:44:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858953**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C9-C18 Aliphatic Hydrocarbons	ND	10	mg/Kg	0	0	0	0	0	0			
C19-C36 Aliphatic Hydrocarbons	ND	10	mg/Kg	0	0	0	0	0	0			
Surr: 1-Chlorooctadecane	1.188	0.10	mg/Kg	2	0	59.4	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 4:19:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858954**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	1.712	0.10	mg/Kg	2.5	0	68.5	40	140	0			
n-Docosane	2.371	0.10	mg/Kg	2.5	0	94.8	40	140	0			
n-Dodecane	1.858	0.10	mg/Kg	2.5	0	74.3	40	140	0			
n-Eicosane	2.234	0.10	mg/Kg	2.5	0	89.4	40	140	0			
n-Hexacosane	2.464	0.10	mg/Kg	2.5	0	98.6	40	140	0			
n-Hexadecane	2.094	0.10	mg/Kg	2.5	0	83.7	40	140	0			
n-Hexatriacontane	1.756	0.10	mg/Kg	2.5	0	70.2	40	140	0			
n-Nonadecane	2.282	0.10	mg/Kg	2.5	0	91.3	40	140	0			
n-Nonane	1.402	0.10	mg/Kg	2.5	0	56.1	30	140	0			
n-Octacosane	2.152	0.10	mg/Kg	2.5	0	86.1	40	140	0			
n-Octadecane	2.241	0.10	mg/Kg	2.5	0	89.6	40	140	0			
n-Tetracosane	2.393	0.10	mg/Kg	2.5	0	95.7	40	140	0			
n-Tetradecane	1.943	0.10	mg/Kg	2.5	0	77.7	40	140	0			
n-Triacontane	2.026	0.10	mg/Kg	2.5	0	81	40	140	0			
Surr: 1-Chlorooctadecane	1.301	0.10	mg/Kg	2	0	65	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **LCSD-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 4:54:00 PM** Prep Date: **8/12/2013**

Client ID: Run ID: **SV-2_130813A** SeqNo: **858955**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	1.744	0.10	mg/Kg	2.5	0	69.8	40	140	1.712	1.88	25	
n-Docosane	2.524	0.10	mg/Kg	2.5	0	101	40	140	2.371	6.27	25	
n-Dodecane	1.922	0.10	mg/Kg	2.5	0	76.9	40	140	1.858	3.36	25	
n-Eicosane	2.404	0.10	mg/Kg	2.5	0	96.2	40	140	2.234	7.31	25	
n-Hexacosane	2.67	0.10	mg/Kg	2.5	0	107	40	140	2.464	7.99	25	
n-Hexadecane	2.267	0.10	mg/Kg	2.5	0	90.7	40	140	2.094	7.96	25	
n-Hexatriacontane	1.946	0.10	mg/Kg	2.5	0	77.9	40	140	1.756	10.3	25	
n-Nonadecane	2.426	0.10	mg/Kg	2.5	0	97	40	140	2.282	6.14	25	
n-Nonane	1.432	0.10	mg/Kg	2.5	0	57.3	30	140	1.402	2.12	25	
n-Octacosane	2.49	0.10	mg/Kg	2.5	0	99.6	40	140	2.152	14.6	25	
n-Octadecane	2.368	0.10	mg/Kg	2.5	0	94.7	40	140	2.241	5.51	25	
n-Tetracosane	2.572	0.10	mg/Kg	2.5	0	103	40	140	2.393	7.21	25	
n-Tetradecane	2.113	0.10	mg/Kg	2.5	0	84.5	40	140	1.943	8.38	25	
n-Triacontane	2.326	0.10	mg/Kg	2.5	0	93	40	140	2.026	13.8	25	
Surr: 1-Chlorooctadecane	1.389	0.10	mg/Kg	2	0	69.4	40	140	0	0	0	

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 2:34:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858951**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Surr: 2-Bromonaphthalene	1.41	0.10	mg/Kg	2	0	70.5	40	140	0			
Surr: 2-Fluorobiphenyl	1.452	0.10	mg/Kg	2	0	72.6	40	140	0			
Surr: o-Terphenyl	1.51	0.10	mg/Kg	2	0	75.5	40	140	0			

Sample ID: **LCSD-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 3:09:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858952**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Surr: 2-Bromonaphthalene	1.6	0.10	mg/Kg	2	0	80	40	140	0	0	0	
Surr: 2-Fluorobiphenyl	1.653	0.10	mg/Kg	2	0	82.6	40	140	0	0	0	
Surr: o-Terphenyl	1.766	0.10	mg/Kg	2	0	88.3	40	140	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

Send to Database

Breakthrough Report

LIMS Sample ID: LCS-23459
Test Code: EPH1.1SDT
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10767.D	28.3169
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10767.D	28.894

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10770.D	0.062496
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10770.D	0

Naphthalene Breakthrough: 0.220215752 %

2-Methylnaphthalene Breakthrough: 0 %

Send to Database

Breakthrough Report

LIMS Sample ID: LCSD-23459
Test Code: EPH1.1SDT
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10768.D	33.2581
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10768.D	34.9369

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10771.D	0.121425
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10771.D	0.012654

Naphthalene Breakthrough: 0.363770904 %

2-Methylnaphthalene Breakthrough: 0.036207329 %

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308013
Project: 18.0171593.00 NRA

Lab ID: 1308013-01 **Collection Date:** 8/7/2013 8:22:00 AM
Collection Time:
Client Sample ID: GZ-10 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	21.8	6.40		mg/Kg-dry	1	8/13/2013 8:23:03 PM
Barium	35.9	12.8		mg/Kg-dry	1	8/13/2013 8:23:03 PM
Cadmium	ND	0.640		mg/Kg-dry	1	8/13/2013 8:23:03 PM
Chromium	64.7	1.28		mg/Kg-dry	1	8/13/2013 8:23:03 PM
Lead	101	5.12		mg/Kg-dry	1	8/13/2013 8:23:03 PM
Selenium	ND	15.4		mg/Kg-dry	1	8/13/2013 8:23:03 PM
Silver	ND	1.79		mg/Kg-dry	1	8/13/2013 8:23:03 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.120	0.0520		mg/Kg-dry	1	8/15/2013 1:26:26 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	7.0	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	21		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	100		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
**** Sample receipt problems were observed for this test method. See Case Narrative for details. ****						
pH	7.0	0		pH Units	1	8/9/2013 10:22:00 AM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	140	1.0		µmhos/cm	1	8/14/2013

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308013
Project: 18.0171593.00 NRA

Lab ID: 1308013-02 **Collection Date:** 8/7/2013 8:52:00 AM
Collection Time:
Client Sample ID: GZ-10 6' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	18.0	6.67		mg/Kg-dry	1	8/13/2013 8:30:24 PM
Barium	37.1	13.3		mg/Kg-dry	1	8/13/2013 8:30:24 PM
Cadmium	ND	0.667		mg/Kg-dry	1	8/13/2013 8:30:24 PM
Chromium	19.4	1.33		mg/Kg-dry	1	8/13/2013 8:30:24 PM
Lead	128	5.34		mg/Kg-dry	1	8/13/2013 8:30:24 PM
Selenium	ND	16.0		mg/Kg-dry	1	8/13/2013 8:30:24 PM
Silver	ND	1.87		mg/Kg-dry	1	8/13/2013 8:30:24 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.290	0.0527		mg/Kg-dry	1	8/15/2013 1:39:31 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	10.6	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	22		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
**** Sample receipt problems were observed for this test method. See Case Narrative for details. ****						
pH	6.9	0		pH Units	1	8/9/2013 10:22:00 AM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	250	1.0		µmhos/cm	1	8/14/2013

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID **mb-23460** Batch ID: **23460** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/13/13 5:19:09 PM** Prep Date **8/12/13**
Client ID: Run ID: **ICP-OPTIMA_130813A** SeqNo: **858885**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	ND	6.2	mg/Kg									
Barium	ND	12	mg/Kg									
Cadmium	ND	0.62	mg/Kg									
Chromium	ND	1.2	mg/Kg									
Lead	ND	5.0	mg/Kg									
Selenium	ND	15	mg/Kg									
Silver	ND	1.8	mg/Kg									

Sample ID **mb-23466** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/15/13 1:16:39 PM** Prep Date **8/14/13**
Client ID: Run ID: **HG-FIMS_130815A** SeqNo: **859111**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	ND	0.050	mg/Kg									

Sample ID **MB-R51613** Batch ID: **R51613** Test Code: **SW7.3.3.2** Units: **mg/Kg** Analysis Date **8/13/13** Prep Date
Client ID: Run ID: **ING-WET_130813B** SeqNo: **859153**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Cyanide	ND	20	mg/Kg									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID **MB-R51609**	Batch ID: **R51609**	Test Code: **SW7.3.4.2**	Units: **mg/Kg**	Analysis Date **8/13/13**	Prep Date
Client ID:		Run ID: **ING-WET_130813A**		SeqNo: **859119**	

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Sulfide	ND	100	mg/Kg									

Sample ID **MB-R51608**	Batch ID: **R51608**	Test Code: **SW9050A**	Units: **µmhos/cm**	Analysis Date **8/14/13**	Prep Date
Client ID:		Run ID: **ING-WET_130814D**		SeqNo: **859112**	

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	ND	1.0	µmhos/cm									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **lcs-23460** Batch ID: **23460** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/13/13 5:26:02 PM** Prep Date **8/12/13**
Client ID: Run ID: **ICP-OPTIMA_130813A** SeqNo: **858886**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	245.1	6.2	mg/Kg	250	0	98	80	120	0			
Barium	503.9	12	mg/Kg	503.8	0	100	80	120	0			
Cadmium	99.65	0.62	mg/Kg	100	0	99.6	80	120	0			
Chromium	510.9	1.2	mg/Kg	500	0	102	80	120	0			
Lead	257.3	5.0	mg/Kg	249.8	0	103	80	120	0			
Selenium	184.1	15	mg/Kg	199.1	0	92.4	80	120	0			
Silver	50.96	1.8	mg/Kg	50	0	102	80	120	0			

Sample ID **lcsd-23460** Batch ID: **23460** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/13/13 5:34:09 PM** Prep Date **8/12/13**
Client ID: Run ID: **ICP-OPTIMA_130813A** SeqNo: **858887**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	246.8	6.2	mg/Kg	250	0	98.7	80	120	245.1	0.704	20	
Barium	506.1	12	mg/Kg	503.8	0	100	80	120	503.9	0.441	20	
Cadmium	100.4	0.62	mg/Kg	100	0	100	80	120	99.65	0.796	20	
Chromium	515.6	1.2	mg/Kg	500	0	103	80	120	510.9	0.917	20	
Lead	259.1	5.0	mg/Kg	249.8	0	104	80	120	257.3	0.709	20	
Selenium	184.7	15	mg/Kg	199.1	0	92.8	80	120	184.1	0.36	20	
Silver	50.43	1.8	mg/Kg	50	0	101	80	120	50.96	1.04	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **lcs-23466** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/15/13 1:19:53 PM** Prep Date **8/14/13**
Client ID: Run ID: **HG-FIMS_130815A** SeqNo: **859074**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.7859	0.048	mg/Kg	0.8006	0	98.2	80	120	0			

Sample ID **lcsd-23466** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/15/13 1:23:07 PM** Prep Date **8/14/13**
Client ID: Run ID: **HG-FIMS_130815A** SeqNo: **859075**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.7886	0.049	mg/Kg	0.8091	0	97.5	80	120	0.7859	0.333	20	

Sample ID **PXYLENE** Batch ID: **R51594** Test Code: **SW1010** Units: **°F** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814A** SeqNo: **858938**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Ignitability	80	0	°F	81	0	98.8	97.5	102.5	0			

Sample ID **3% ACETONE** Batch ID: **R51594** Test Code: **SW1010** Units: **°F** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814A** SeqNo: **858939**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Ignitability	100	0	°F	100	0	100	98	102	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-R51579** Batch ID: **R51579** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/9/13 10:22:00 AM** Prep Date
Client ID: Run ID: **ING-WET_130809B** SeqNo: **858710**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	5.95	0	pH Units	6	0	99.2	99	101	0			

Sample ID **LCSD-R51579** Batch ID: **R51579** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/9/13 10:22:00 AM** Prep Date
Client ID: Run ID: **ING-WET_130809B** SeqNo: **858715**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	5.99	0	pH Units	6	0	99.8	99	101	5.95	0.67	5	

Sample ID **LCS-R51608** Batch ID: **R51608** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814D** SeqNo: **859113**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1370	1.0	µmhos/cm	1409	0	97.2	95	105	0			

Sample ID **LCSD-R51608** Batch ID: **R51608** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814D** SeqNo: **859118**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1352	1.0	µmhos/cm	1409	0	96	95	105	1370	1.32	20	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Sample Duplicate

Sample ID **1308013-01bd** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg-dry** Analysis Date **8/15/13 1:29:42 PM** Prep Date **8/14/13**
Client ID: **GZ-10 2'** Run ID: **HG-FIMS_130815A** SeqNo: **859077**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.1771	0.052	mg/Kg-dry	0	0	0	0	0	0.1203	38.2	20	R

Sample ID **1308013-01CD** Batch ID: **R51613** Test Code: **SW7.3.3.2** Units: **mg/Kg-dry** Analysis Date **8/13/13** Prep Date
Client ID: **GZ-10 2'** Run ID: **ING-WET_130813B** SeqNo: **859236**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Cyanide	ND	21	mg/Kg-dry	0	0	0	0	0	0	0	20	

Sample ID **1308013-01CD** Batch ID: **R51609** Test Code: **SW7.3.4.2** Units: **mg/Kg-dry** Analysis Date **8/13/13** Prep Date
Client ID: **GZ-10 2'** Run ID: **ING-WET_130813A** SeqNo: **859129**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Sulfide	ND	110	mg/Kg-dry	0	0	0	0	0	0	0	20	

Sample ID **1308013-01CD** Batch ID: **R51579** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/9/13 10:22:00 AM** Prep Date
Client ID: **GZ-10 2'** Run ID: **ING-WET_130809B** SeqNo: **858714**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	7.05	0	pH Units	0	0	0	0	0	7.01	0.569	5	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Sample Duplicate

Sample ID **1308013-01CDup** Batch ID: **R51608** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/14/13** Prep Date

Client ID: **GZ-10 2'** Run ID: **ING-WET_130814D** SeqNo: **859117**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	156	1.0	µmhos/cm	0	0	0	0	0	138	12.2	20	

60

Qualifiers:

ND - Not Detected at the Reporting Limit

J - Analyte detected below quantitation limits

S - Spike Recovery outside accepted recovery limits

R - RPD outside accepted recovery limits

B - Analyte detected in the associated Method Blank

NA - Not applicable where J values or ND results occur

RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308013
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Sample Matrix Spike

Sample ID **1308013-01bms** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg-dry** Analysis Date **8/15/13 1:32:58 PM** Prep Date **8/14/13**
Client ID: **GZ-10 2'** Run ID: **HG-FIMS_130815A** SeqNo: **859078**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.9586	0.050	mg/Kg-dry	0.8413	0.1203	99.6	75	125	0			

Sample ID **1308013-01bmsd** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg-dry** Analysis Date **8/15/13 1:36:14 PM** Prep Date **8/14/13**
Client ID: **GZ-10 2'** Run ID: **HG-FIMS_130815A** SeqNo: **859079**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.9621	0.051	mg/Kg-dry	0.8562	0.1203	98.3	75	125	0.9586	0.357	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 • FAX: (603) 429-8496
www.amrolabs.com

August 20, 2013

ANALYTICAL TEST RESULTS

Matthew Steele
GZA GeoEnvironmental, Inc.
372 Merrimac Street
Newburyport, MA 01950
TEL: (781) 278-4805
FAX:

Subject: 18.0171593.00 NRA Workorder No.: 1308018

Dear Matthew Steele:

AMRO Environmental Laboratories Corp. received 7 samples on 8/9/2013 for the analyses presented in the following report.

AMRO is accredited in accordance with NELAC and certifies that these test results meet all the requirements of NELAC, where applicable, unless otherwise noted in the case narrative.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of 60 days from sample receipt date (90 days for samples from New York). After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 90 pages. This letter is an integral part of your data report. All results in this project relate only to the sample(s) as received by the laboratory and documented in the Chain-of-Custody. This report shall not be reproduced except in full, without the written approval of the laboratory. If you have any questions regarding this project in the future, please refer to the Workorder Number above.

Sincerely,

Nancy Stewart
Vice President

State Certifications: NH (NELAC): 1001, MA: M-NH012, CT: PH-0758, NY: 11278 (NELAC), ME: NH012 and 1001.

Hard copy of the State Certification is available upon request.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308018
Date Received: 8/9/2013

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date	Collection Time
1308018-01A	GZ-14 2'	8/8/2013	2:17 PM
1308018-01B	GZ-14 2'	8/8/2013	2:17 PM
1308018-01C	GZ-14 2'	8/8/2013	2:17 PM
1308018-02A	GZ-14 7'	8/8/2013	2:27 PM
1308018-02B	GZ-14 7'	8/8/2013	2:27 PM
1308018-02C	GZ-14 7'	8/8/2013	2:27 PM
1308018-03A	GZ-17 2'	8/9/2013	7:32 AM
1308018-03B	GZ-17 2'	8/9/2013	7:32 AM
1308018-03C	GZ-17 2'	8/9/2013	7:32 AM
1308018-04A	GZ-17 6-7	8/9/2013	7:49 AM
1308018-04B	GZ-17 6-7	8/9/2013	7:49 AM
1308018-04C	GZ-17 6-7	8/9/2013	7:49 AM
1308018-05A	GZ-20 1'-3'	8/9/2013	8:39 AM
1308018-05B	GZ-20 1'-3'	8/9/2013	8:39 AM
1308018-05C	GZ-20 1'-3'	8/9/2013	8:39 AM
1308018-06A	GZ-20 6-8	8/9/2013	8:51 AM
1308018-06B	GZ-20 6-8	8/9/2013	8:51 AM
1308018-06C	GZ-20 6-8	8/9/2013	8:51 AM
1308018-07A	Trip Blank	8/9/2013	12:00 AM

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-01A	GZ-14 2'	8/8/2013 2:17:00 PM	Soil	MCP 8260B, EPA 5035 MeOH preserved		8/13/2013	
				EPA 5035,methanol preserved	8/8/2013	R51606	
				Volatile Petroleum Hydrocarbons 1.1		8/12/2013	
					8/8/2013	R51590	
1308018-01B				EPA 8082 PCBS IN SOIL/SOLIDS		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/12/2013	23458	
				EPH 1.1, Soil, Diesel Targets		8/13/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				EPH 1.1, Soil, Diesel Targets		8/13/2013	
					8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
				Percent Moisture		8/12/2013	
						R51585	
1308018-01C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013	
						R51613	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013	
						R51609	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-01C	GZ-14 2'	8/8/2013 2:17:00 PM	Soil	EPA 9045C pH/Corrosivity in Soil		8/9/2013	
						R51581	
				EPA 9050ASpecific Conductance (modified for soil))		8/10/2013	
						R51582	
1308018-02A	GZ-14 7'	8/8/2013 2:27:00 PM		MCP 8260B, EPA 5035 MeOH preserved		8/13/2013	
				EPA 5035,methanol preserved	8/8/2013	R51606	
				Volatile Petroleum Hydrocarbons 1.1		8/12/2013	
					8/8/2013	R51590	
1308018-02B				EPA 8082 PCBS IN SOIL/SOLIDS		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/12/2013	23458	
				EPH 1.1, Soil, Diesel Targets		8/13/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				EPH 1.1, Soil, Diesel Targets		8/13/2013	
					8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
				Percent Moisture		8/12/2013	
						R51585	
1308018-02C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013	
						R51613	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-02C	GZ-14 7'	8/8/2013 2:27:00 PM	Soil	EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013	
						R51609	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	
				EPA 9045C pH/Corrosivity in Soil		8/9/2013	
						R51581	
				EPA 9050ASpecific Conductance (modified for soil))		8/10/2013	
						R51582	
1308018-03A	GZ-17 2'	8/9/2013 7:32:00 AM		MCP 8260B, EPA 5035 MeOH preserved		8/13/2013	
				EPA 5035,methanol preserved	8/9/2013	R51606	
				Volatile Petroleum Hydrocarbons 1.1		8/12/2013	
					8/9/2013	R51590	
1308018-03B				EPA 8082 PCBS IN SOIL/SOLIDS		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/12/2013	23458	
				EPH 1.1, Soil, Diesel Targets		8/13/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
					8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/14/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
				Percent Moisture		8/12/2013	
						R51585	
1308018-03C				EPA 1010 Ignitability		8/14/2013	
						R51594	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-03C	GZ-17 2'	8/9/2013 7:32:00 AM	Soil	EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013	
						R51613	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013	
						R51609	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	
				EPA 9045C pH/Corrosivity in Soil		8/9/2013	
						R51581	
				EPA 9050ASpecific Conductance (modified for soil))		8/10/2013	
						R51582	
1308018-04A	GZ-17 6-7	8/9/2013 7:49:00 AM		MCP 8260B, EPA 5035 MeOH preserved		8/13/2013	
				EPA 5035,methanol preserved	8/9/2013	R51606	
				Volatile Petroleum Hydrocarbons 1.1		8/12/2013	
					8/9/2013	R51590	
1308018-04B				EPA 8082 PCBS IN SOIL/SOLIDS		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/12/2013	23458	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
					8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/14/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-04B	GZ-17 6-7	8/9/2013 7:49:00 AM	Soil	Percent Moisture		8/12/2013 R51585	
1308018-04C				EPA 1010 Ignitability		8/14/2013 R51594	
				EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013 R51613	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013 R51609	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	
				EPA 9045C pH/Corrosivity in Soil		8/9/2013 R51581	
				EPA 9050ASpecific Conductance (modified for soil))		8/10/2013 R51582	
1308018-05A	GZ-20 1'-3'	8/9/2013 8:39:00 AM		MCP 8260B, EPA 5035 MeOH preserved		8/13/2013	
				EPA 5035,methanol preserved	8/9/2013	R51606	
				Volatile Petroleum Hydrocarbons 1.1	8/9/2013	8/12/2013 R51590	
1308018-05B				EPA 8082 PCBS IN SOIL/SOLIDS		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/12/2013	23458	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-05B	GZ-20 1'-3'	8/9/2013 8:39:00 AM	Soil	EPH 1.1, Soil, Diesel Targets		8/14/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/14/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
				Percent Moisture		8/12/2013	
						R51585	
1308018-05C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013	
						R51613	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013	
						R51609	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	
				EPA 9045C pH/Corrosivity in Soil		8/9/2013	
						R51581	
				EPA 9050ASpecific Conductance (modified for soil))		8/10/2013	
						R51582	
1308018-06A	GZ-20 6-8	8/9/2013 8:51:00 AM		MCP 8260B, EPA 5035 MeOH preserved		8/13/2013	
				EPA 5035,methanol preserved	8/9/2013	R51606	
				Volatile Petroleum Hydrocarbons 1.1		8/12/2013	
					8/9/2013	R51590	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-06B	GZ-20 6-8	8/9/2013 8:51:00 AM	Soil	EPA 8082 PCBS IN SOIL/SOLIDS		8/13/2013	
				EPA 3541 SOPREP AUTOSOXHLET: PCBS	8/12/2013	23458	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
				SOPREP AUTOSOXHLET: EPH	8/12/2013	23459	
				EPH 1.1, Soil, Diesel Targets		8/14/2013	
					8/12/2013	23459	
				MCP SVOCs 8270C, EPA 3541		8/14/2013	
				EPA 3541 SOPREP AUTOSOXHLET: BNA	8/13/2013	23462	
				Percent Moisture		8/12/2013	
						R51585	
1308018-06C				EPA 1010 Ignitability		8/14/2013	
						R51594	
				EPA 6010B ICP METALS, 3051/6010		8/13/2013	
				EPA 3051 SOPREP TOTAL METALS: Micro	8/12/2013	23460	
				EPA 7.3.3.2 Cyanide, Reactive		8/13/2013	
						R51613	
				EPA 7.3.4.2 Sulfide, Reactive (Soils/Solids/Waste)		8/13/2013	
						R51609	
				EPA 7471 MERCURY, Soil		8/15/2013	
				EPA 7471 HG Soil Prep	8/14/2013	23466	
				EPA 9045C pH/Corrosivity in Soil		8/9/2013	
						R51581	
				EPA 9050ASpecific Conductance (modified for soil))		8/10/2013	
						R51582	

AMRO Environmental Laboratories Corp.

19-Aug-13

Lab Order: 1308018
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308018-07A	Trip Blank	8/9/2013	Trip Blank	MCP 8260B, EPA 5035 MeOH preserved		8/13/2013	
				EPA 5035,methanol preserved	8/9/2013	R51606	

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

NO: 63086

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
17.0171593.00	NRA	MA	MATT STEELE		13080/8

P.O.#:	Results Needed by:

QUOTE #:	Seal Intact? Yes No N/A

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	EPH - RANGES	VPH - RANGES	RCRA 8 METALS	pH	Flashpoint	PCB's	Reactivity/conductivity	SVOCs	VOCs	TCLP-metals (HOLD)	Remarks
GZ-14 2'	8/8/13 1417	SL	5	X		X	X	X	X	X	X	X	X	X	X	HOLD TCLP metals
GZ-14 7'	8/8/13 1427	SL	5	X		X	X	X	X	X	X	X	X	X	X	
GZ-17 2'	8/8/13 0732	SL	5	X		X	X	X	X	X	X	X	X	X	X	
GZ-17 6-8	8/8/13 0749	SL	5	X		X	X	X	X	X	X	X	X	X	X	
YES- ~~MW-2~~ GZ-201-3'	8/9/13 0839	SL	5	X		X	X	X	X	X	X	X	X	X	X	
YES- ~~MW-2~~ GZ-206-8	8/9/13 0851	SL	5	X		X	X	X	X	X	X	X	X	X	X	
														X		
BLANK																

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

Send Results To:	PRIORITY TURNAROUND TIME AUTHORIZATION
MAT STEELE, GZA Newburyport	Before submitting samples for expedited TAT, you must *have a coded AUTHORIZATION NUMBER*
	AUTHORIZATION No.: BY:
PHONE #: 781-278-4805 FAX #:	
E-mail: MATTHEW.STEELE@GZA.com	

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:

Dissolved Metals Field Filtered? YES ☐ NO ☐

MCP Presumptive Certainty Required? YES ☒ NO ☐

MCP Methods Needed: YES ☒ NO ☐

Required Reporting Limits: S-1 ☒ GW-1 ☐ S-2 ☐ GW-2 ☒ S-3 ☐ GW-3 ☐ Other:

AMRO report package level needed:

EDD required:

Relinquished By:	Date/Time	Received By
	8/9/13 1410	
	8/9/13 1525	

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

KNOWN SITE CONTAMINATION:

White: Lab Copy Yellow: Client Copy

SHEET OF

AMROCOC2004, Rev.3 08/18/04

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: GZA-MA
Project Name: 18.0171593.00 NRA
Ship via: (circle one) Fed Ex., UPS, AMRO Courier,
Hand Del., Other Courier, Other:

AMRO ID: 1308018
Date Rec.: 8-9-13
Date Due: 8-16-13

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 3 ° Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled? Is client temperature = or <6°C ?		✓		
If no obtain authorization from the client for the analyses. **Client authorization from: Date: Obtained by:**	✓			
9. Is the COC filled out correctly and completely?				
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓	✓		pH OUT OF HOLDING TIME
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?	✓			
17. Were the sample volumes sufficient for requested analysis?			✓	
18. Were all samples received?	✓			
19. VPH and VOA Soils only:				
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?	✓			
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?	✓			
If NO then client must be faxed.				
Were vials provided by AMRO?	✓			
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?	✓			
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:				
What samples sent:			✓	
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?	✓			
Composite Log?		✓		
Filtration Log?		✓		

Received By: MS Date: 8-9-13
Labeled By: MG Date: 8-12-13
Logged in By: MG Date: 8-12-13
Checked By: [illegible] Date: 8-12-13

NA= Not Applicable

GC/MS VOLATILES: 8260B:

1. Sample GZ-14 2' (1308018-01A) had Methylene Chloride above the reporting limit due to possible laboratory contamination as a result of dirt in the vial threads.

2. 1,1,2,2,-Tetrachloroethane, Bromodichloromethane, Carbon disulfide, Dichlorodifluoromethane, and Naphthalene recovered outside the control limits (+/-20%) in the Continuing Calibration Verification Standard analyzed on 08/13/13.

3. The minimum response factor was not met for Acetone, 2-Butanone, and 4-Methyl-2-pentanone on 08/13/13.

4. A quadratic regression was used for Dibromochloromethane, Acetone and 1,1,1,2,-Tetrachloroethane in the Initial Calibration analyzed on 06/21/13.

MA-DEP VPH 1.1:

1. The surrogate 2,5-Dibromotoluene recovered above the control limits in sample GZ-14 7' (1308018-02A) on the FID. The unadjusted recovery was within the control limits.

2. A quadratic regression was used for the C9-C12 aliphatic range and n-Decane in the Initial Calibration analyzed on 05/02/13.

GC/MS SEMIVOLATILES: 8270C:

1. No QC deviations were noted.

GC/ECD-PCBs: 8082

1. The ending Continuing Calibration Verification standard on 08/13/13 was out low on signal one for Aroclor 1260. The data from signal two was reported; the ending Continuing Calibration Verification standard passed on signal two.

MA-DEP EPH 1.1:

1. AMRO Laboratory analyzed EPH using the GC/MS option as indicated in the MADEP EPH Rev.1.1, Section 9.10 May 2004.

2. The C11-C22 Aromatic Hydrocarbons range result has not been adjusted to exclude the

concentration of Target PAH Analytes.

3. Only ranges are reported per client request.

METALS:

1. The RCRA-8 metals were analyzed at the request of the client.

2. No QC deviations were noted.

WET CHEMISTRY:

1. The samples for pH were received past holding time and were analyzed at the request of the client.

2. No other QC deviations were noted.

MassDEP Analytical Protocol Certification Form

Laboratory Name: AMRO Environmental Lab. Corp. Project #: 18.0171593.00

Project Location: NRA RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):

1308018 - 01 → 07

Matrices: ☐ Groundwater/Surface Water ☑ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A ☑	7470/7471 Hg CAM III B ☑	MassDEP VPH CAM IV A ☑	8081 Pesticides CAM V B ☐	7196 Hex Cr CAM VI B ☐	MassDEP APH CAM IX A ☐
8270 SVOC CAM II B ☑	7010 Metals CAM III C ☐	MassDEP EPH CAM IV B ☑	8151 Herbicides CAM V C ☐	8330 Explosives CAM VIII A ☐	TO-15 VOC CAM IX B ☐
6010 Metals CAM III A ☑	6020 Metals CAM III D ☐	8082 PCB CAM V A ☑	9014 Total Cyanide/PAC CAM VI A ☐	6860 Perchlorate CAM VIII B ☐	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☐ Yes ☑ No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	☑ Yes ☐ No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes ☐ No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☑ Yes ☐ No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☑ Yes ☐ No ☐ Yes ☐ No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	☑ Yes ☐ No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes ☐ No[1]

***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	☐ Yes ☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☐ Yes ☑ No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ **Position:** Vice President

Printed Name: Nancy Stewart **Date:** 8-20-13

DATA COMMENT PAGE

Organic Data Qualifiers

ND	Indicates compound was analyzed for, but not detected at or above the reporting limit.
J	Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than the method detection limit.
H	Method prescribed holding time exceeded.
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
B	This flag is used when the analyte is found in the associated blank as well as in the sample.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
#	See Case Narrative

Micro Data Qualifiers

TNTC	Too numerous to count

Inorganic Data Qualifiers

ND or U	Indicates element was analyzed for, but not detected at or above the reporting limit.
J	Indicates a value greater than or equal to the method detection limit, but less than the quantitation limit.
H	Indicates analytical holding time exceedance.
B	Indicates that the analyte is found in the associated blank, as well as in the sample.
MSA	Indicates value determined by the Method of Standard Addition
+	Indicates the correlation coefficient for the Method of Standard Addition is less than 0.995
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
PS	The analyte was below the Reporting Limit but has significant matrix interference as noted by the poor recovery of the Post Digestion Spike.
#	See Case Narrative
*	MCL Exceeded

Report Comments:

1. Soil, sediment and sludge sample results are reported on a "dry weight" basis.
2. Reporting limits are adjusted for sample size used, dilutions and moisture content, if applicable.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-14 2'
Lab Order:	1308018	**Collection Date:**	8/8/2013 2:17:00 PM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-01A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	320		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Tertiary Amyl Methyl Ether	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Benzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Bromobenzene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Bromochloromethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Bromodichloromethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Bromoform	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Bromomethane	ND	130		µg/Kg-dry	1	8/13/2013 1:47:00 PM
sec-Butylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
n-Butylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
tert-Butylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Carbon disulfide	ND	130		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Carbon tetrachloride	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Chlorobenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Dibromochloromethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Chloroethane	ND	130		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Chloroform	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Chloromethane	ND	130		µg/Kg-dry	1	8/13/2013 1:47:00 PM
2-Chlorotoluene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
4-Chlorotoluene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2-Dibromo-3-chloropropane	ND	160		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2-Dibromoethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Dibromomethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,3-Dichlorobenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2-Dichlorobenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,4-Dichlorobenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Dichlorodifluoromethane	ND	130		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,1-Dichloroethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2-Dichloroethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,1-Dichloroethene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
cis-1,2-Dichloroethene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
trans-1,2-Dichloroethene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2-Dichloropropane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,3-Dichloropropane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
2,2-Dichloropropane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,1-Dichloropropene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
cis-1,3-Dichloropropene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
trans-1,3-Dichloropropene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Diethyl ether	ND	320		µg/Kg-dry	1	8/13/2013 1:47:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-01A

Client Sample ID: GZ-14 2'
Collection Date: 8/8/2013 2:17:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,4-Dioxane	ND	1,600		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Ethyl Tertiary Butyl Ether	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Ethylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Hexachlorobutadiene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
2-Hexanone	ND	320		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Isopropylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
4-Isopropyltoluene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
2-Butanone	ND	320		µg/Kg-dry	1	8/13/2013 1:47:00 PM
4-Methyl-2-pentanone	ND	320		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Methyl tert-butyl ether	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Methylene chloride	110	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Naphthalene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
n-Propylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Styrene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,1,1,2-Tetrachloroethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,1,2,2-Tetrachloroethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Tetrachloroethene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Tetrahydrofuran	ND	320		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Toluene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2,4-Trichlorobenzene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2,3-Trichlorobenzene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,1,1-Trichloroethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,1,2-Trichloroethane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Trichloroethene	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Trichlorofluoromethane	ND	130		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2,3-Trichloropropane	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,2,4-Trimethylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
1,3,5-Trimethylbenzene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Vinyl chloride	ND	65		µg/Kg-dry	1	8/13/2013 1:47:00 PM
o-Xylene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
m,p-Xylene	ND	32		µg/Kg-dry	1	8/13/2013 1:47:00 PM
Surr: Dibromofluoromethane	91.4	70-130		%REC	1	8/13/2013 1:47:00 PM
Surr: 1,2-Dichloroethane-d4	85.4	70-130		%REC	1	8/13/2013 1:47:00 PM
Surr: Toluene-d8	102	70-130		%REC	1	8/13/2013 1:47:00 PM
Surr: 4-Bromofluorobenzene	102	70-130		%REC	1	8/13/2013 1:47:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-14 7'
Lab Order:	1308018	**Collection Date:**	8/8/2013 2:27:00 PM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-02A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	540		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Tertiary Amyl Methyl Ether	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Benzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Bromobenzene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Bromochloromethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Bromodichloromethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Bromoform	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Bromomethane	ND	220		µg/Kg-dry	1	8/13/2013 2:22:00 PM
sec-Butylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
n-Butylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
tert-Butylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Carbon disulfide	ND	220		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Carbon tetrachloride	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Chlorobenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Dibromochloromethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Chloroethane	ND	220		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Chloroform	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Chloromethane	ND	220		µg/Kg-dry	1	8/13/2013 2:22:00 PM
2-Chlorotoluene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
4-Chlorotoluene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2-Dibromo-3-chloropropane	ND	270		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2-Dibromoethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Dibromomethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,3-Dichlorobenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2-Dichlorobenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,4-Dichlorobenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Dichlorodifluoromethane	ND	220		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,1-Dichloroethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2-Dichloroethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,1-Dichloroethene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
cis-1,2-Dichloroethene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
trans-1,2-Dichloroethene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2-Dichloropropane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,3-Dichloropropane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
2,2-Dichloropropane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,1-Dichloropropene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
cis-1,3-Dichloropropene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
trans-1,3-Dichloropropene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Diethyl ether	ND	540		µg/Kg-dry	1	8/13/2013 2:22:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-14 7'
Lab Order:	1308018	**Collection Date:**	8/8/2013 2:27:00 PM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-02A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,4-Dioxane	ND	2,700		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Ethyl Tertiary Butyl Ether	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Ethylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Hexachlorobutadiene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
2-Hexanone	ND	540		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Isopropylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
4-Isopropyltoluene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
2-Butanone	ND	540		µg/Kg-dry	1	8/13/2013 2:22:00 PM
4-Methyl-2-pentanone	ND	540		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Methyl tert-butyl ether	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Methylene chloride	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Naphthalene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
n-Propylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Styrene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,1,1,2-Tetrachloroethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,1,2,2-Tetrachloroethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Tetrachloroethene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Tetrahydrofuran	ND	540		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Toluene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2,4-Trichlorobenzene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2,3-Trichlorobenzene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,1,1-Trichloroethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,1,2-Trichloroethane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Trichloroethene	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Trichlorofluoromethane	ND	220		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2,3-Trichloropropane	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,2,4-Trimethylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
1,3,5-Trimethylbenzene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Vinyl chloride	ND	110		µg/Kg-dry	1	8/13/2013 2:22:00 PM
o-Xylene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
m,p-Xylene	ND	54		µg/Kg-dry	1	8/13/2013 2:22:00 PM
Surr: Dibromofluoromethane	91.2	70-130		%REC	1	8/13/2013 2:22:00 PM
Surr: 1,2-Dichloroethane-d4	84.4	70-130		%REC	1	8/13/2013 2:22:00 PM
Surr: Toluene-d8	101	70-130		%REC	1	8/13/2013 2:22:00 PM
Surr: 4-Bromofluorobenzene	101	70-130		%REC	1	8/13/2013 2:22:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-17 2'
Lab Order:	1308018	**Collection Date:**	8/9/2013 7:32:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-03A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	280		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Tertiary Amyl Methyl Ether	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Benzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Bromobenzene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Bromochloromethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Bromodichloromethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Bromoform	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Bromomethane	ND	110		µg/Kg-dry	1	8/13/2013 2:57:00 PM
sec-Butylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
n-Butylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
tert-Butylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Carbon disulfide	ND	110		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Carbon tetrachloride	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Chlorobenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Dibromochloromethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Chloroethane	ND	110		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Chloroform	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Chloromethane	ND	110		µg/Kg-dry	1	8/13/2013 2:57:00 PM
2-Chlorotoluene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
4-Chlorotoluene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2-Dibromo-3-chloropropane	ND	140		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2-Dibromoethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Dibromomethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,3-Dichlorobenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2-Dichlorobenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,4-Dichlorobenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Dichlorodifluoromethane	ND	110		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,1-Dichloroethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2-Dichloroethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,1-Dichloroethene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
cis-1,2-Dichloroethene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
trans-1,2-Dichloroethene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2-Dichloropropane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,3-Dichloropropane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
2,2-Dichloropropane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,1-Dichloropropene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
cis-1,3-Dichloropropene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
trans-1,3-Dichloropropene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Diethyl ether	ND	280		µg/Kg-dry	1	8/13/2013 2:57:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-17 2'
Lab Order:	1308018	**Collection Date:**	8/9/2013 7:32:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-03A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,4-Dioxane	ND	1,400		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Ethyl Tertiary Butyl Ether	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Ethylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Hexachlorobutadiene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
2-Hexanone	ND	280		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Isopropylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
4-Isopropyltoluene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
2-Butanone	ND	280		µg/Kg-dry	1	8/13/2013 2:57:00 PM
4-Methyl-2-pentanone	ND	280		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Methyl tert-butyl ether	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Methylene chloride	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Naphthalene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
n-Propylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Styrene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,1,1,2-Tetrachloroethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,1,2,2-Tetrachloroethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Tetrachloroethene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Tetrahydrofuran	ND	280		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Toluene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2,4-Trichlorobenzene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2,3-Trichlorobenzene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,1,1-Trichloroethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,1,2-Trichloroethane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Trichloroethene	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Trichlorofluoromethane	ND	110		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2,3-Trichloropropane	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,2,4-Trimethylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
1,3,5-Trimethylbenzene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Vinyl chloride	ND	56		µg/Kg-dry	1	8/13/2013 2:57:00 PM
o-Xylene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
m,p-Xylene	ND	28		µg/Kg-dry	1	8/13/2013 2:57:00 PM
Surr: Dibromofluoromethane	89.9	70-130		%REC	1	8/13/2013 2:57:00 PM
Surr: 1,2-Dichloroethane-d4	83.1	70-130		%REC	1	8/13/2013 2:57:00 PM
Surr: Toluene-d8	99.8	70-130		%REC	1	8/13/2013 2:57:00 PM
Surr: 4-Bromofluorobenzene	94.6	70-130		%REC	1	8/13/2013 2:57:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-17 6-7
Lab Order:	1308018	**Collection Date:**	8/9/2013 7:49:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-04A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	300		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Tertiary Amyl Methyl Ether	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Benzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Bromobenzene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Bromochloromethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Bromodichloromethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Bromoform	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Bromomethane	ND	120		µg/Kg-dry	1	8/13/2013 3:33:00 PM
sec-Butylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
n-Butylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
tert-Butylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Carbon disulfide	ND	120		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Carbon tetrachloride	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Chlorobenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Dibromochloromethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Chloroethane	ND	120		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Chloroform	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Chloromethane	ND	120		µg/Kg-dry	1	8/13/2013 3:33:00 PM
2-Chlorotoluene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
4-Chlorotoluene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2-Dibromo-3-chloropropane	ND	150		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2-Dibromoethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Dibromomethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,3-Dichlorobenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2-Dichlorobenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,4-Dichlorobenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Dichlorodifluoromethane	ND	120		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,1-Dichloroethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2-Dichloroethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,1-Dichloroethene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
cis-1,2-Dichloroethene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
trans-1,2-Dichloroethene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2-Dichloropropane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,3-Dichloropropane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
2,2-Dichloropropane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,1-Dichloropropene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
cis-1,3-Dichloropropene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
trans-1,3-Dichloropropene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Diethyl ether	ND	300		µg/Kg-dry	1	8/13/2013 3:33:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-04A

Client Sample ID: GZ-17 6-7
Collection Date: 8/9/2013 7:49:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,4-Dioxane	ND	1,500		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Ethyl Tertiary Butyl Ether	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Ethylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Hexachlorobutadiene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
2-Hexanone	ND	300		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Isopropylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
4-Isopropyltoluene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
2-Butanone	ND	300		µg/Kg-dry	1	8/13/2013 3:33:00 PM
4-Methyl-2-pentanone	ND	300		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Methyl tert-butyl ether	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Methylene chloride	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Naphthalene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
n-Propylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Styrene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,1,1,2-Tetrachloroethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,1,2,2-Tetrachloroethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Tetrachloroethene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Tetrahydrofuran	ND	300		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Toluene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2,4-Trichlorobenzene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2,3-Trichlorobenzene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,1,1-Trichloroethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,1,2-Trichloroethane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Trichloroethene	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Trichlorofluoromethane	ND	120		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2,3-Trichloropropane	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,2,4-Trimethylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
1,3,5-Trimethylbenzene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Vinyl chloride	ND	61		µg/Kg-dry	1	8/13/2013 3:33:00 PM
o-Xylene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
m,p-Xylene	ND	30		µg/Kg-dry	1	8/13/2013 3:33:00 PM
Surr: Dibromofluoromethane	86.8	70-130		%REC	1	8/13/2013 3:33:00 PM
Surr: 1,2-Dichloroethane-d4	78.7	70-130		%REC	1	8/13/2013 3:33:00 PM
Surr: Toluene-d8	95.1	70-130		%REC	1	8/13/2013 3:33:00 PM
Surr: 4-Bromofluorobenzene	88.9	70-130		%REC	1	8/13/2013 3:33:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-20 1'-3'
Lab Order:	1308018	**Collection Date:**	8/9/2013 8:39:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-05A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	270		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Tertiary Amyl Methyl Ether	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Benzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Bromobenzene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Bromochloromethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Bromodichloromethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Bromoform	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Bromomethane	ND	110		µg/Kg-dry	1	8/13/2013 4:08:00 PM
sec-Butylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
n-Butylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
tert-Butylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Carbon disulfide	ND	110		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Carbon tetrachloride	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Chlorobenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Dibromochloromethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Chloroethane	ND	110		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Chloroform	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Chloromethane	ND	110		µg/Kg-dry	1	8/13/2013 4:08:00 PM
2-Chlorotoluene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
4-Chlorotoluene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2-Dibromo-3-chloropropane	ND	130		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2-Dibromoethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Dibromomethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,3-Dichlorobenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2-Dichlorobenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,4-Dichlorobenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Dichlorodifluoromethane	ND	110		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,1-Dichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2-Dichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,1-Dichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
cis-1,2-Dichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
trans-1,2-Dichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2-Dichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,3-Dichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
2,2-Dichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,1-Dichloropropene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
cis-1,3-Dichloropropene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
trans-1,3-Dichloropropene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Diethyl ether	ND	270		µg/Kg-dry	1	8/13/2013 4:08:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-05A

Client Sample ID: GZ-20 1'-3'
Collection Date: 8/9/2013 8:39:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,4-Dioxane	ND	1,300		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Ethyl Tertiary Butyl Ether	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Ethylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Hexachlorobutadiene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
2-Hexanone	ND	270		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Isopropylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
4-Isopropyltoluene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
2-Butanone	ND	270		µg/Kg-dry	1	8/13/2013 4:08:00 PM
4-Methyl-2-pentanone	ND	270		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Methyl tert-butyl ether	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Methylene chloride	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Naphthalene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
n-Propylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Styrene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,1,1,2-Tetrachloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,1,2,2-Tetrachloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Tetrachloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Tetrahydrofuran	ND	270		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Toluene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2,4-Trichlorobenzene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2,3-Trichlorobenzene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,1,1-Trichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,1,2-Trichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Trichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Trichlorofluoromethane	ND	110		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2,3-Trichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,2,4-Trimethylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
1,3,5-Trimethylbenzene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Vinyl chloride	ND	53		µg/Kg-dry	1	8/13/2013 4:08:00 PM
o-Xylene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
m,p-Xylene	ND	27		µg/Kg-dry	1	8/13/2013 4:08:00 PM
Surr: Dibromofluoromethane	88.6	70-130		%REC	1	8/13/2013 4:08:00 PM
Surr: 1,2-Dichloroethane-d4	81.2	70-130		%REC	1	8/13/2013 4:08:00 PM
Surr: Toluene-d8	97.8	70-130		%REC	1	8/13/2013 4:08:00 PM
Surr: 4-Bromofluorobenzene	92.1	70-130		%REC	1	8/13/2013 4:08:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-20 6-8
Lab Order:	1308018	**Collection Date:**	8/9/2013 8:51:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-06A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	260		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Tertiary Amyl Methyl Ether	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Benzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Bromobenzene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Bromochloromethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Bromodichloromethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Bromoform	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Bromomethane	ND	110		µg/Kg-dry	1	8/13/2013 4:43:00 PM
sec-Butylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
n-Butylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
tert-Butylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Carbon disulfide	ND	110		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Carbon tetrachloride	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Chlorobenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Dibromochloromethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Chloroethane	ND	110		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Chloroform	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Chloromethane	ND	110		µg/Kg-dry	1	8/13/2013 4:43:00 PM
2-Chlorotoluene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
4-Chlorotoluene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2-Dibromo-3-chloropropane	ND	130		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2-Dibromoethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Dibromomethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,3-Dichlorobenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2-Dichlorobenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,4-Dichlorobenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Dichlorodifluoromethane	ND	110		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,1-Dichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2-Dichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,1-Dichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
cis-1,2-Dichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
trans-1,2-Dichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2-Dichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,3-Dichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
2,2-Dichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,1-Dichloropropene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
cis-1,3-Dichloropropene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
trans-1,3-Dichloropropene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Diethyl ether	ND	260		µg/Kg-dry	1	8/13/2013 4:43:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-06A

Client Sample ID: GZ-20 6-8
Collection Date: 8/9/2013 8:51:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,4-Dioxane	ND	1,300		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Ethyl Tertiary Butyl Ether	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Ethylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Hexachlorobutadiene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
2-Hexanone	ND	260		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Isopropylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
4-Isopropyltoluene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
2-Butanone	ND	260		µg/Kg-dry	1	8/13/2013 4:43:00 PM
4-Methyl-2-pentanone	ND	260		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Methyl tert-butyl ether	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Methylene chloride	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Naphthalene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
n-Propylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Styrene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,1,1,2-Tetrachloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,1,2,2-Tetrachloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Tetrachloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Tetrahydrofuran	ND	260		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Toluene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2,4-Trichlorobenzene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2,3-Trichlorobenzene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,1,1-Trichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,1,2-Trichloroethane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Trichloroethene	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Trichlorofluoromethane	ND	110		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2,3-Trichloropropane	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,2,4-Trimethylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
1,3,5-Trimethylbenzene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Vinyl chloride	ND	53		µg/Kg-dry	1	8/13/2013 4:43:00 PM
o-Xylene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
m,p-Xylene	ND	26		µg/Kg-dry	1	8/13/2013 4:43:00 PM
Surr: Dibromofluoromethane	91.8	70-130		%REC	1	8/13/2013 4:43:00 PM
Surr: 1,2-Dichloroethane-d4	84.5	70-130		%REC	1	8/13/2013 4:43:00 PM
Surr: Toluene-d8	101	70-130		%REC	1	8/13/2013 4:43:00 PM
Surr: 4-Bromofluorobenzene	96.3	70-130		%REC	1	8/13/2013 4:43:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1308018	**Collection Date:**	8/9/2013
Project:	18.0171593.00 NRA	**Matrix:**	TRIP BLANK
Lab ID:	1308018-07A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
VOLATILE ORGANIC COMPOUNDS BY MCP MET SW8260B						Analyst: **DH**
Acetone	ND	250		µg/Kg	1	8/13/2013 12:37:00 PM
Tertiary Amyl Methyl Ether	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Benzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Bromobenzene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Bromochloromethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Bromodichloromethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Bromoform	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Bromomethane	ND	100		µg/Kg	1	8/13/2013 12:37:00 PM
sec-Butylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
n-Butylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
tert-Butylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Carbon disulfide	ND	100		µg/Kg	1	8/13/2013 12:37:00 PM
Carbon tetrachloride	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Chlorobenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Dibromochloromethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Chloroethane	ND	100		µg/Kg	1	8/13/2013 12:37:00 PM
Chloroform	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Chloromethane	ND	100		µg/Kg	1	8/13/2013 12:37:00 PM
2-Chlorotoluene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
4-Chlorotoluene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,2-Dibromo-3-chloropropane	ND	120		µg/Kg	1	8/13/2013 12:37:00 PM
1,2-Dibromoethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Dibromomethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,3-Dichlorobenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
1,2-Dichlorobenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
1,4-Dichlorobenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Dichlorodifluoromethane	ND	100		µg/Kg	1	8/13/2013 12:37:00 PM
1,1-Dichloroethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,2-Dichloroethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,1-Dichloroethene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
cis-1,2-Dichloroethene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
trans-1,2-Dichloroethene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,2-Dichloropropane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,3-Dichloropropane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
2,2-Dichloropropane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,1-Dichloropropene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
cis-1,3-Dichloropropene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
trans-1,3-Dichloropropene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Diethyl ether	ND	250		µg/Kg	1	8/13/2013 12:37:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	Trip Blank
Lab Order:	1308018	**Collection Date:**	8/9/2013
Project:	18.0171593.00 NRA	**Matrix:**	TRIP BLANK
Lab ID:	1308018-07A		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Diisopropyl ether	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,4-Dioxane	ND	1,200		µg/Kg	1	8/13/2013 12:37:00 PM
Ethyl Tertiary Butyl Ether	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Ethylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Hexachlorobutadiene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
2-Hexanone	ND	250		µg/Kg	1	8/13/2013 12:37:00 PM
Isopropylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
4-Isopropyltoluene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
2-Butanone	ND	250		µg/Kg	1	8/13/2013 12:37:00 PM
4-Methyl-2-pentanone	ND	250		µg/Kg	1	8/13/2013 12:37:00 PM
Methyl tert-butyl ether	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Methylene chloride	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Naphthalene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
n-Propylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Styrene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,1,1,2-Tetrachloroethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,1,2,2-Tetrachloroethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Tetrachloroethene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Tetrahydrofuran	ND	250		µg/Kg	1	8/13/2013 12:37:00 PM
Toluene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
1,2,4-Trichlorobenzene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,2,3-Trichlorobenzene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,1,1-Trichloroethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,1,2-Trichloroethane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Trichloroethene	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
Trichlorofluoromethane	ND	100		µg/Kg	1	8/13/2013 12:37:00 PM
1,2,3-Trichloropropane	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
1,2,4-Trimethylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
1,3,5-Trimethylbenzene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Vinyl chloride	ND	50		µg/Kg	1	8/13/2013 12:37:00 PM
o-Xylene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
m,p-Xylene	ND	25		µg/Kg	1	8/13/2013 12:37:00 PM
Surr: Dibromofluoromethane	91.2	70-130		%REC	1	8/13/2013 12:37:00 PM
Surr: 1,2-Dichloroethane-d4	85.1	70-130		%REC	1	8/13/2013 12:37:00 PM
Surr: Toluene-d8	102	70-130		%REC	1	8/13/2013 12:37:00 PM
Surr: 4-Bromofluorobenzene	100	70-130		%REC	1	8/13/2013 12:37:00 PM

AMRO Environmental Laboratories Corp.

Date: *15-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **mb-08/13/13** Batch ID: **R51606** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/13/2013 12:02:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **V-2_130813A** SeqNo: **859105**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	ND	250	µg/Kg									
Tertiary Amyl Methyl Ether	ND	50	µg/Kg									
Benzene	ND	25	µg/Kg									
Bromobenzene	ND	50	µg/Kg									
Bromochloromethane	ND	50	µg/Kg									
Bromodichloromethane	ND	50	µg/Kg									
Bromoform	ND	50	µg/Kg									
Bromomethane	ND	100	µg/Kg									
sec-Butylbenzene	ND	25	µg/Kg									
n-Butylbenzene	ND	25	µg/Kg									
tert-Butylbenzene	ND	25	µg/Kg									
Carbon disulfide	ND	100	µg/Kg									
Carbon tetrachloride	ND	50	µg/Kg									
Chlorobenzene	ND	25	µg/Kg									
Dibromochloromethane	ND	50	µg/Kg									
Chloroethane	ND	100	µg/Kg									
Chloroform	ND	50	µg/Kg									
Chloromethane	ND	100	µg/Kg									
2-Chlorotoluene	ND	50	µg/Kg									
4-Chlorotoluene	ND	50	µg/Kg									
1,2-Dibromo-3-chloropropane	ND	120	µg/Kg									
1,2-Dibromoethane	ND	50	µg/Kg									
Dibromomethane	ND	50	µg/Kg									
1,3-Dichlorobenzene	ND	25	µg/Kg									
1,2-Dichlorobenzene	ND	25	µg/Kg									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

1,4-Dichlorobenzene	ND	25	µg/Kg
Dichlorodifluoromethane	ND	100	µg/Kg
1,1-Dichloroethane	ND	50	µg/Kg
1,2-Dichloroethane	ND	50	µg/Kg
1,1-Dichloroethene	ND	50	µg/Kg
cis-1,2-Dichloroethene	ND	50	µg/Kg
trans-1,2-Dichloroethene	ND	50	µg/Kg
1,2-Dichloropropane	ND	50	µg/Kg
1,3-Dichloropropane	ND	50	µg/Kg
2,2-Dichloropropane	ND	50	µg/Kg
1,1-Dichloropropene	ND	50	µg/Kg
cis-1,3-Dichloropropene	ND	50	µg/Kg
trans-1,3-Dichloropropene	ND	50	µg/Kg
Diethyl ether	ND	250	µg/Kg
Diisopropyl ether	ND	50	µg/Kg
1,4-Dioxane	ND	1,200	µg/Kg
Ethyl Tertiary Butyl Ether	ND	50	µg/Kg
Ethylbenzene	ND	25	µg/Kg
Hexachlorobutadiene	ND	50	µg/Kg
2-Hexanone	ND	250	µg/Kg
Isopropylbenzene	ND	25	µg/Kg
4-Isopropyltoluene	ND	25	µg/Kg
2-Butanone	ND	250	µg/Kg
4-Methyl-2-pentanone	ND	250	µg/Kg
Methyl tert-butyl ether	ND	25	µg/Kg
Methylene chloride	ND	50	µg/Kg
Naphthalene	ND	50	µg/Kg
n-Propylbenzene	ND	25	µg/Kg
Styrene	ND	50	µg/Kg
1,1,1,2-Tetrachloroethane	ND	50	µg/Kg
1,1,2,2-Tetrachloroethane	ND	50	µg/Kg

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

Tetrachloroethene	ND	50	µg/Kg						
Tetrahydrofuran	ND	250	µg/Kg						
Toluene	ND	25	µg/Kg						
1,2,4-Trichlorobenzene	ND	50	µg/Kg						
1,2,3-Trichlorobenzene	ND	50	µg/Kg						
1,1,1-Trichloroethane	ND	50	µg/Kg						
1,1,2-Trichloroethane	ND	50	µg/Kg						
Trichloroethene	ND	50	µg/Kg						
Trichlorofluoromethane	ND	100	µg/Kg						
1,2,3-Trichloropropane	ND	50	µg/Kg						
1,2,4-Trimethylbenzene	ND	25	µg/Kg						
1,3,5-Trimethylbenzene	ND	25	µg/Kg						
Vinyl chloride	ND	50	µg/Kg						
o-Xylene	ND	25	µg/Kg						
m,p-Xylene	ND	25	µg/Kg						
Surr: Dibromofluoromethane	2476	25	µg/Kg	2500	0	99.1	70	130	0
Surr: 1,2-Dichloroethane-d4	2238	25	µg/Kg	2500	0	89.5	70	130	0
Surr: Toluene-d8	2738	25	µg/Kg	2500	0	110	70	130	0
Surr: 4-Bromofluorobenzene	2581	25	µg/Kg	2500	0	103	70	130	0

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *15-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **lcs-08/13/13** Batch ID: **R51606** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/13/2013 9:39:00 AM** Prep Date: **8/13/2013**
Client ID: Run ID: **V-2_130813A** SeqNo: **859107**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	256.5	250	µg/Kg	500	0	51.3	40	160	0			
Tertiary Amyl Methyl Ether	497.2	50	µg/Kg	500	0	99.4	70	130	0			
Benzene	490.5	25	µg/Kg	500	0	98.1	70	130	0			
Bromobenzene	518.8	50	µg/Kg	500	0	104	70	130	0			
Bromochloromethane	462.5	50	µg/Kg	500	0	92.5	70	130	0			
Bromodichloromethane	409.2	50	µg/Kg	500	0	81.8	70	130	0			
Bromoform	556.8	50	µg/Kg	500	0	111	70	130	0			
Bromomethane	481.8	100	µg/Kg	500	0	96.4	40	160	0			
sec-Butylbenzene	566.8	25	µg/Kg	500	0	113	70	130	0			
n-Butylbenzene	502.8	25	µg/Kg	500	0	101	70	130	0			
tert-Butylbenzene	566	25	µg/Kg	500	0	113	70	130	0			
Carbon disulfide	363.8	100	µg/Kg	500	0	72.8	70	130	0			
Carbon tetrachloride	470.8	50	µg/Kg	500	0	94.2	70	130	0			
Chlorobenzene	502.5	25	µg/Kg	500	0	100	70	130	0			
Dibromochloromethane	523	50	µg/Kg	500	0	105	70	130	0			
Chloroethane	449.8	100	µg/Kg	500	0	90	70	130	0			
Chloroform	428.2	50	µg/Kg	500	0	85.6	70	130	0			
Chloromethane	437.5	100	µg/Kg	500	0	87.5	40	160	0			
2-Chlorotoluene	501	50	µg/Kg	500	0	100	70	130	0			
4-Chlorotoluene	487.5	50	µg/Kg	500	0	97.5	70	130	0			
1,2-Dibromo-3-chloropropane	590.2	120	µg/Kg	500	0	118	70	130	0			
1,2-Dibromoethane	415.5	50	µg/Kg	500	0	83.1	70	130	0			
Dibromomethane	449.2	50	µg/Kg	500	0	89.8	70	130	0			
1,3-Dichlorobenzene	506.8	25	µg/Kg	500	0	101	70	130	0			
1,2-Dichlorobenzene	514.2	25	µg/Kg	500	0	103	70	130	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

1,4-Dichlorobenzene	494	25	µg/Kg	500	0	98.8	70	130	0
Dichlorodifluoromethane	368.5	100	µg/Kg	500	0	73.7	40	160	0
1,1-Dichloroethane	488.5	50	µg/Kg	500	0	97.7	70	130	0
1,2-Dichloroethane	428.2	50	µg/Kg	500	0	85.6	70	130	0
1,1-Dichloroethene	471.2	50	µg/Kg	500	0	94.2	70	130	0
cis-1,2-Dichloroethene	475.2	50	µg/Kg	500	0	95	70	130	0
trans-1,2-Dichloroethene	470	50	µg/Kg	500	0	94	70	130	0
1,2-Dichloropropane	469.2	50	µg/Kg	500	0	93.8	70	130	0
1,3-Dichloropropane	453.2	50	µg/Kg	500	0	90.7	70	130	0
2,2-Dichloropropane	495	50	µg/Kg	500	0	99	70	130	0
1,1-Dichloropropene	458.5	50	µg/Kg	500	0	91.7	70	130	0
cis-1,3-Dichloropropene	440.2	50	µg/Kg	500	0	88	70	130	0
trans-1,3-Dichloropropene	477.5	50	µg/Kg	500	0	95.5	70	130	0
Diethyl ether	442.2	250	µg/Kg	500	0	88.4	70	130	0
Diisopropyl ether	500	50	µg/Kg	500	0	100	70	130	0
1,4-Dioxane	2742	1,200	µg/Kg	2500	0	110	40	160	0
Ethyl Tertiary Butyl Ether	502.5	50	µg/Kg	500	0	100	70	130	0
Ethylbenzene	491.3	25	µg/Kg	500	0	98.2	70	130	0
Hexachlorobutadiene	496.5	50	µg/Kg	500	0	99.3	70	130	0
2-Hexanone	376.2	250	µg/Kg	500	0	75.2	40	160	0
Isopropylbenzene	568.8	25	µg/Kg	500	0	114	70	130	0
4-Isopropyltoluene	552	25	µg/Kg	500	0	110	70	130	0
2-Butanone	306.2	250	µg/Kg	500	0	61.2	40	160	0
4-Methyl-2-pentanone	451	250	µg/Kg	500	0	90.2	40	160	0
Methyl tert-butyl ether	439	25	µg/Kg	500	0	87.8	70	130	0
Methylene chloride	434.5	50	µg/Kg	500	0	86.9	70	130	0
Naphthalene	419	50	µg/Kg	500	0	83.8	70	130	0
n-Propylbenzene	539	25	µg/Kg	500	0	108	70	130	0
Styrene	483.3	50	µg/Kg	500	0	96.7	70	130	0
1,1,1,2-Tetrachloroethane	592.5	50	µg/Kg	500	0	118	70	130	0
1,1,2,2-Tetrachloroethane	395.2	50	µg/Kg	500	0	79	70	130	0

Qualifiers: ND - Not Detected at the Reporting Limit
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R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
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CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Tetrachloroethene	524.5	50	µg/Kg	500	0	105	70	130	0
Tetrahydrofuran	424.8	250	µg/Kg	500	0	85	70	130	0
Toluene	462.5	25	µg/Kg	500	0	92.5	70	130	0
1,2,4-Trichlorobenzene	547.8	50	µg/Kg	500	0	110	70	130	0
1,2,3-Trichlorobenzene	501.2	50	µg/Kg	500	0	100	70	130	0
1,1,1-Trichloroethane	448.8	50	µg/Kg	500	0	89.8	70	130	0
1,1,2-Trichloroethane	428.5	50	µg/Kg	500	0	85.7	70	130	0
Trichloroethene	490	50	µg/Kg	500	0	98	70	130	0
Trichlorofluoromethane	446.5	100	µg/Kg	500	0	89.3	70	130	0
1,2,3-Trichloropropane	461.2	50	µg/Kg	500	0	92.2	70	130	0
1,2,4-Trimethylbenzene	549	25	µg/Kg	500	0	110	70	130	0
1,3,5-Trimethylbenzene	530.8	25	µg/Kg	500	0	106	70	130	0
Vinyl chloride	529.2	50	µg/Kg	500	0	106	70	130	0
o-Xylene	539.2	25	µg/Kg	500	0	108	70	130	0
m,p-Xylene	990.8	25	µg/Kg	1000	0	99.1	70	130	0
Surr: Dibromofluoromethane	2135	25	µg/Kg	2500	0	85.4	70	130	0
Surr: 1,2-Dichloroethane-d4	1914	25	µg/Kg	2500	0	76.6	70	130	0
Surr: Toluene-d8	2288	25	µg/Kg	2500	0	91.5	70	130	0
Surr: 4-Bromofluorobenzene	2242	25	µg/Kg	2500	0	89.7	70	130	0

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NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *15-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **lcsd-08/13/13** Batch ID: **R51606** Test Code: **SW8260B** Units: **µg/Kg** Analysis Date **8/13/2013 10:14:00 AM** Prep Date: **8/13/2013**

Client ID: Run ID: **V-2_130813A** SeqNo: **859106**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acetone	244.8	250	µg/Kg	500	0	49	40	160	256.5	4.69	20	J
Tertiary Amyl Methyl Ether	488.8	50	µg/Kg	500	0	97.8	70	130	497.2	1.72	20	
Benzene	509.2	25	µg/Kg	500	0	102	70	130	490.5	3.75	20	
Bromobenzene	568.5	50	µg/Kg	500	0	114	70	130	518.8	9.15	20	
Bromochloromethane	466.8	50	µg/Kg	500	0	93.4	70	130	462.5	0.915	20	
Bromodichloromethane	404.5	50	µg/Kg	500	0	80.9	70	130	409.2	1.17	20	
Bromoform	561.8	50	µg/Kg	500	0	112	70	130	556.8	0.894	20	
Bromomethane	485.8	100	µg/Kg	500	0	97.2	40	160	481.8	0.827	20	
sec-Butylbenzene	610.2	25	µg/Kg	500	0	122	70	130	566.8	7.39	20	
n-Butylbenzene	536	25	µg/Kg	500	0	107	70	130	502.8	6.4	20	
tert-Butylbenzene	604.2	25	µg/Kg	500	0	121	70	130	566	6.54	20	
Carbon disulfide	356.2	100	µg/Kg	500	0	71.2	70	130	363.8	2.08	20	
Carbon tetrachloride	437	50	µg/Kg	500	0	87.4	70	130	470.8	7.44	20	
Chlorobenzene	533.5	25	µg/Kg	500	0	107	70	130	502.5	5.98	20	
Dibromochloromethane	553.2	50	µg/Kg	500	0	111	70	130	523	5.62	20	
Chloroethane	467	100	µg/Kg	500	0	93.4	70	130	449.8	3.76	20	
Chloroform	429.2	50	µg/Kg	500	0	85.8	70	130	428.2	0.233	20	
Chloromethane	413.8	100	µg/Kg	500	0	82.8	40	160	437.5	5.58	20	
2-Chlorotoluene	536.8	50	µg/Kg	500	0	107	70	130	501	6.89	20	
4-Chlorotoluene	539.5	50	µg/Kg	500	0	108	70	130	487.5	10.1	20	
1,2-Dibromo-3-chloropropane	614.2	120	µg/Kg	500	0	123	70	130	590.2	3.99	20	
1,2-Dibromoethane	418	50	µg/Kg	500	0	83.6	70	130	415.5	0.6	20	
Dibromomethane	466.5	50	µg/Kg	500	0	93.3	70	130	449.2	3.77	20	
1,3-Dichlorobenzene	565	25	µg/Kg	500	0	113	70	130	506.8	10.9	20	
1,2-Dichlorobenzene	550.5	25	µg/Kg	500	0	110	70	130	514.2	6.81	20	

Qualifiers: ND - Not Detected at the Reporting Limit
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B - Analyte detected in the associated Method Blank
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R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

1,4-Dichlorobenzene	538.5	25	µg/Kg	500	0	108	70	130	494	8.62	20
Dichlorodifluoromethane	366.2	100	µg/Kg	500	0	73.2	40	160	368.5	0.612	20
1,1-Dichloroethane	479.2	50	µg/Kg	500	0	95.8	70	130	488.5	1.91	20
1,2-Dichloroethane	435	50	µg/Kg	500	0	87	70	130	428.2	1.56	20
1,1-Dichloroethene	473.5	50	µg/Kg	500	0	94.7	70	130	471.2	0.476	20
cis-1,2-Dichloroethene	493	50	µg/Kg	500	0	98.6	70	130	475.2	3.67	20
trans-1,2-Dichloroethene	444	50	µg/Kg	500	0	88.8	70	130	470	5.69	20
1,2-Dichloropropane	475.2	50	µg/Kg	500	0	95	70	130	469.2	1.27	20
1,3-Dichloropropane	494.5	50	µg/Kg	500	0	98.9	70	130	453.2	8.7	20
2,2-Dichloropropane	516.8	50	µg/Kg	500	0	103	70	130	495	4.3	20
1,1-Dichloropropene	476	50	µg/Kg	500	0	95.2	70	130	458.5	3.75	20
cis-1,3-Dichloropropene	443.2	50	µg/Kg	500	0	88.7	70	130	440.2	0.679	20
trans-1,3-Dichloropropene	482.5	50	µg/Kg	500	0	96.5	70	130	477.5	1.04	20
Diethyl ether	454.8	250	µg/Kg	500	0	91	70	130	442.2	2.79	20
Diisopropyl ether	505.8	50	µg/Kg	500	0	101	70	130	500	1.14	20
1,4-Dioxane	3109	1,200	µg/Kg	2500	0	124	40	160	2742	12.5	20
Ethyl Tertiary Butyl Ether	485.8	50	µg/Kg	500	0	97.2	70	130	502.5	3.39	20
Ethylbenzene	520.5	25	µg/Kg	500	0	104	70	130	491.3	5.78	20
Hexachlorobutadiene	549.5	50	µg/Kg	500	0	110	70	130	496.5	10.1	20
2-Hexanone	385.5	250	µg/Kg	500	0	77.1	40	160	376.2	2.43	20
Isopropylbenzene	615	25	µg/Kg	500	0	123	70	130	568.8	7.81	20
4-Isopropyltoluene	607	25	µg/Kg	500	0	121	70	130	552	9.49	20
2-Butanone	354.2	250	µg/Kg	500	0	70.8	40	160	306.2	14.5	20
4-Methyl-2-pentanone	429.8	250	µg/Kg	500	0	86	40	160	451	4.83	20
Methyl tert-butyl ether	434	25	µg/Kg	500	0	86.8	70	130	439	1.15	20
Methylene chloride	446	50	µg/Kg	500	0	89.2	70	130	434.5	2.61	20
Naphthalene	457	50	µg/Kg	500	0	91.4	70	130	419	8.68	20
n-Propylbenzene	563.8	25	µg/Kg	500	0	113	70	130	539	4.49	20
Styrene	512.5	50	µg/Kg	500	0	103	70	130	483.3	5.87	20
1,1,1,2-Tetrachloroethane	592.8	50	µg/Kg	500	0	119	70	130	592.5	0.0422	20
1,1,2,2-Tetrachloroethane	422.5	50	µg/Kg	500	0	84.5	70	130	395.2	6.66	20

Qualifiers: ND - Not Detected at the Reporting Limit
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R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Tetrachloroethene	570.5	50	µg/Kg	500	0	114	70	130	524.5	8.4	20
Tetrahydrofuran	432.2	250	µg/Kg	500	0	86.4	70	130	424.8	1.75	20
Toluene	470.8	25	µg/Kg	500	0	94.2	70	130	462.5	1.77	20
1,2,4-Trichlorobenzene	603	50	µg/Kg	500	0	121	70	130	547.8	9.6	20
1,2,3-Trichlorobenzene	566	50	µg/Kg	500	0	113	70	130	501.2	12.1	20
1,1,1-Trichloroethane	459.8	50	µg/Kg	500	0	92	70	130	448.8	2.42	20
1,1,2-Trichloroethane	451.5	50	µg/Kg	500	0	90.3	70	130	428.5	5.23	20
Trichloroethene	495	50	µg/Kg	500	0	99	70	130	490	1.02	20
Trichlorofluoromethane	421.5	100	µg/Kg	500	0	84.3	70	130	446.5	5.76	20
1,2,3-Trichloropropane	487.5	50	µg/Kg	500	0	97.5	70	130	461.2	5.53	20
1,2,4-Trimethylbenzene	577.2	25	µg/Kg	500	0	115	70	130	549	5.02	20
1,3,5-Trimethylbenzene	577	25	µg/Kg	500	0	115	70	130	530.8	8.35	20
Vinyl chloride	507	50	µg/Kg	500	0	101	70	130	529.2	4.29	20
o-Xylene	567.5	25	µg/Kg	500	0	114	70	130	539.2	5.11	20
m,p-Xylene	1058	25	µg/Kg	1000	0	106	70	130	990.8	6.61	20
Surr: Dibromofluoromethane	2202	25	µg/Kg	2500	0	88.1	70	130	0	0	0
Surr: 1,2-Dichloroethane-d4	1961	25	µg/Kg	2500	0	78.4	70	130	0	0	0
Surr: Toluene-d8	2377	25	µg/Kg	2500	0	95.1	70	130	0	0	0
Surr: 4-Bromofluorobenzene	2442	25	µg/Kg	2500	0	97.7	70	130	0	0	0

Qualifiers:
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RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-01 **Collection Date:** 8/8/2013 2:17:00 PM
Collection Time:
Client Sample ID: GZ-14 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	2.5		mg/Kg-dry	1	8/12/2013 5:08:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.5		mg/Kg-dry	1	8/12/2013 5:08:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.5		mg/Kg-dry	1	8/12/2013 5:08:00 PM
Surr: 2,5-Dibromotoluene-PID	104	70-130		%REC	1	8/12/2013 5:08:00 PM
Surr: 2,5-Dibromotoluene-FID	111	70-130		%REC	1	8/12/2013 5:08:00 PM

Lab ID: 1308018-02 **Collection Date:** 8/8/2013 2:27:00 PM
Collection Time:
Client Sample ID: GZ-14 7' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	3.3		mg/Kg-dry	1	8/12/2013 6:06:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	3.3		mg/Kg-dry	1	8/12/2013 6:06:00 PM
C9-C10 Aromatic Hydrocarbons	ND	3.3		mg/Kg-dry	1	8/12/2013 6:06:00 PM
Surr: 2,5-Dibromotoluene-PID	128	70-130		%REC	1	8/12/2013 6:06:00 PM
Surr: 2,5-Dibromotoluene-FID	136	70-130	S	%REC	1	8/12/2013 6:06:00 PM

Lab ID: 1308018-03 **Collection Date:** 8/9/2013 7:32:00 AM
Collection Time:
Client Sample ID: GZ-17 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	2.7		mg/Kg-dry	1	8/12/2013 7:03:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.7		mg/Kg-dry	1	8/12/2013 7:03:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.7		mg/Kg-dry	1	8/12/2013 7:03:00 PM
Surr: 2,5-Dibromotoluene-PID	106	70-130		%REC	1	8/12/2013 7:03:00 PM
Surr: 2,5-Dibromotoluene-FID	112	70-130		%REC	1	8/12/2013 7:03:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-04 **Collection Date:** 8/9/2013 7:49:00 AM
Collection Time:
Client Sample ID: GZ-17 6-7 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	3.8		mg/Kg-dry	1	8/12/2013 8:01:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	3.8		mg/Kg-dry	1	8/12/2013 8:01:00 PM
C9-C10 Aromatic Hydrocarbons	ND	3.8		mg/Kg-dry	1	8/12/2013 8:01:00 PM
Surr: 2,5-Dibromotoluene-PID	108	70-130		%REC	1	8/12/2013 8:01:00 PM
Surr: 2,5-Dibromotoluene-FID	113	70-130		%REC	1	8/12/2013 8:01:00 PM

Lab ID: 1308018-05 **Collection Date:** 8/9/2013 8:39:00 AM
Collection Time:
Client Sample ID: GZ-20 1'-3' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/12/2013 8:58:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/12/2013 8:58:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.6		mg/Kg-dry	1	8/12/2013 8:58:00 PM
Surr: 2,5-Dibromotoluene-PID	108	70-130		%REC	1	8/12/2013 8:58:00 PM
Surr: 2,5-Dibromotoluene-FID	115	70-130		%REC	1	8/12/2013 8:58:00 PM

Lab ID: 1308018-06 **Collection Date:** 8/9/2013 8:51:00 AM
Collection Time:
Client Sample ID: GZ-20 6-8 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	2.3		mg/Kg-dry	1	8/12/2013 9:54:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	2.3		mg/Kg-dry	1	8/12/2013 9:54:00 PM
C9-C10 Aromatic Hydrocarbons	ND	2.3		mg/Kg-dry	1	8/12/2013 9:54:00 PM
Surr: 2,5-Dibromotoluene-PID	101	70-130		%REC	1	8/12/2013 9:54:00 PM
Surr: 2,5-Dibromotoluene-FID	107	70-130		%REC	1	8/12/2013 9:54:00 PM

AMRO Environmental Laboratories Corp.

Date: *13-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **mb-08/12/13** Batch ID: **R51590** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/12/2013 4:10:00 PM** Prep Date: **8/12/2013**

Client ID: Run ID: **V-6_130812A** SeqNo: **858823**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C12 Aliphatic Hydrocarbons	ND	2.5	mg/Kg									
C9-C10 Aromatic Hydrocarbons	ND	2.5	mg/Kg									
Surr: 2,5-Dibromotoluene-PID	2.571	0	mg/Kg	2.5	0	103	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.731	0	mg/Kg	2.5	0	109	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *13-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID: **lcs-08/12/13** Batch ID: **R51590** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/12/2013 12:20:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **V-6_130812A** SeqNo: **858821**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	8.154	2.5	mg/Kg	7.5	0	109	70	130	0			
C9-C12 Aliphatic Hydrocarbons	7.38	2.5	mg/Kg	7.5	0	98.4	70	130	0			
C9-C10 Aromatic Hydrocarbons	2.612	2.5	mg/Kg	2.5	0	104	70	130	0			
Surr: 2,5-Dibromotoluene-PID	2.524	0	mg/Kg	2.5	0	101	70	130	0			
Surr: 2,5-Dibromotoluene-FID	2.708	0	mg/Kg	2.5	0	108	70	130	0			

Sample ID: **lcsd-08/12/13** Batch ID: **R51590** Test Code: **MAVPH1.1** Units: **mg/Kg** Analysis Date **8/12/2013 1:17:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **V-6_130812A** SeqNo: **858822**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	7.623	2.5	mg/Kg	7.5	0	102	70	130	8.154	6.73	25	
C9-C12 Aliphatic Hydrocarbons	7.045	2.5	mg/Kg	7.5	0	93.9	70	130	7.38	4.64	25	
C9-C10 Aromatic Hydrocarbons	2.501	2.5	mg/Kg	2.5	0	100	70	130	2.612	4.33	25	
Surr: 2,5-Dibromotoluene-PID	2.475	0	mg/Kg	2.5	0	99	70	130	0	0	0	
Surr: 2,5-Dibromotoluene-FID	2.629	0	mg/Kg	2.5	0	105	70	130	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-14 2'
Lab Order:	1308018	**Collection Date:**	8/8/2013 2:17:00 PM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-01B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Acenaphthylene	810	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Acetophenone	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Aniline	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Anthracene	790	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Benz(a)anthracene	1,700	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Benzo(a)pyrene	1,500	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Benzo(b)fluoranthene	1,200	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Benzo(k)fluoranthene	1,200	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Benzo(g,h,i)perylene	880	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
4-Bromophenyl phenyl ether	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Butyl benzyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Di-n-butyl phthalate	330	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
4-Chloroaniline	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Bis(2-chloroethoxy)methane	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Bis(2-chloroethyl)ether	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Bis(2-chloroisopropyl)ether	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2-Chloronaphthalene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2-Chlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Chrysene	1,900	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Dibenz(a,h)anthracene	320	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Dibenzofuran	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
1,2-Dichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
1,3-Dichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
1,4-Dichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
3,3´-Dichlorobenzidine	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2,4-Dichlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Diethyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Dimethyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2,4-Dimethylphenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2,4-Dinitrophenol	ND	540		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2,4-Dinitrotoluene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2,6-Dinitrotoluene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Bis(2-ethylhexyl)phthalate	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Fluoranthene	3,100	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Fluorene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Hexachlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-01B

Client Sample ID: GZ-14 2'
Collection Date: 8/8/2013 2:17:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Hexachloroethane	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Indeno(1,2,3-cd)pyrene	800	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Isophorone	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2-Methylnaphthalene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2-Methylphenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
4-Methylphenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Naphthalene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Nitrobenzene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2-Nitrophenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
4-Nitrophenol	ND	540		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Di-n-octyl phthalate	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Pentachlorophenol	ND	540		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Phenanthrene	2,000	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Phenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Pyrene	3,400	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
1,2,4-Trichlorobenzene	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2,4,5-Trichlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
2,4,6-Trichlorophenol	ND	270		µg/Kg-dry	1	8/13/2013 6:30:00 PM
Surr: 2-Fluorophenol	68.9	30-130		%REC	1	8/13/2013 6:30:00 PM
Surr: Phenol-d5	67.6	30-130		%REC	1	8/13/2013 6:30:00 PM
Surr: Nitrobenzene-d5	61.5	30-130		%REC	1	8/13/2013 6:30:00 PM
Surr: 2-Fluorobiphenyl	60.6	30-130		%REC	1	8/13/2013 6:30:00 PM
Surr: 2,4,6-Tribromophenol	71.9	30-130		%REC	1	8/13/2013 6:30:00 PM
Surr: 4-Terphenyl-d14	78.0	30-130		%REC	1	8/13/2013 6:30:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-14 7'
Lab Order:	1308018	**Collection Date:**	8/8/2013 2:27:00 PM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-02B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Acenaphthylene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Acetophenone	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Aniline	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Anthracene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Benz(a)anthracene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Benzo(a)pyrene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Benzo(b)fluoranthene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Benzo(k)fluoranthene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Benzo(g,h,i)perylene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
4-Bromophenyl phenyl ether	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Butyl benzyl phthalate	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Di-n-butyl phthalate	440	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
4-Chloroaniline	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Bis(2-chloroethoxy)methane	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Bis(2-chloroethyl)ether	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Bis(2-chloroisopropyl)ether	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2-Chloronaphthalene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2-Chlorophenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Chrysene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Dibenz(a,h)anthracene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Dibenzofuran	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
1,2-Dichlorobenzene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
1,3-Dichlorobenzene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
1,4-Dichlorobenzene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
3,3´-Dichlorobenzidine	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2,4-Dichlorophenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Diethyl phthalate	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Dimethyl phthalate	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2,4-Dimethylphenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2,4-Dinitrophenol	ND	670		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2,4-Dinitrotoluene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2,6-Dinitrotoluene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Bis(2-ethylhexyl)phthalate	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Fluoranthene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Fluorene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Hexachlorobenzene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-02B

Client Sample ID: GZ-14 7'
Collection Date: 8/8/2013 2:27:00 PM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Hexachloroethane	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Indeno(1,2,3-cd)pyrene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Isophorone	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2-Methylnaphthalene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2-Methylphenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
4-Methylphenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Naphthalene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Nitrobenzene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2-Nitrophenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
4-Nitrophenol	ND	670		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Di-n-octyl phthalate	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Pentachlorophenol	ND	670		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Phenanthrene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Phenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Pyrene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
1,2,4-Trichlorobenzene	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2,4,5-Trichlorophenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
2,4,6-Trichlorophenol	ND	340		µg/Kg-dry	1	8/13/2013 6:56:00 PM
Surr: 2-Fluorophenol	60.8	30-130		%REC	1	8/13/2013 6:56:00 PM
Surr: Phenol-d5	62.5	30-130		%REC	1	8/13/2013 6:56:00 PM
Surr: Nitrobenzene-d5	50.6	30-130		%REC	1	8/13/2013 6:56:00 PM
Surr: 2-Fluorobiphenyl	56.4	30-130		%REC	1	8/13/2013 6:56:00 PM
Surr: 2,4,6-Tribromophenol	71.8	30-130		%REC	1	8/13/2013 6:56:00 PM
Surr: 4-Terphenyl-d14	78.4	30-130		%REC	1	8/13/2013 6:56:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-17 2'
Lab Order:	1308018	**Collection Date:**	8/9/2013 7:32:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-03B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Acenaphthylene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Acetophenone	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Aniline	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Anthracene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Benz(a)anthracene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Benzo(a)pyrene	680	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Benzo(b)fluoranthene	680	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Benzo(k)fluoranthene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Benzo(g,h,i)perylene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
4-Bromophenyl phenyl ether	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Butyl benzyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Di-n-butyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
4-Chloroaniline	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Bis(2-chloroethoxy)methane	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Bis(2-chloroethyl)ether	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Bis(2-chloroisopropyl)ether	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2-Chloronaphthalene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2-Chlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Chrysene	620	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Dibenz(a,h)anthracene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Dibenzofuran	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
1,2-Dichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
1,3-Dichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
1,4-Dichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
3,3'-Dichlorobenzidine	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2,4-Dichlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Diethyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Dimethyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2,4-Dimethylphenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2,4-Dinitrophenol	ND	1,100		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2,4-Dinitrotoluene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2,6-Dinitrotoluene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Bis(2-ethylhexyl)phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Fluoranthene	750	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Fluorene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Hexachlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-17 2'
Lab Order:	1308018	**Collection Date:**	8/9/2013 7:32:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-03B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Hexachloroethane	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Indeno(1,2,3-cd)pyrene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Isophorone	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2-Methylnaphthalene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2-Methylphenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
4-Methylphenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Naphthalene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Nitrobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2-Nitrophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
4-Nitrophenol	ND	1,100		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Di-n-octyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Pentachlorophenol	ND	1,100		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Phenanthrene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Phenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Pyrene	820	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
1,2,4-Trichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2,4,5-Trichlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
2,4,6-Trichlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:28:00 PM
Surr: 2-Fluorophenol	79.4	30-130		%REC	1	8/14/2013 1:28:00 PM
Surr: Phenol-d5	77.2	30-130		%REC	1	8/14/2013 1:28:00 PM
Surr: Nitrobenzene-d5	63.0	30-130		%REC	1	8/14/2013 1:28:00 PM
Surr: 2-Fluorobiphenyl	67.8	30-130		%REC	1	8/14/2013 1:28:00 PM
Surr: 2,4,6-Tribromophenol	93.6	30-130		%REC	1	8/14/2013 1:28:00 PM
Surr: 4-Terphenyl-d14	91.2	30-130		%REC	1	8/14/2013 1:28:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-17 6-7
Lab Order:	1308018	**Collection Date:**	8/9/2013 7:49:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-04B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Acenaphthylene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Acetophenone	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Aniline	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Anthracene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Benz(a)anthracene	880	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Benzo(a)pyrene	950	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Benzo(b)fluoranthene	890	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Benzo(k)fluoranthene	800	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Benzo(g,h,i)perylene	600	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
4-Bromophenyl phenyl ether	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Butyl benzyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Di-n-butyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
4-Chloroaniline	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Bis(2-chloroethoxy)methane	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Bis(2-chloroethyl)ether	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Bis(2-chloroisopropyl)ether	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2-Chloronaphthalene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2-Chlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Chrysene	1,000	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Dibenz(a,h)anthracene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Dibenzofuran	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
1,2-Dichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
1,3-Dichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
1,4-Dichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
3,3´-Dichlorobenzidine	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2,4-Dichlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Diethyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Dimethyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2,4-Dimethylphenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2,4-Dinitrophenol	ND	1,100		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2,4-Dinitrotoluene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2,6-Dinitrotoluene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Bis(2-ethylhexyl)phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Fluoranthene	1,400	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Fluorene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Hexachlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-04B

Client Sample ID: GZ-17 6-7
Collection Date: 8/9/2013 7:49:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Hexachloroethane	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Indeno(1,2,3-cd)pyrene	570	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Isophorone	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2-Methylnaphthalene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2-Methylphenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
4-Methylphenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Naphthalene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Nitrobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2-Nitrophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
4-Nitrophenol	ND	1,100		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Di-n-octyl phthalate	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Pentachlorophenol	ND	1,100		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Phenanthrene	640	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Phenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Pyrene	1,300	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
1,2,4-Trichlorobenzene	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2,4,5-Trichlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
2,4,6-Trichlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 1:54:00 PM
Surr: 2-Fluorophenol	73.6	30-130		%REC	1	8/14/2013 1:54:00 PM
Surr: Phenol-d5	72.6	30-130		%REC	1	8/14/2013 1:54:00 PM
Surr: Nitrobenzene-d5	62.6	30-130		%REC	1	8/14/2013 1:54:00 PM
Surr: 2-Fluorobiphenyl	67.1	30-130		%REC	1	8/14/2013 1:54:00 PM
Surr: 2,4,6-Tribromophenol	92.5	30-130		%REC	1	8/14/2013 1:54:00 PM
Surr: 4-Terphenyl-d14	91.2	30-130		%REC	1	8/14/2013 1:54:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-20 1'-3'
Lab Order:	1308018	**Collection Date:**	8/9/2013 8:39:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-05B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Acenaphthylene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Acetophenone	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Aniline	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Anthracene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Benz(a)anthracene	550	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Benzo(a)pyrene	620	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Benzo(b)fluoranthene	520	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Benzo(k)fluoranthene	530	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Benzo(g,h,i)perylene	400	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
4-Bromophenyl phenyl ether	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Butyl benzyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Di-n-butyl phthalate	360	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
4-Chloroaniline	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Bis(2-chloroethoxy)methane	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Bis(2-chloroethyl)ether	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Bis(2-chloroisopropyl)ether	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2-Chloronaphthalene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2-Chlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Chrysene	650	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Dibenz(a,h)anthracene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Dibenzofuran	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
1,2-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
1,3-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
1,4-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
3,3'-Dichlorobenzidine	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2,4-Dichlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Diethyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Dimethyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2,4-Dimethylphenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2,4-Dinitrophenol	ND	570		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2,4-Dinitrotoluene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2,6-Dinitrotoluene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Bis(2-ethylhexyl)phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Fluoranthene	1,100	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Fluorene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Hexachlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-05B

Client Sample ID: GZ-20 1'-3'
Collection Date: 8/9/2013 8:39:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Hexachloroethane	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Indeno(1,2,3-cd)pyrene	360	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Isophorone	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2-Methylnaphthalene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2-Methylphenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
4-Methylphenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Naphthalene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Nitrobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2-Nitrophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
4-Nitrophenol	ND	570		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Di-n-octyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Pentachlorophenol	ND	570		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Phenanthrene	640	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Phenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Pyrene	1,100	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
1,2,4-Trichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2,4,5-Trichlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
2,4,6-Trichlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:20:00 PM
Surr: 2-Fluorophenol	71.4	30-130		%REC	1	8/14/2013 2:20:00 PM
Surr: Phenol-d5	70.2	30-130		%REC	1	8/14/2013 2:20:00 PM
Surr: Nitrobenzene-d5	61.1	30-130		%REC	1	8/14/2013 2:20:00 PM
Surr: 2-Fluorobiphenyl	63.3	30-130		%REC	1	8/14/2013 2:20:00 PM
Surr: 2,4,6-Tribromophenol	78.8	30-130		%REC	1	8/14/2013 2:20:00 PM
Surr: 4-Terphenyl-d14	84.3	30-130		%REC	1	8/14/2013 2:20:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	GZ-20 6-8
Lab Order:	1308018	**Collection Date:**	8/9/2013 8:51:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	SOIL
Lab ID:	1308018-06B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
SEMIVOLATILE ORGANIC COMPOUNDS BY MCP SW8270C						Analyst: **KAM**
Acenaphthene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Acenaphthylene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Acetophenone	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Aniline	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Anthracene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
1,2-Diphenylhydrazine (as Azobenzene)	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Benz(a)anthracene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Benzo(a)pyrene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Benzo(b)fluoranthene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Benzo(k)fluoranthene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Benzo(g,h,i)perylene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
4-Bromophenyl phenyl ether	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Butyl benzyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Di-n-butyl phthalate	480	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
4-Chloroaniline	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Bis(2-chloroethoxy)methane	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Bis(2-chloroethyl)ether	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Bis(2-chloroisopropyl)ether	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2-Chloronaphthalene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2-Chlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Chrysene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Dibenz(a,h)anthracene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Dibenzofuran	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
1,2-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
1,3-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
1,4-Dichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
3,3´-Dichlorobenzidine	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2,4-Dichlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Diethyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Dimethyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2,4-Dimethylphenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2,4-Dinitrophenol	ND	560		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2,4-Dinitrotoluene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2,6-Dinitrotoluene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Bis(2-ethylhexyl)phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Fluoranthene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Fluorene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Hexachlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Lab Order: 1308018
Project: 18.0171593.00 NRA
Lab ID: 1308018-06B

Client Sample ID: GZ-20 6-8
Collection Date: 8/9/2013 8:51:00 AM
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
Hexachlorobutadiene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Hexachloroethane	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Indeno(1,2,3-cd)pyrene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Isophorone	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2-Methylnaphthalene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2-Methylphenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
4-Methylphenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Naphthalene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Nitrobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2-Nitrophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
4-Nitrophenol	ND	560		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Di-n-octyl phthalate	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Pentachlorophenol	ND	560		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Phenanthrene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Phenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Pyrene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
1,2,4-Trichlorobenzene	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2,4,5-Trichlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
2,4,6-Trichlorophenol	ND	280		µg/Kg-dry	1	8/14/2013 2:46:00 PM
Surr: 2-Fluorophenol	74.1	30-130		%REC	1	8/14/2013 2:46:00 PM
Surr: Phenol-d5	72.7	30-130		%REC	1	8/14/2013 2:46:00 PM
Surr: Nitrobenzene-d5	65.0	30-130		%REC	1	8/14/2013 2:46:00 PM
Surr: 2-Fluorobiphenyl	66.7	30-130		%REC	1	8/14/2013 2:46:00 PM
Surr: 2,4,6-Tribromophenol	76.6	30-130		%REC	1	8/14/2013 2:46:00 PM
Surr: 4-Terphenyl-d14	85.6	30-130		%REC	1	8/14/2013 2:46:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 2:10:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **SV-4_130813A** SeqNo: **858874**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	ND	250	µg/Kg									
Acenaphthylene	ND	250	µg/Kg									
Acetophenone	ND	250	µg/Kg									
Aniline	ND	250	µg/Kg									
Anthracene	ND	250	µg/Kg									
1,2-Diphenylhydrazine (as Azobe	ND	250	µg/Kg									
Benz(a)anthracene	ND	250	µg/Kg									
Benzo(a)pyrene	ND	250	µg/Kg									
Benzo(b)fluoranthene	ND	250	µg/Kg									
Benzo(k)fluoranthene	ND	250	µg/Kg									
Benzo(g,h,i)perylene	ND	250	µg/Kg									
4-Bromophenyl phenyl ether	ND	250	µg/Kg									
Butyl benzyl phthalate	ND	250	µg/Kg									
Di-n-butyl phthalate	ND	250	µg/Kg									
4-Chloroaniline	ND	250	µg/Kg									
Bis(2-chloroethoxy)methane	ND	250	µg/Kg									
Bis(2-chloroethyl)ether	ND	250	µg/Kg									
Bis(2-chloroisopropyl)ether	ND	250	µg/Kg									
2-Chloronaphthalene	ND	250	µg/Kg									
2-Chlorophenol	ND	250	µg/Kg									
Chrysene	ND	250	µg/Kg									
Dibenz(a,h)anthracene	ND	250	µg/Kg									
Dibenzofuran	ND	250	µg/Kg									
1,2-Dichlorobenzene	ND	250	µg/Kg									
1,3-Dichlorobenzene	ND	250	µg/Kg									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

1,4-Dichlorobenzene	ND	250	µg/Kg
3,3´-Dichlorobenzidine	ND	250	µg/Kg
2,4-Dichlorophenol	ND	250	µg/Kg
Diethyl phthalate	ND	250	µg/Kg
Dimethyl phthalate	ND	250	µg/Kg
2,4-Dimethylphenol	ND	250	µg/Kg
2,4-Dinitrophenol	ND	500	µg/Kg
2,4-Dinitrotoluene	ND	250	µg/Kg
2,6-Dinitrotoluene	ND	250	µg/Kg
Bis(2-ethylhexyl)phthalate	ND	250	µg/Kg
Fluoranthene	ND	250	µg/Kg
Fluorene	ND	250	µg/Kg
Hexachlorobenzene	ND	250	µg/Kg
Hexachlorobutadiene	ND	250	µg/Kg
Hexachloroethane	ND	250	µg/Kg
Indeno(1,2,3-cd)pyrene	ND	250	µg/Kg
Isophorone	ND	250	µg/Kg
2-Methylnaphthalene	ND	250	µg/Kg
2-Methylphenol	ND	250	µg/Kg
4-Methylphenol	ND	250	µg/Kg
Naphthalene	ND	250	µg/Kg
Nitrobenzene	ND	250	µg/Kg
2-Nitrophenol	ND	250	µg/Kg
4-Nitrophenol	ND	500	µg/Kg
Di-n-octyl phthalate	ND	250	µg/Kg
Pentachlorophenol	ND	500	µg/Kg
Phenanthrene	ND	250	µg/Kg
Phenol	ND	250	µg/Kg
Pyrene	ND	250	µg/Kg
1,2,4-Trichlorobenzene	ND	250	µg/Kg
2,4,5-Trichlorophenol	ND	250	µg/Kg

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

2,4,6-Trichlorophenol	ND	250	µg/Kg						
Surr: 2-Fluorophenol	2262	50	µg/Kg	3750	0	60.3	30	130	0
Surr: Phenol-d5	2285	50	µg/Kg	3750	0	60.9	30	130	0
Surr: Nitrobenzene-d5	1363	50	µg/Kg	2500	0	54.5	30	130	0
Surr: 2-Fluorobiphenyl	1356	50	µg/Kg	2500	0	54.3	30	130	0
Surr: 2,4,6-Tribromophenol	2518	50	µg/Kg	3750	0	67.2	30	130	0
Surr: 4-Terphenyl-d14	1980	50	µg/Kg	2500	0	79.2	30	130	0

Qualifiers: ND - Not Detected at the Reporting Limit; S - Spike Recovery outside accepted recovery limits; B - Analyte detected in the associated Method Blank; J - Analyte detected below quantitation limits; R - RPD outside accepted recovery limits; NA - Not applicable where J values or ND results occur; RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike - Full List

Sample ID: **LCS-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 2:36:00 PM** Prep Date: **8/13/2013**
Client ID: Run ID: **SV-4_130813A** SeqNo: **858876**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	1833	250	µg/Kg	2500	0	73.3	40	140	0			
Acenaphthylene	1775	250	µg/Kg	2500	0	71	40	140	0			
Acetophenone	1576	250	µg/Kg	2500	0	63	40	140	0			
Aniline	1258	250	µg/Kg	2500	0	50.3	40	140	0			
Anthracene	1926	250	µg/Kg	2500	0	77	40	140	0			
1,2-Diphenylhydrazine (as Azobe	1706	250	µg/Kg	2500	0	68.3	40	140	0			
Benz(a)anthracene	1940	250	µg/Kg	2500	0	77.6	40	140	0			
Benzo(a)pyrene	1994	250	µg/Kg	2500	0	79.7	40	140	0			
Benzo(b)fluoranthene	2120	250	µg/Kg	2500	0	84.8	40	140	0			
Benzo(k)fluoranthene	1947	250	µg/Kg	2500	0	77.9	40	140	0			
Benzo(g,h,i)perylene	2024	250	µg/Kg	2500	0	80.9	40	140	0			
4-Bromophenyl phenyl ether	2012	250	µg/Kg	2500	0	80.5	40	140	0			
Butyl benzyl phthalate	1954	250	µg/Kg	2500	0	78.1	40	140	0			
Di-n-butyl phthalate	2368	250	µg/Kg	2500	0	94.7	40	140	0			
4-Chloroaniline	1665	250	µg/Kg	2500	0	66.6	40	140	0			
Bis(2-chloroethoxy)methane	1664	250	µg/Kg	2500	0	66.6	40	140	0			
Bis(2-chloroethyl)ether	1514	250	µg/Kg	2500	0	60.5	40	140	0			
Bis(2-chloroisopropyl)ether	1200	250	µg/Kg	2500	0	48	40	140	0			
2-Chloronaphthalene	1682	250	µg/Kg	2500	0	67.3	40	140	0			
2-Chlorophenol	2500	250	µg/Kg	3750	0	66.7	30	130	0			
Chrysene	2016	250	µg/Kg	2500	0	80.6	40	140	0			
Dibenz(a,h)anthracene	2026	250	µg/Kg	2500	0	81	40	140	0			
Dibenzofuran	1855	250	µg/Kg	2500	0	74.2	40	140	0			
1,2-Dichlorobenzene	1474	250	µg/Kg	2500	0	59	40	140	0			
1,3-Dichlorobenzene	1362	250	µg/Kg	2500	0	54.5	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike - Full List

1,4-Dichlorobenzene	1378	250	µg/Kg	2500	0	55.1	40	140	0
3,3'-Dichlorobenzidine	1765	250	µg/Kg	2500	0	70.6	40	140	0
2,4-Dichlorophenol	2851	250	µg/Kg	3750	0	76	30	130	0
Diethyl phthalate	1920	250	µg/Kg	2500	0	76.8	40	140	0
Dimethyl phthalate	1898	250	µg/Kg	2500	0	75.9	40	140	0
2,4-Dimethylphenol	2780	250	µg/Kg	3750	0	74.1	30	130	0
2,4-Dinitrophenol	2046	500	µg/Kg	3750	0	54.5	30	130	0
2,4-Dinitrotoluene	1946	250	µg/Kg	2500	0	77.8	40	140	0
2,6-Dinitrotoluene	2006	250	µg/Kg	2500	0	80.3	40	140	0
Bis(2-ethylhexyl)phthalate	2010	250	µg/Kg	2500	0	80.4	40	140	0
Fluoranthene	2034	250	µg/Kg	2500	0	81.3	40	140	0
Fluorene	1870	250	µg/Kg	2500	0	74.8	40	140	0
Hexachlorobenzene	2030	250	µg/Kg	2500	0	81.2	40	140	0
Hexachlorobutadiene	1584	250	µg/Kg	2500	0	63.4	40	140	0
Hexachloroethane	1388	250	µg/Kg	2500	0	55.5	40	140	0
Indeno(1,2,3-cd)pyrene	2050	250	µg/Kg	2500	0	82	40	140	0
Isophorone	1634	250	µg/Kg	2500	0	65.4	40	140	0
2-Methylnaphthalene	1667	250	µg/Kg	2500	0	66.7	40	140	0
2-Methylphenol	2662	250	µg/Kg	3750	0	71	30	130	0
4-Methylphenol	3646	250	µg/Kg	7500	0	48.6	30	130	0
Naphthalene	1613	250	µg/Kg	2500	0	64.5	40	140	0
Nitrobenzene	1563	250	µg/Kg	2500	0	62.5	40	140	0
2-Nitrophenol	2470	250	µg/Kg	3750	0	65.9	30	130	0
4-Nitrophenol	2836	500	µg/Kg	3750	0	75.6	30	130	0
Di-n-octyl phthalate	1978	250	µg/Kg	2500	0	79.1	40	140	0
Pentachlorophenol	2819	500	µg/Kg	3750	0	75.2	30	130	0
Phenanthrene	1944	250	µg/Kg	2500	0	77.8	40	140	0
Phenol	2374	250	µg/Kg	3750	0	63.3	30	130	0
Pyrene	2016	250	µg/Kg	2500	0	80.6	40	140	0
1,2,4-Trichlorobenzene	1633	250	µg/Kg	2500	0	65.3	40	140	0
2,4,5-Trichlorophenol	3058	250	µg/Kg	3750	0	81.5	30	130	0

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike - Full List

2,4,6-Trichlorophenol	2874	250	µg/Kg	3750	0	76.7	30	130	0
Surr: 2-Fluorophenol	2278	50	µg/Kg	3750	0	60.7	30	130	0
Surr: Phenol-d5	2380	50	µg/Kg	3750	0	63.5	30	130	0
Surr: Nitrobenzene-d5	1388	50	µg/Kg	2500	0	55.5	30	130	0
Surr: 2-Fluorobiphenyl	1466	50	µg/Kg	2500	0	58.7	30	130	0
Surr: 2,4,6-Tribromophenol	2796	50	µg/Kg	3750	0	74.5	30	130	0
Surr: 4-Terphenyl-d14	2050	50	µg/Kg	2500	0	82	30	130	0

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

Sample ID: **LCSD-23462** Batch ID: **23462** Test Code: **SW8270C** Units: **µg/Kg** Analysis Date **8/13/2013 3:02:00 PM** Prep Date: **8/13/2013**

Client ID: Run ID: **SV-4_130813A** SeqNo: **858875**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Acenaphthene	2094	250	µg/Kg	2500	0	83.8	40	140	1833	13.3	30	
Acenaphthylene	2076	250	µg/Kg	2500	0	83.1	40	140	1775	15.7	30	
Acetophenone	1908	250	µg/Kg	2500	0	76.3	40	140	1576	19	30	
Aniline	1114	250	µg/Kg	2500	0	44.6	40	140	1258	12.2	30	
Anthracene	2267	250	µg/Kg	2500	0	90.7	40	140	1926	16.3	30	
1,2-Diphenylhydrazine (as Azobe	1937	250	µg/Kg	2500	0	77.5	40	140	1706	12.6	30	
Benz(a)anthracene	2355	250	µg/Kg	2500	0	94.2	40	140	1940	19.4	30	
Benzo(a)pyrene	2376	250	µg/Kg	2500	0	95	40	140	1994	17.5	30	
Benzo(b)fluoranthene	2374	250	µg/Kg	2500	0	94.9	40	140	2120	11.3	30	
Benzo(k)fluoranthene	2532	250	µg/Kg	2500	0	101	40	140	1947	26.1	30	
Benzo(g,h,i)perylene	2376	250	µg/Kg	2500	0	95	40	140	2024	16	30	
4-Bromophenyl phenyl ether	2378	250	µg/Kg	2500	0	95.1	40	140	2012	16.7	30	
Butyl benzyl phthalate	2255	250	µg/Kg	2500	0	90.2	40	140	1954	14.3	30	
Di-n-butyl phthalate	2622	250	µg/Kg	2500	0	105	40	140	2368	10.2	30	
4-Chloroaniline	1596	250	µg/Kg	2500	0	63.9	40	140	1665	4.2	30	
Bis(2-chloroethoxy)methane	1866	250	µg/Kg	2500	0	74.6	40	140	1664	11.4	30	
Bis(2-chloroethyl)ether	1821	250	µg/Kg	2500	0	72.8	40	140	1514	18.4	30	
Bis(2-chloroisopropyl)ether	1454	250	µg/Kg	2500	0	58.2	40	140	1200	19.2	30	
2-Chloronaphthalene	1988	250	µg/Kg	2500	0	79.5	40	140	1682	16.7	30	
2-Chlorophenol	2976	250	µg/Kg	3750	0	79.4	30	130	2500	17.4	30	
Chrysene	2388	250	µg/Kg	2500	0	95.5	40	140	2016	16.9	30	
Dibenz(a,h)anthracene	2448	250	µg/Kg	2500	0	97.9	40	140	2026	18.9	30	
Dibenzofuran	2178	250	µg/Kg	2500	0	87.1	40	140	1855	16	30	
1,2-Dichlorobenzene	1782	250	µg/Kg	2500	0	71.3	40	140	1474	18.9	30	
1,3-Dichlorobenzene	1670	250	µg/Kg	2500	0	66.8	40	140	1362	20.3	30	

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

1,4-Dichlorobenzene	1676	250	µg/Kg	2500	0	67.1	40	140	1378	19.5	30
3,3'-Dichlorobenzidine	1804	250	µg/Kg	2500	0	72.1	40	140	1765	2.16	30
2,4-Dichlorophenol	3149	250	µg/Kg	3750	0	84	30	130	2851	9.93	30
Diethyl phthalate	2186	250	µg/Kg	2500	0	87.4	40	140	1920	13	30
Dimethyl phthalate	2159	250	µg/Kg	2500	0	86.4	40	140	1898	12.9	30
2,4-Dimethylphenol	3066	250	µg/Kg	3750	0	81.7	30	130	2780	9.79	30
2,4-Dinitrophenol	2505	500	µg/Kg	3750	0	66.8	30	130	2046	20.2	30
2,4-Dinitrotoluene	2248	250	µg/Kg	2500	0	89.9	40	140	1946	14.4	30
2,6-Dinitrotoluene	2250	250	µg/Kg	2500	0	90	40	140	2006	11.4	30
Bis(2-ethylhexyl)phthalate	2326	250	µg/Kg	2500	0	93	40	140	2010	14.6	30
Fluoranthene	2454	250	µg/Kg	2500	0	98.2	40	140	2034	18.8	30
Fluorene	2150	250	µg/Kg	2500	0	86	40	140	1870	14	30
Hexachlorobenzene	2400	250	µg/Kg	2500	0	96	40	140	2030	16.7	30
Hexachlorobutadiene	1929	250	µg/Kg	2500	0	77.2	40	140	1584	19.6	30
Hexachloroethane	1703	250	µg/Kg	2500	0	68.1	40	140	1388	20.3	30
Indeno(1,2,3-cd)pyrene	2440	250	µg/Kg	2500	0	97.6	40	140	2050	17.3	30
Isophorone	1659	250	µg/Kg	2500	0	66.4	40	140	1634	1.49	30
2-Methylnaphthalene	1956	250	µg/Kg	2500	0	78.3	40	140	1667	16	30
2-Methylphenol	2930	250	µg/Kg	3750	0	78.1	30	130	2662	9.57	30
4-Methylphenol	4088	250	µg/Kg	7500	0	54.5	30	130	3646	11.4	30
Naphthalene	1887	250	µg/Kg	2500	0	75.5	40	140	1613	15.6	30
Nitrobenzene	1887	250	µg/Kg	2500	0	75.5	40	140	1563	18.8	30
2-Nitrophenol	2873	250	µg/Kg	3750	0	76.6	30	130	2470	15.1	30
4-Nitrophenol	3378	500	µg/Kg	3750	0	90.1	30	130	2836	17.4	30
Di-n-octyl phthalate	2240	250	µg/Kg	2500	0	89.6	40	140	1978	12.4	30
Pentachlorophenol	3285	500	µg/Kg	3750	0	87.6	30	130	2819	15.3	30
Phenanthrene	2294	250	µg/Kg	2500	0	91.7	40	140	1944	16.5	30
Phenol	2782	250	µg/Kg	3750	0	74.2	30	130	2374	15.8	30
Pyrene	2354	250	µg/Kg	2500	0	94.2	40	140	2016	15.5	30
1,2,4-Trichlorobenzene	1950	250	µg/Kg	2500	0	78	40	140	1633	17.7	30
2,4,5-Trichlorophenol	3378	250	µg/Kg	3750	0	90.1	30	130	3058	9.96	30

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate - Full List

2,4,6-Trichlorophenol	3151	250	µg/Kg	3750	0	84	30	130	2874	9.18	30
Surr: 2-Fluorophenol	2744	50	µg/Kg	3750	0	73.2	30	130	0	0	0
Surr: Phenol-d5	2706	50	µg/Kg	3750	0	72.2	30	130	0	0	0
Surr: Nitrobenzene-d5	1596	50	µg/Kg	2500	0	63.9	30	130	0	0	0
Surr: 2-Fluorobiphenyl	1645	50	µg/Kg	2500	0	65.8	30	130	0	0	0
Surr: 2,4,6-Tribromophenol	2954	50	µg/Kg	3750	0	78.8	30	130	0	0	0
Surr: 4-Terphenyl-d14	2200	50	µg/Kg	2500	0	88	30	130	0	0	0

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-01 **Collection Date:** 8/8/2013 2:17:00 PM
Collection Time:
Client Sample ID: GZ-14 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1221	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1232	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1242	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1248	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1254	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1260	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1262	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Aroclor 1268	ND	27		µg/Kg-dry	1	8/13/2013 12:54:00 PM
Surr: Tetrachloro-m-xylene	84.4	30-150		%REC	1	8/13/2013 12:54:00 PM
Surr: Decachlorobiphenyl	97.3	30-150		%REC	1	8/13/2013 12:54:00 PM

Lab ID: 1308018-02 **Collection Date:** 8/8/2013 2:27:00 PM
Collection Time:
Client Sample ID: GZ-14 7' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1221	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1232	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1242	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1248	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1254	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1260	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1262	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Aroclor 1268	ND	34		µg/Kg-dry	1	8/13/2013 1:19:00 PM
Surr: Tetrachloro-m-xylene	65.5	30-150		%REC	1	8/13/2013 1:19:00 PM
Surr: Decachlorobiphenyl	72.6	30-150		%REC	1	8/13/2013 1:19:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-03 **Collection Date:** 8/9/2013 7:32:00 AM
Collection Time:
Client Sample ID: GZ-17 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1221	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1232	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1242	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1248	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1254	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1260	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1262	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Aroclor 1268	ND	28		µg/Kg-dry	1	8/13/2013 1:46:00 PM
Surr: Tetrachloro-m-xylene	93.9	30-150		%REC	1	8/13/2013 1:46:00 PM
Surr: Decachlorobiphenyl	101	30-150		%REC	1	8/13/2013 1:46:00 PM

Lab ID: 1308018-04 **Collection Date:** 8/9/2013 7:49:00 AM
Collection Time:
Client Sample ID: GZ-17 6-7 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1221	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1232	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1242	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1248	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1254	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1260	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1262	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Aroclor 1268	ND	28		µg/Kg-dry	1	8/13/2013 2:12:00 PM
Surr: Tetrachloro-m-xylene	78.4	30-150		%REC	1	8/13/2013 2:12:00 PM
Surr: Decachlorobiphenyl	84.4	30-150		%REC	1	8/13/2013 2:12:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-05 **Collection Date:** 8/9/2013 8:39:00 AM
Collection Time:
Client Sample ID: GZ-20 1'-3' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1221	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1232	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1242	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1248	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1254	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1260	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1262	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Aroclor 1268	ND	28		µg/Kg-dry	1	8/13/2013 2:39:00 PM
Surr: Tetrachloro-m-xylene	88.4	30-150		%REC	1	8/13/2013 2:39:00 PM
Surr: Decachlorobiphenyl	84.4	30-150		%REC	1	8/13/2013 2:39:00 PM

Lab ID: 1308018-06 **Collection Date:** 8/9/2013 8:51:00 AM
Collection Time:
Client Sample ID: GZ-20 6-8 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
POLYCHLORINATED BIPHENYLS BY MCP METH SW8082						Analyst: **KAM**
Aroclor 1016	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1221	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1232	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1242	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1248	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1254	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1260	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1262	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Aroclor 1268	ND	28		µg/Kg-dry	1	8/13/2013 3:05:00 PM
Surr: Tetrachloro-m-xylene	91.2	30-150		%REC	1	8/13/2013 3:05:00 PM
Surr: Decachlorobiphenyl	84.8	30-150		%REC	1	8/13/2013 3:05:00 PM

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23458** Batch ID: **23458** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/13/2013 11:09:00 AM** Prep Date: **8/12/2013**
Client ID: Run ID: **GC-ELVIS_130813A** SeqNo: **858940**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	ND	25	µg/Kg									
Aroclor 1221	ND	25	µg/Kg									
Aroclor 1232	ND	25	µg/Kg									
Aroclor 1242	ND	25	µg/Kg									
Aroclor 1248	ND	25	µg/Kg									
Aroclor 1254	ND	25	µg/Kg									
Aroclor 1260	ND	25	µg/Kg									
Aroclor 1262	ND	25	µg/Kg									
Aroclor 1268	ND	25	µg/Kg									
Surr: Tetrachloro-m-xylene	7.26	0	µg/Kg	8	0	90.7	30	150	0			
Surr: Decachlorobiphenyl	7.45	0	µg/Kg	8	0	93.1	30	150	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23458** Batch ID: **23458** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/13/2013 11:35:00 AM** Prep Date: **8/12/2013**
Client ID: Run ID: **GC-ELVIS_130813A** SeqNo: **858941**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	480.1	25	µg/Kg	500	0	96	40	140	0			
Aroclor 1260	485.7	25	µg/Kg	500	0	97.1	40	140	0			
Surr: Tetrachloro-m-xylene	7.78	0	µg/Kg	8	0	97.2	30	150	0			
Surr: Decachlorobiphenyl	7.732	0	µg/Kg	8	0	96.7	30	150	0			

Sample ID: **LCSD-23458** Batch ID: **23458** Test Code: **SW8082** Units: **µg/Kg** Analysis Date **8/13/2013 12:01:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **GC-ELVIS_130813A** SeqNo: **858942**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Aroclor 1016	501.4	25	µg/Kg	500	0	100	40	140	480.1	4.33	30	
Aroclor 1260	520.4	25	µg/Kg	500	0	104	40	140	485.7	6.9	30	
Surr: Tetrachloro-m-xylene	8.464	0	µg/Kg	8	0	106	30	150	0	0	0	
Surr: Decachlorobiphenyl	7.955	0	µg/Kg	8	0	99.4	30	150	0	0	0	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-01 **Collection Date:** 8/8/2013 2:17:00 PM
Collection Time:
Client Sample ID: GZ-14 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/13/2013 8:57:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/13/2013 8:57:00 PM
C11-C22 Aromatic Hydrocarbons	77	11		mg/Kg-dry	1	8/13/2013 9:33:00 PM
Surr: 1-Chlorooctadecane	52.6	40-140		%REC	1	8/13/2013 8:57:00 PM
Surr: 2-Bromonaphthalene	86.0	40-140		%REC	1	8/13/2013 9:33:00 PM
Surr: 2-Fluorobiphenyl	82.0	40-140		%REC	1	8/13/2013 9:33:00 PM
Surr: o-Terphenyl	77.6	40-140		%REC	1	8/13/2013 9:33:00 PM

Lab ID: 1308018-02 **Collection Date:** 8/8/2013 2:27:00 PM
Collection Time:
Client Sample ID: GZ-14 7' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	13		mg/Kg-dry	1	8/13/2013 10:07:00 PM
C19-C36 Aliphatic Hydrocarbons	21	13		mg/Kg-dry	1	8/13/2013 10:07:00 PM
C11-C22 Aromatic Hydrocarbons	87	13		mg/Kg-dry	1	8/13/2013 10:42:00 PM
Surr: 1-Chlorooctadecane	55.5	40-140		%REC	1	8/13/2013 10:07:00 PM
Surr: 2-Bromonaphthalene	68.2	40-140		%REC	1	8/13/2013 10:42:00 PM
Surr: 2-Fluorobiphenyl	69.9	40-140		%REC	1	8/13/2013 10:42:00 PM
Surr: o-Terphenyl	51.6	40-140		%REC	1	8/13/2013 10:42:00 PM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-03 **Collection Date:** 8/9/2013 7:32:00 AM
Collection Time:
Client Sample ID: GZ-17 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 12:09:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 12:09:00 PM
C11-C22 Aromatic Hydrocarbons	14	11		mg/Kg-dry	1	8/13/2013 11:52:00 PM
Surr: 1-Chlorooctadecane	45.7	40-140		%REC	1	8/14/2013 12:09:00 PM
Surr: 2-Bromonaphthalene	81.7	40-140		%REC	1	8/13/2013 11:52:00 PM
Surr: 2-Fluorobiphenyl	82.1	40-140		%REC	1	8/13/2013 11:52:00 PM
Surr: o-Terphenyl	78.6	40-140		%REC	1	8/13/2013 11:52:00 PM

Lab ID: 1308018-04 **Collection Date:** 8/9/2013 7:49:00 AM
Collection Time:
Client Sample ID: GZ-17 6-7 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 12:44:00 PM
C19-C36 Aliphatic Hydrocarbons	43	11		mg/Kg-dry	1	8/14/2013 12:44:00 PM
C11-C22 Aromatic Hydrocarbons	43	11		mg/Kg-dry	1	8/14/2013 1:01:00 AM
Surr: 1-Chlorooctadecane	52.5	40-140		%REC	1	8/14/2013 12:44:00 PM
Surr: 2-Bromonaphthalene	73.8	40-140		%REC	1	8/14/2013 1:01:00 AM
Surr: 2-Fluorobiphenyl	76.8	40-140		%REC	1	8/14/2013 1:01:00 AM
Surr: o-Terphenyl	63.8	40-140		%REC	1	8/14/2013 1:01:00 AM

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-05 **Collection Date:** 8/9/2013 8:39:00 AM
Collection Time:
Client Sample ID: GZ-20 1'-3' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 1:36:00 AM
C19-C36 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 1:36:00 AM
C11-C22 Aromatic Hydrocarbons	19	11		mg/Kg-dry	1	8/14/2013 2:11:00 AM
Surr: 1-Chlorooctadecane	63.2	40-140		%REC	1	8/14/2013 1:36:00 AM
Surr: 2-Bromonaphthalene	67.7	40-140		%REC	1	8/14/2013 2:11:00 AM
Surr: 2-Fluorobiphenyl	66.7	40-140		%REC	1	8/14/2013 2:11:00 AM
Surr: o-Terphenyl	72.0	40-140		%REC	1	8/14/2013 2:11:00 AM

Lab ID: 1308018-06 **Collection Date:** 8/9/2013 8:51:00 AM
Collection Time:
Client Sample ID: GZ-20 6-8 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 2:46:00 AM
C19-C36 Aliphatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 2:46:00 AM
C11-C22 Aromatic Hydrocarbons	ND	11		mg/Kg-dry	1	8/14/2013 3:20:00 AM
Surr: 1-Chlorooctadecane	47.8	40-140		%REC	1	8/14/2013 2:46:00 AM
Surr: 2-Bromonaphthalene	88.3	40-140		%REC	1	8/14/2013 3:20:00 AM
Surr: 2-Fluorobiphenyl	85.8	40-140		%REC	1	8/14/2013 3:20:00 AM
Surr: o-Terphenyl	82.8	40-140		%REC	1	8/14/2013 3:20:00 AM

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 1:59:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858950**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C11-C22 Aromatic Hydrocarbons	ND	10	mg/Kg									
Surr: 2-Bromonaphthalene	1.663	0.10	mg/Kg	2	0	83.2	40	140	0			
Surr: 2-Fluorobiphenyl	1.678	0.10	mg/Kg	2	0	83.9	40	140	0			
Surr: o-Terphenyl	1.621	0.10	mg/Kg	2	0	81	40	140	0			

Sample ID: **MB-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 3:44:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858953**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C9-C18 Aliphatic Hydrocarbons	ND	10	mg/Kg	0	0	0	0	0	0			
C19-C36 Aliphatic Hydrocarbons	ND	10	mg/Kg	0	0	0	0	0	0			
Surr: 1-Chlorooctadecane	1.188	0.10	mg/Kg	2	0	59.4	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 4:19:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858954**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	1.712	0.10	mg/Kg	2.5	0	68.5	40	140	0			
n-Docosane	2.371	0.10	mg/Kg	2.5	0	94.8	40	140	0			
n-Dodecane	1.858	0.10	mg/Kg	2.5	0	74.3	40	140	0			
n-Eicosane	2.234	0.10	mg/Kg	2.5	0	89.4	40	140	0			
n-Hexacosane	2.464	0.10	mg/Kg	2.5	0	98.6	40	140	0			
n-Hexadecane	2.094	0.10	mg/Kg	2.5	0	83.7	40	140	0			
n-Hexatriacontane	1.756	0.10	mg/Kg	2.5	0	70.2	40	140	0			
n-Nonadecane	2.282	0.10	mg/Kg	2.5	0	91.3	40	140	0			
n-Nonane	1.402	0.10	mg/Kg	2.5	0	56.1	30	140	0			
n-Octacosane	2.152	0.10	mg/Kg	2.5	0	86.1	40	140	0			
n-Octadecane	2.241	0.10	mg/Kg	2.5	0	89.6	40	140	0			
n-Tetracosane	2.393	0.10	mg/Kg	2.5	0	95.7	40	140	0			
n-Tetradecane	1.943	0.10	mg/Kg	2.5	0	77.7	40	140	0			
n-Triacontane	2.026	0.10	mg/Kg	2.5	0	81	40	140	0			
Surr: 1-Chlorooctadecane	1.301	0.10	mg/Kg	2	0	65	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **LCSD-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 4:54:00 PM** Prep Date: **8/12/2013**

Client ID: Run ID: **SV-2_130813A** SeqNo: **858955**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	1.744	0.10	mg/Kg	2.5	0	69.8	40	140	1.712	1.88	25	
n-Docosane	2.524	0.10	mg/Kg	2.5	0	101	40	140	2.371	6.27	25	
n-Dodecane	1.922	0.10	mg/Kg	2.5	0	76.9	40	140	1.858	3.36	25	
n-Eicosane	2.404	0.10	mg/Kg	2.5	0	96.2	40	140	2.234	7.31	25	
n-Hexacosane	2.67	0.10	mg/Kg	2.5	0	107	40	140	2.464	7.99	25	
n-Hexadecane	2.267	0.10	mg/Kg	2.5	0	90.7	40	140	2.094	7.96	25	
n-Hexatriacontane	1.946	0.10	mg/Kg	2.5	0	77.9	40	140	1.756	10.3	25	
n-Nonadecane	2.426	0.10	mg/Kg	2.5	0	97	40	140	2.282	6.14	25	
n-Nonane	1.432	0.10	mg/Kg	2.5	0	57.3	30	140	1.402	2.12	25	
n-Octacosane	2.49	0.10	mg/Kg	2.5	0	99.6	40	140	2.152	14.6	25	
n-Octadecane	2.368	0.10	mg/Kg	2.5	0	94.7	40	140	2.241	5.51	25	
n-Tetracosane	2.572	0.10	mg/Kg	2.5	0	103	40	140	2.393	7.21	25	
n-Tetradecane	2.113	0.10	mg/Kg	2.5	0	84.5	40	140	1.943	8.38	25	
n-Triacontane	2.326	0.10	mg/Kg	2.5	0	93	40	140	2.026	13.8	25	
Surr: 1-Chlorooctadecane	1.389	0.10	mg/Kg	2	0	69.4	40	140	0	0	0	

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *14-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 2:34:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858951**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Surr: 2-Bromonaphthalene	1.41	0.10	mg/Kg	2	0	70.5	40	140	0			
Surr: 2-Fluorobiphenyl	1.452	0.10	mg/Kg	2	0	72.6	40	140	0			
Surr: o-Terphenyl	1.51	0.10	mg/Kg	2	0	75.5	40	140	0			

Sample ID: **LCSD-23459** Batch ID: **23459** Test Code: **MAEPH** Units: **mg/Kg** Analysis Date **8/13/2013 3:09:00 PM** Prep Date: **8/12/2013**
Client ID: Run ID: **SV-2_130813A** SeqNo: **858952**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Surr: 2-Bromonaphthalene	1.6	0.10	mg/Kg	2	0	80	40	140	0	0	0	
Surr: 2-Fluorobiphenyl	1.653	0.10	mg/Kg	2	0	82.6	40	140	0	0	0	
Surr: o-Terphenyl	1.766	0.10	mg/Kg	2	0	88.3	40	140	0	0	0	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

Send to Database

Breakthrough Report

LIMS Sample ID: LCS-23459
Test Code: EPH1.1SDT
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10767.D	28.3169
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10767.D	28.894

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10770.D	0.062496
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10770.D	0

Naphthalene Breakthrough: 0.220215752 %

2-Methylnaphthalene Breakthrough: 0 %

Send to Database

Breakthrough Report

LIMS Sample ID: LCSD-23459
Test Code: EPH1.1SDT
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10768.D	33.2581
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10768.D	34.9369

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\081313E\2B10771.D	0.121425
2-Methylnaphthalene	C:\HPCHEM\1\DATA\081313E\2B10771.D	0.012654

Naphthalene Breakthrough: 0.363770904 %

2-Methylnaphthalene Breakthrough: 0.036207329 %

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-01 **Collection Date:** 8/8/2013 2:17:00 PM
Collection Time:
Client Sample ID: GZ-14 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	20.7	6.40		mg/Kg-dry	1	8/13/2013 8:45:07 PM
Barium	45.9	12.8		mg/Kg-dry	1	8/13/2013 8:45:07 PM
Cadmium	ND	0.640		mg/Kg-dry	1	8/13/2013 8:45:07 PM
Chromium	21.2	1.28		mg/Kg-dry	1	8/13/2013 8:45:07 PM
Lead	92.4	5.12		mg/Kg-dry	1	8/13/2013 8:45:07 PM
Selenium	ND	15.4		mg/Kg-dry	1	8/13/2013 8:45:07 PM
Silver	ND	1.79		mg/Kg-dry	1	8/13/2013 8:45:07 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.568	0.0529		mg/Kg-dry	1	8/15/2013 2:35:25 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	8.7	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	22		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
**** Sample receipt problems were observed for this test method. See Case Narrative for details. ****						
pH	7.6	0		pH Units	1	8/9/2013 4:10:00 PM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	230	1.0		µmhos/cm	1	8/10/2013

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-02 **Collection Date:** 8/8/2013 2:27:00 PM
Collection Time:
Client Sample ID: GZ-14 7' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	ND	7.46		mg/Kg-dry	1	8/13/2013 8:52:40 PM
Barium	44.6	14.9		mg/Kg-dry	1	8/13/2013 8:52:40 PM
Cadmium	ND	0.746		mg/Kg-dry	1	8/13/2013 8:52:40 PM
Chromium	16.9	1.49		mg/Kg-dry	1	8/13/2013 8:52:40 PM
Lead	131	5.97		mg/Kg-dry	1	8/13/2013 8:52:40 PM
Selenium	ND	17.9		mg/Kg-dry	1	8/13/2013 8:52:40 PM
Silver	ND	2.09		mg/Kg-dry	1	8/13/2013 8:52:40 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.367	0.0623		mg/Kg-dry	1	8/15/2013 2:38:41 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	25.7	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	26		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	130		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
**** Sample receipt problems were observed for this test method. See Case Narrative for details. ****						
pH	6.2	0		pH Units	1	8/9/2013 4:10:00 PM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	1,100	1.0		µmhos/cm	1	8/10/2013

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-03 **Collection Date:** 8/9/2013 7:32:00 AM
Collection Time:
Client Sample ID: GZ-17 2' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	13.7	7.01		mg/Kg-dry	1	8/13/2013 9:00:09 PM
Barium	52.6	14.0		mg/Kg-dry	1	8/13/2013 9:00:09 PM
Cadmium	ND	0.701		mg/Kg-dry	1	8/13/2013 9:00:09 PM
Chromium	25.7	1.40		mg/Kg-dry	1	8/13/2013 9:00:09 PM
Lead	188	5.61		mg/Kg-dry	1	8/13/2013 9:00:09 PM
Selenium	ND	16.8		mg/Kg-dry	1	8/13/2013 9:00:09 PM
Silver	ND	1.96		mg/Kg-dry	1	8/13/2013 9:00:09 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.447	0.0559		mg/Kg-dry	1	8/15/2013 2:41:56 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	12.0	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	22		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	7.3	0		pH Units	1	8/9/2013 4:10:00 PM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	1,900	1.0		µmhos/cm	1	8/10/2013

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-04 **Collection Date:** 8/9/2013 7:49:00 AM
Collection Time:

Client Sample ID: GZ-17 6-7 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	14.3	6.37		mg/Kg-dry	1	8/13/2013 9:07:45 PM
Barium	46.7	12.7		mg/Kg-dry	1	8/13/2013 9:07:45 PM
Cadmium	ND	0.637		mg/Kg-dry	1	8/13/2013 9:07:45 PM
Chromium	16.4	1.27		mg/Kg-dry	1	8/13/2013 9:07:45 PM
Lead	167	5.10		mg/Kg-dry	1	8/13/2013 9:07:45 PM
Selenium	ND	15.3		mg/Kg-dry	1	8/13/2013 9:07:45 PM
Silver	ND	1.78		mg/Kg-dry	1	8/13/2013 9:07:45 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.449	0.0533		mg/Kg-dry	1	8/15/2013 2:45:13 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	11.6	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	22		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	7.2	0		pH Units	1	8/9/2013 4:10:00 PM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	1,700	1.0		µmhos/cm	1	8/10/2013

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-05 **Collection Date:** 8/9/2013 8:39:00 AM
Collection Time:
Client Sample ID: GZ-20 1'-3' **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	12.0	6.96		mg/Kg-dry	1	8/13/2013 9:15:28 PM
Barium	44.7	13.9		mg/Kg-dry	1	8/13/2013 9:15:28 PM
Cadmium	ND	0.696		mg/Kg-dry	1	8/13/2013 9:15:28 PM
Chromium	22.8	1.39		mg/Kg-dry	1	8/13/2013 9:15:28 PM
Lead	142	5.56		mg/Kg-dry	1	8/13/2013 9:15:28 PM
Selenium	ND	16.7		mg/Kg-dry	1	8/13/2013 9:15:28 PM
Silver	ND	1.95		mg/Kg-dry	1	8/13/2013 9:15:28 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	0.221	0.0560		mg/Kg-dry	1	8/15/2013 2:48:32 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	11.9	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	22		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	7.0	0		pH Units	1	8/9/2013 4:10:00 PM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	570	1.0		µmhos/cm	1	8/10/2013

AMRO Environmental Laboratories Corp.

Date: *19-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308018
Project: 18.0171593.00 NRA

Lab ID: 1308018-06 **Collection Date:** 8/9/2013 8:51:00 AM
Collection Time:
Client Sample ID: GZ-20 6-8 **Matrix:** SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS TOTAL SW-846 - 3051/6010		**SW6010B**				Analyst: **AL**
Arsenic	12.7	6.47		mg/Kg-dry	1	8/13/2013 9:23:05 PM
Barium	14.0	12.9		mg/Kg-dry	1	8/13/2013 9:23:05 PM
Cadmium	ND	0.647		mg/Kg-dry	1	8/13/2013 9:23:05 PM
Chromium	13.0	1.29		mg/Kg-dry	1	8/13/2013 9:23:05 PM
Lead	ND	5.18		mg/Kg-dry	1	8/13/2013 9:23:05 PM
Selenium	ND	15.5		mg/Kg-dry	1	8/13/2013 9:23:05 PM
Silver	ND	1.81		mg/Kg-dry	1	8/13/2013 9:23:05 PM
MERCURY, 7471A		**SW7471A**				Analyst: **AL**
Mercury	ND	0.0536		mg/Kg-dry	1	8/15/2013 2:51:50 PM
FLASH POINT / IGNITABILITY		**SW1010**				Analyst: **AL**
Ignitability	>200	0		°F	1	8/14/2013
PERCENT MOISTURE		**D2216**				Analyst: **MG**
Percent Moisture	11.2	0		wt%	1	8/12/2013
CYANIDE, REACTIVE		**SW7.3.3.2**				Analyst: **AL**
Reactive Cyanide	ND	22		mg/Kg-dry	1	8/13/2013
SULFIDE, REACTIVE		**SW7.3.4.2**				Analyst: **AL**
Reactive Sulfide	ND	110		mg/Kg-dry	1	8/13/2013
PH/CORROSIVITY		**SW9045C**				Analyst: **DD**
pH	6.6	0		pH Units	1	8/9/2013 4:10:00 PM
SPECIFIC CONDUCTANCE (MODIFIED)		**SW9050A**				Analyst: **NS**
Specific Conductivity	350	1.0		µmhos/cm	1	8/10/2013

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID **mb-23460** Batch ID: **23460** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/13/13 5:19:09 PM** Prep Date **8/12/13**
Client ID: Run ID: **ICP-OPTIMA_130813A** SeqNo: **858885**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	ND	6.2	mg/Kg									
Barium	ND	12	mg/Kg									
Cadmium	ND	0.62	mg/Kg									
Chromium	ND	1.2	mg/Kg									
Lead	ND	5.0	mg/Kg									
Selenium	ND	15	mg/Kg									
Silver	ND	1.8	mg/Kg									

Sample ID **mb-23466** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/15/13 1:16:39 PM** Prep Date **8/14/13**
Client ID: Run ID: **HG-FIMS_130815A** SeqNo: **859111**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	ND	0.050	mg/Kg									

Sample ID **MB-R51613** Batch ID: **R51613** Test Code: **SW7.3.3.2** Units: **mg/Kg** Analysis Date **8/13/13** Prep Date
Client ID: Run ID: **ING-WET_130813B** SeqNo: **859153**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Cyanide	ND	20	mg/Kg									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID **MB-R51609** Batch ID: **R51609** Test Code: **SW7.3.4.2** Units: **mg/Kg** Analysis Date **8/13/13** Prep Date
Client ID: Run ID: **ING-WET_130813A** SeqNo: **859119**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Reactive Sulfide	ND	100	mg/Kg									

Sample ID **MB-R51582** Batch ID: **R51582** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/10/13** Prep Date
Client ID: Run ID: **ING-WET_130810A** SeqNo: **858734**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	ND	1.0	µmhos/cm									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **lcs-23460** Batch ID: **23460** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/13/13 5:26:02 PM** Prep Date **8/12/13**
Client ID: Run ID: **ICP-OPTIMA_130813A** SeqNo: **858886**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	245.1	6.2	mg/Kg	250	0	98	80	120	0			
Barium	503.9	12	mg/Kg	503.8	0	100	80	120	0			
Cadmium	99.65	0.62	mg/Kg	100	0	99.6	80	120	0			
Chromium	510.9	1.2	mg/Kg	500	0	102	80	120	0			
Lead	257.3	5.0	mg/Kg	249.8	0	103	80	120	0			
Selenium	184.1	15	mg/Kg	199.1	0	92.4	80	120	0			
Silver	50.96	1.8	mg/Kg	50	0	102	80	120	0			

Sample ID **lcsd-23460** Batch ID: **23460** Test Code: **SW6010B** Units: **mg/Kg** Analysis Date **8/13/13 5:34:09 PM** Prep Date **8/12/13**
Client ID: Run ID: **ICP-OPTIMA_130813A** SeqNo: **858887**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	246.8	6.2	mg/Kg	250	0	98.7	80	120	245.1	0.704	20	
Barium	506.1	12	mg/Kg	503.8	0	100	80	120	503.9	0.441	20	
Cadmium	100.4	0.62	mg/Kg	100	0	100	80	120	99.65	0.796	20	
Chromium	515.6	1.2	mg/Kg	500	0	103	80	120	510.9	0.917	20	
Lead	259.1	5.0	mg/Kg	249.8	0	104	80	120	257.3	0.709	20	
Selenium	184.7	15	mg/Kg	199.1	0	92.8	80	120	184.1	0.36	20	
Silver	50.43	1.8	mg/Kg	50	0	101	80	120	50.96	1.04	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **lcs-23466** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/15/13 1:19:53 PM** Prep Date **8/14/13**
Client ID: Run ID: **HG-FIMS_130815A** SeqNo: **859074**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.7859	0.048	mg/Kg	0.8006	0	98.2	80	120	0			

Sample ID **lcsd-23466** Batch ID: **23466** Test Code: **SW7471A** Units: **mg/Kg** Analysis Date **8/15/13 1:23:07 PM** Prep Date **8/14/13**
Client ID: Run ID: **HG-FIMS_130815A** SeqNo: **859075**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Mercury	0.7886	0.049	mg/Kg	0.8091	0	97.5	80	120	0.7859	0.333	20	

Sample ID **PXYLENE** Batch ID: **R51594** Test Code: **SW1010** Units: **°F** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814A** SeqNo: **858938**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Ignitability	80	0	°F	81	0	98.8	97.5	102.5	0			

Sample ID **3% ACETONE** Batch ID: **R51594** Test Code: **SW1010** Units: **°F** Analysis Date **8/14/13** Prep Date
Client ID: Run ID: **ING-WET_130814A** SeqNo: **858939**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Ignitability	100	0	°F	100	0	100	98	102	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID **LCS-R51581** Batch ID: **R51581** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/9/13 4:10:00 PM** Prep Date
Client ID: Run ID: **ING-WET_130809D** SeqNo: **858725**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	6.05	0	pH Units	6	0	101	99	101	0			

Sample ID **LCSD-R51581** Batch ID: **R51581** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/9/13 4:10:00 PM** Prep Date
Client ID: Run ID: **ING-WET_130809D** SeqNo: **858732**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	6.04	0	pH Units	6	0	101	99	101	6.05	0.165	5	

Sample ID **LCS-R51582** Batch ID: **R51582** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/10/13** Prep Date
Client ID: Run ID: **ING-WET_130810A** SeqNo: **858735**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1380	1.0	µmhos/cm	1409	0	97.9	95	105	0			

Sample ID **lcsd-R51582** Batch ID: **R51582** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/10/13** Prep Date
Client ID: Run ID: **ING-WET_130810A** SeqNo: **858742**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1370	1.0	µmhos/cm	1409	0	97.2	95	105	1380	0.727	20	

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corp.

Date: *16-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308018
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Sample Duplicate

Sample ID **1308018-03CD** Batch ID: **R51581** Test Code: **SW9045C** Units: **pH Units** Analysis Date **8/9/13 4:10:00 PM** Prep Date

Client ID: **GZ-17 2'** Run ID: **ING-WET_130809D** SeqNo: **858733**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
pH	7.36	0	pH Units	0	0	0	0	0	7.31	0.682	5	

Sample ID **1308018-03CDUP** Batch ID: **R51582** Test Code: **SW9050A** Units: **µmhos/cm** Analysis Date **8/10/13** Prep Date

Client ID: **GZ-17 2'** Run ID: **ING-WET_130810A** SeqNo: **858743**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Specific Conductivity	1917	1.0	µmhos/cm	0	0	0	0	0	1910	0.366	20	

90

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 • FAX: (603) 429-8496
www.amrolabs.com

August 22, 2013

ANALYTICAL TEST RESULTS

Matthew Steele
GZA GeoEnvironmental, Inc.
372 Merrimac Street
Newburyport, MA 01950
TEL: (781) 278-4805
FAX:

Subject: 18.0171593.00 NRA Workorder No.: 1308044

Dear Matthew Steele:

AMRO Environmental Laboratories Corp. received 3 samples on 8/16/2013 for the analyses presented in the following report.

AMRO is accredited in accordance with NELAC and certifies that these test results meet all the requirements of NELAC, where applicable, unless otherwise noted in the case narrative.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of 60 days from sample receipt date (90 days for samples from New York). After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need the samples held for a longer period, please contact us immediately.

This report consists of a total of 24 pages. This letter is an integral part of your data report. All results in this project relate only to the sample(s) as received by the laboratory and documented in the Chain-of-Custody. This report shall not be reproduced except in full, without the written approval of the laboratory. If you have any questions regarding this project in the future, please refer to the Workorder Number above.

Sincerely,

Nancy Stewart
Vice President

State Certifications: NH (NELAC): 1001, MA: M-NH012, CT: PH-0758, NY: 11278 (NELAC), ME: NH012 and 1001.

Hard copy of the State Certification is available upon request.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308044
Date Received: 8/16/2013

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date	Collection Time
1308044-01A	MW-1	8/16/2013	8:36 AM
1308044-01B	MW-1	8/16/2013	8:36 AM
1308044-02A	MW-2	8/16/2013	9:27 AM
1308044-02B	MW-2	8/16/2013	9:27 AM
1308044-03A	Trip Blank	8/16/2013	12:00 AM

AMRO Environmental Laboratories Corp.

22-Aug-13

Lab Order: 1308044
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308044-01A	MW-1	8/16/2013 8:36:00 AM	Groundwater	Volatile Petroleum Hydrocarbons 1.1		8/19/2013	
					8/16/2013	R51639	
1308044-01B				EPH 1.1, Water, Full List		8/21/2013	
				AQPREP SEP FUNNEL: EPH	8/19/2013	23480	
				EPH 1.1, Water, Full List		8/21/2013	
					8/19/2013	23480	
1308044-02A	MW-2	8/16/2013 9:27:00 AM		Volatile Petroleum Hydrocarbons 1.1		8/19/2013	
					8/16/2013	R51639	
1308044-02B				EPH 1.1, Water, Full List		8/21/2013	
				AQPREP SEP FUNNEL: EPH	8/19/2013	23480	
				EPH 1.1, Water, Full List		8/21/2013	
					8/19/2013	23480	
1308044-03A	Trip Blank	8/16/2013	Trip Blank	Volatile Petroleum Hydrocarbons 1.1		8/19/2013	
					8/16/2013	R51639	

~~ESS Laboratory~~ AMRC
~~Division of Thielsch Engineering, Inc.~~
~~185 Frances Avenue, Cranston, RI 02910-2211~~
~~Tel. (401) 461-7181 Fax (401) 461-4486~~
~~www.esslaboratory.com~~

CHAIN OF CUSTODY

Page ____ of ____

Turn Time: X Standard Other ____
If faster than 5 days, prior approval by laboratory is required # ____

States where samples were collected from:
(MA) RI CT NH NJ NY ME Other ____

Is this project for any of the following:
(MA-MCP) Navy USACE Other ____

Reporting Limits: S-1/GW-2

~~AMRC~~ ESS LAB PROJECT ID: 1308044

Electronic Deliverable: Yes X No ____
Format: Excel X Access ____ PDF ____ Other ____

Co. Name	Project #	Project Name (20 Char. or less)
GZA GeoEnvironmental	18017593.00	NRA

Contact Person	Address
Matt Steele	372 Merrimac St

City	State	Zip	PO#
Newburyport	MA	01950	171593

Telephone #	Fax #	Email Address
781-278-4805	~~978~~	matthew.steele@gza.com

ESS LAB Sample #	Date	Collection Time	COMP	GRAB	MATRIX	Sample Identification (20 Char. or less)	Pres Code	Number of Containers	Type of Containers	Write Required Analysis: VPH w/ Targets	EPH w/ Targets
	8/16/13	0836	X		GW	MW-1	2	4	VG	X	X
	8/16/13	0927	X		GW	MW-2	2	4	VG	X	X

Container Type: P-Poly G-Glass S-Sterile V-VOA
Matrix: S-Soil SD-Solid D-Sludge WW-Waste Water GW-Ground Water SW-Surface Water DW-Drinking Water O-Oil W-Wipes F-Filters

Cooler Present ___ Yes ___ No Internal Use Only
Seals Intact ___ Yes ___ No NA: ___ [ ] Pickup
Cooler Temp: ____ [ ] Technicians ____

Preservation Code 1- NP, 2- HC1, 3- H_2SO_4, 4- HNO_3, 5- NaOH, 6- MeOH, 7- Asorbic Acid, 8- ZnAct, 9- ____

Sampled by: Mathew Steele

Comments: MADEP CAM compliant project

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	8/16/13 1400		8/16/13 1700		8/16/13 1505		8/16/13 1505
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time

*By circling MA-MCP, client acknowledges samples were collected in accordance with MADEP CAM VII A

Please fax all changes to Chain of Custody in writing.

1 (White) Lab Copy 2 (Yellow) Client Receipt

10/26/04 A

AMRO Environmental
Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: GZA
Project Name: 18.0171593.00 NRA
Ship via: (circle one) Fed Ex., UPS, AMRO Courier
Hand Del., Other Courier, Other:

AMRO ID: 130804R
Date Rec.: 8-16-13
Date Due: 8-23-13

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 4°				
Samples rec. with ice___ ice packs___ neither___				
8. Were samples received the same day they were sampled?	✓			
Is client temperature = or <6°C ?				
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?	✓			
17. Were the sample volumes sufficient for requested analysis?	✓			
18. Were all samples received?	✓			
19. VPH and VOA Soils only:			✓	
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?				
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?				
If NO then client must be faxed.				
Were vials provided by AMRO?				
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?				
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?			✓	
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: KS Date: 8-16-13 Logged in By: MG Date: 8-19-13
Labeled By: MG Date: 8-19-13 Checked By: [illegible] Date: 8-19-13

NA= Not Applicable

AMRO Environmental
Laboratories Corporation

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Please Circle if:
Sample= Soil
Sample= Waste

AMRO ID: 130 80XX

Sample ID	Analysis	Volume Sample	Preserv. Listed	Initial pH*	Acceptable? Y or N	List Preserv. Added by AMRO	Solution ID # of Preserv.	Volume Preservative Added	Final adjusted pH	Final adjusted pH (after 16 or 24 hours)
01A-702A	VPH	2-40mls	HCL	—	—					
01B-702B	EPH	2-1L Amb	HCL	<2	Y					

Sample ID	Analysis	Volume Sample	Preserv. Listed	Initial TRC	Acceptable? Y or N	List Preserv. Added by AMRO	Solution ID # of Preserv.	Volume Preservative Added	Final adjusted TRC	Acceptable? Y or N

***** = *if the laboratory preserves the drinking water sample (s) for EPA Method 200 series, sample (s) should be held at least 16 hours prior to analysis or 24 hours for water sample (s).*

pH Checked By: HG Date: 8-19-13 pH adjusted By: ______ Date: ______

pH Checked By: ______ Date: ______ pH adj.(16 or 24hrs)By: ______ Date: ______

qc/qcmemos/forms/samplerec Rev 20 05/24/12

MA-DEP VPH 1.1:

1. n-Pentane recovered above the control limits in the opening and closing Continuing Calibration Verification Standards analyzed on 08/19/13. The ranges and target compounds passed.

MA-DEP EPH 1.1:

1. AMRO Laboratory analyzed EPH using the GC/MS option as indicated in the MADEP EPH Rev.1.1, Section 9.10 May 2004.

2. The C11-C22 Aromatic Hydrocarbons range result has been adjusted to exclude the concentration of Target PAH Analytes.

3. No QC deviations were noted.

MassDEP Analytical Protocol Certification Form

Laboratory Name: AMRO Environmental Lab. Corp. Project #: 18.0171593.00

Project Location: NRA RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):

1308044 -01, 02, 03

Matrices: ☑ Groundwater/Surface Water ☐ Soil/Sediment ☐ Drinking Water ☐ Air ☐ Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A ☐	7470/7471 Hg CAM III B ☐	MassDEP VPH CAM IV A ☑	8081 Pesticides CAM V B ☐	7196 Hex Cr CAM VI B ☐	MassDEP APH CAM IX A ☐
8270 SVOC CAM II B ☐	7010 Metals CAM III C ☐	MassDEP EPH CAM IV B ☑	8151 Herbicides CAM V C ☐	8330 Explosives CAM VIII A ☐	TO-15 VOC CAM IX B ☐
6010 Metals CAM III A ☐	6020 Metals CAM III D ☐	8082 PCB CAM V A ☐	9014 Total Cyanide/PAC CAM VI A ☐	6860 Perchlorate CAM VIII B ☐	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	☑ Yes ☐ No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	☑ Yes ☐ No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	☑ Yes ☐ No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	☑ Yes ☐ No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	☑ Yes ☐ No ☐ Yes ☐ No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	☑ Yes ☐ No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	☑ Yes ☐ No[1]

Data User Note: Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	☐ Yes ☑ No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	☑ Yes ☐ No[1]

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: _____ **Position:** Vice President

Printed Name: Nancy Stewart **Date:** 8-23-13

DATA COMMENT PAGE

Organic Data Qualifiers

ND	Indicates compound was analyzed for, but not detected at or above the reporting limit.
J	Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than the method detection limit.
H	Method prescribed holding time exceeded.
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
B	This flag is used when the analyte is found in the associated blank as well as in the sample.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
#	See Case Narrative

Micro Data Qualifiers

TNTC	Too numerous to count

Inorganic Data Qualifiers

ND or U	Indicates element was analyzed for, but not detected at or above the reporting limit.
J	Indicates a value greater than or equal to the method detection limit, but less than the quantitation limit.
H	Indicates analytical holding time exceedance.
B	Indicates that the analyte is found in the associated blank, as well as in the sample.
MSA	Indicates value determined by the Method of Standard Addition
+	Indicates the correlation coefficient for the Method of Standard Addition is less than 0.995
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
PS	The analyte was below the Reporting Limit but has significant matrix interference as noted by the poor recovery of the Post Digestion Spike.
#	See Case Narrative
*	MCL Exceeded

Report Comments:

1. Soil, sediment and sludge sample results are reported on a "dry weight" basis.
2. Reporting limits are adjusted for sample size used, dilutions and moisture content, if applicable.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308044
Project: 18.0171593.00 NRA

Lab ID: 1308044-01 **Collection Date:** 8/16/2013 8:36:00 AM
Collection Time:
Client Sample ID: MW-1 **Matrix:** GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 6:14:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 6:14:00 PM
C9-C10 Aromatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 6:14:00 PM
Benzene	ND	1.0		µg/L	1	8/19/2013 6:14:00 PM
Ethylbenzene	ND	1.0		µg/L	1	8/19/2013 6:14:00 PM
Methyl tert-butyl ether	ND	1.0		µg/L	1	8/19/2013 6:14:00 PM
Naphthalene	ND	2.0		µg/L	1	8/19/2013 6:14:00 PM
Toluene	ND	1.0		µg/L	1	8/19/2013 6:14:00 PM
m,p-Xylene	ND	1.0		µg/L	1	8/19/2013 6:14:00 PM
o-Xylene	ND	1.0		µg/L	1	8/19/2013 6:14:00 PM
Surr: 2,5-Dibromotoluene-PID	108	70-130		%REC	1	8/19/2013 6:14:00 PM
Surr: 2,5-Dibromotoluene-FID	115	70-130		%REC	1	8/19/2013 6:14:00 PM

Lab ID: 1308044-02 **Collection Date:** 8/16/2013 9:27:00 AM
Collection Time:
Client Sample ID: MW-2 **Matrix:** GROUNDWATER

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 7:11:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 7:11:00 PM
C9-C10 Aromatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 7:11:00 PM
Benzene	ND	1.0		µg/L	1	8/19/2013 7:11:00 PM
Ethylbenzene	ND	1.0		µg/L	1	8/19/2013 7:11:00 PM
Methyl tert-butyl ether	ND	1.0		µg/L	1	8/19/2013 7:11:00 PM
Naphthalene	ND	2.0		µg/L	1	8/19/2013 7:11:00 PM
Toluene	ND	1.0		µg/L	1	8/19/2013 7:11:00 PM
m,p-Xylene	ND	1.0		µg/L	1	8/19/2013 7:11:00 PM
o-Xylene	ND	1.0		µg/L	1	8/19/2013 7:11:00 PM
Surr: 2,5-Dibromotoluene-PID	100	70-130		%REC	1	8/19/2013 7:11:00 PM
Surr: 2,5-Dibromotoluene-FID	106	70-130		%REC	1	8/19/2013 7:11:00 PM

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc. **Lab Order:** 1308044
Project: 18.0171593.00 NRA

Lab ID: 1308044-03 **Collection Date:** 8/16/2013
Collection Time:
Client Sample ID: Trip Blank **Matrix:** TRIP BLANK

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP VPH REVISION 1.1		**MAVPH1.1**				Analyst: **DH**
C5-C8 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 5:17:00 PM
C9-C12 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 5:17:00 PM
C9-C10 Aromatic Hydrocarbons	ND	100		µg/L	1	8/19/2013 5:17:00 PM
Benzene	ND	1.0		µg/L	1	8/19/2013 5:17:00 PM
Ethylbenzene	ND	1.0		µg/L	1	8/19/2013 5:17:00 PM
Methyl tert-butyl ether	ND	1.0		µg/L	1	8/19/2013 5:17:00 PM
Naphthalene	ND	2.0		µg/L	1	8/19/2013 5:17:00 PM
Toluene	ND	1.0		µg/L	1	8/19/2013 5:17:00 PM
m,p-Xylene	ND	1.0		µg/L	1	8/19/2013 5:17:00 PM
o-Xylene	ND	1.0		µg/L	1	8/19/2013 5:17:00 PM
Surr: 2,5-Dibromotoluene-PID	113	70-130		%REC	1	8/19/2013 5:17:00 PM
Surr: 2,5-Dibromotoluene-FID	120	70-130		%REC	1	8/19/2013 5:17:00 PM

AMRO Environmental Laboratories Corp.

Date: *20-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **mb-08/19/13** Batch ID: **R51639** Test Code: **MAVPH1.1** Units: **µg/L** Analysis Date **8/19/2013 4:20:00 PM** Prep Date: **8/19/2013**
Client ID: Run ID: **V-6_130819A** SeqNo: **859676**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	ND	100	µg/L									
C9-C12 Aliphatic Hydrocarbons	ND	100	µg/L									
C9-C10 Aromatic Hydrocarbons	ND	100	µg/L									
Benzene	ND	1.0	µg/L									
Ethylbenzene	ND	1.0	µg/L									
Methyl tert-butyl ether	ND	1.0	µg/L									
Naphthalene	ND	2.0	µg/L									
Toluene	ND	1.0	µg/L									
m,p-Xylene	ND	1.0	µg/L									
o-Xylene	ND	1.0	µg/L									
Surr: 2,5-Dibromotoluene-PID	57.58	0	µg/L	50	0	115	70	130	0			
Surr: 2,5-Dibromotoluene-FID	60.02	0	µg/L	50	0	120	70	130	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *20-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **lcs-08/19/13** Batch ID: **R51639** Test Code: **MAVPH1.1** Units: **µg/L** Analysis Date **8/19/2013 12:32:00 PM** Prep Date: **8/19/2013**
Client ID: Run ID: **V-6_130819A** SeqNo: **859674**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	337.8	100	µg/L	300	0	113	70	130	0			
C9-C12 Aliphatic Hydrocarbons	259.1	100	µg/L	300	0	86.4	70	130	0			
C9-C10 Aromatic Hydrocarbons	108	100	µg/L	100	0	108	70	130	0			
Benzene	103.3	1.0	µg/L	100	0	103	70	130	0			
Ethylbenzene	107.2	1.0	µg/L	100	0	107	70	130	0			
Methyl tert-butyl ether	100.5	1.0	µg/L	100	0	101	70	130	0			
Naphthalene	103.9	2.0	µg/L	100	0	104	70	130	0			
Toluene	102.7	1.0	µg/L	100	0	103	70	130	0			
m,p-Xylene	212.8	1.0	µg/L	200	0	106	70	130	0			
o-Xylene	104.6	1.0	µg/L	100	0	105	70	130	0			
n-Butylcyclohexane	95.63	5.0	µg/L	100	0	95.6	70	130	0			
n-Decane	98.75	5.0	µg/L	100	0	98.8	70	130	0			
n-Pentane	124.2	5.0	µg/L	100	0	124	70	130	0			
n-Nonane	96.48	5.0	µg/L	100	0	96.5	70	130	0			
Surr: 2,5-Dibromotoluene-PID	106.4	0	µg/L	100	0	106	70	130	0			
Surr: 2,5-Dibromotoluene-FID	109.4	0	µg/L	100	0	109	70	130	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *20-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike Duplicate

Sample ID: **lcsd-08/19/13** Batch ID: **R51639** Test Code: **MAVPH1.1** Units: **µg/L** Analysis Date **8/19/2013 1:29:00 PM** Prep Date: **8/19/2013**
Client ID: Run ID: **V-6_130819A** SeqNo: **859675**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C5-C8 Aliphatic Hydrocarbons	336.9	100	µg/L	300	0	112	70	130	337.8	0.271	25	
C9-C12 Aliphatic Hydrocarbons	289.4	100	µg/L	300	0	96.5	70	130	259.1	11	25	
C9-C10 Aromatic Hydrocarbons	105.5	100	µg/L	100	0	105	70	130	108	2.34	25	
Benzene	102.5	1.0	µg/L	100	0	102	70	130	103.3	0.761	25	
Ethylbenzene	104.5	1.0	µg/L	100	0	105	70	130	107.2	2.57	25	
Methyl tert-butyl ether	98.91	1.0	µg/L	100	0	98.9	70	130	100.5	1.61	25	
Naphthalene	102.9	2.0	µg/L	100	0	103	70	130	103.9	0.974	25	
Toluene	102.3	1.0	µg/L	100	0	102	70	130	102.7	0.393	25	
m,p-Xylene	202.1	1.0	µg/L	200	0	101	70	130	212.8	5.17	25	
o-Xylene	103.5	1.0	µg/L	100	0	103	70	130	104.6	1.14	25	
n-Butylcyclohexane	108	5.0	µg/L	100	0	108	70	130	95.63	12.2	25	
n-Decane	111.2	5.0	µg/L	100	0	111	70	130	98.75	11.8	25	
n-Pentane	122.3	5.0	µg/L	100	0	122	70	130	124.2	1.52	25	
n-Nonane	108.7	5.0	µg/L	100	0	109	70	130	96.48	11.9	25	
Surr: 2,5-Dibromotoluene-PID	109.4	0	µg/L	100	0	109	70	130	0	0	0	
Surr: 2,5-Dibromotoluene-FID	114.5	0	µg/L	100	0	115	70	130	0	0	0	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	MW-1
Lab Order:	1308044	**Collection Date:**	8/16/2013 8:36:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	GROUNDWATER
Lab ID:	1308044-01B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/21/2013 7:16:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/21/2013 7:16:00 PM
C11-C22 Aromatic Hydrocarbons	ND	100		µg/L	1	8/21/2013 7:51:00 PM
Naphthalene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
2-Methylnaphthalene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Acenaphthylene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Acenaphthene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Fluorene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Phenanthrene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Anthracene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Fluoranthene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Pyrene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Benz(a)anthracene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Chrysene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Benzo(b)fluoranthene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Benzo(k)fluoranthene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Benzo(a)pyrene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Dibenz(a,h)anthracene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Indeno(1,2,3-cd)pyrene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Benzo(g,h,i)perylene	ND	2.0		µg/L	1	8/21/2013 7:51:00 PM
Surr: 1-Chlorooctadecane	48.2	40-140		%REC	1	8/21/2013 7:16:00 PM
Surr: 2-Bromonaphthalene	74.4	40-140		%REC	1	8/21/2013 7:51:00 PM
Surr: 2-Fluorobiphenyl	74.4	40-140		%REC	1	8/21/2013 7:51:00 PM
Surr: o-Terphenyl	73.7	40-140		%REC	1	8/21/2013 7:51:00 PM

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT:	GZA GeoEnvironmental, Inc.	**Client Sample ID:**	MW-2
Lab Order:	1308044	**Collection Date:**	8/16/2013 9:27:00 AM
Project:	18.0171593.00 NRA	**Matrix:**	GROUNDWATER
Lab ID:	1308044-02B		

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
MADEP EPH REVISION 1.1		**MAEPH**				Analyst: **KAM**
C9-C18 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/21/2013 8:26:00 PM
C19-C36 Aliphatic Hydrocarbons	ND	100		µg/L	1	8/21/2013 8:26:00 PM
C11-C22 Aromatic Hydrocarbons	ND	100		µg/L	1	8/21/2013 9:01:00 PM
Naphthalene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
2-Methylnaphthalene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Acenaphthylene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Acenaphthene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Fluorene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Phenanthrene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Anthracene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Fluoranthene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Pyrene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Benz(a)anthracene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Chrysene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Benzo(b)fluoranthene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Benzo(k)fluoranthene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Benzo(a)pyrene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Dibenz(a,h)anthracene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Indeno(1,2,3-cd)pyrene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Benzo(g,h,i)perylene	ND	2.0		µg/L	1	8/21/2013 9:01:00 PM
Surr: 1-Chlorooctadecane	44.7	40-140		%REC	1	8/21/2013 8:26:00 PM
Surr: 2-Bromonaphthalene	75.8	40-140		%REC	1	8/21/2013 9:01:00 PM
Surr: 2-Fluorobiphenyl	74.4	40-140		%REC	1	8/21/2013 9:01:00 PM
Surr: o-Terphenyl	77.9	40-140		%REC	1	8/21/2013 9:01:00 PM

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23480** Batch ID: **23480** Test Code: **MAEPH** Units: **µg/L** Analysis Date **8/21/2013 12:15:00 PM** Prep Date: **8/19/2013**
Client ID: Run ID: **SV-2_130821A** SeqNo: **860034**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C9-C18 Aliphatic Hydrocarbons	ND	100	µg/L									
C19-C36 Aliphatic Hydrocarbons	ND	100	µg/L									
Surr: 1-Chlorooctadecane	23.25	1.0	µg/L	40	0	58.1	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Method Blank

Sample ID: **MB-23480** Batch ID: **23480** Test Code: **MAEPH** Units: **µg/L** Analysis Date **8/21/2013 12:49:00 PM** Prep Date: **8/19/2013**
Client ID: Run ID: **SV-2_130821A** SeqNo: **860035**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
C11-C22 Aromatic Hydrocarbons	ND	100	µg/L									
Naphthalene	ND	2.0	µg/L									
2-Methylnaphthalene	ND	2.0	µg/L									
Acenaphthylene	ND	2.0	µg/L									
Acenaphthene	ND	2.0	µg/L									
Fluorene	ND	2.0	µg/L									
Phenanthrene	ND	2.0	µg/L									
Anthracene	ND	2.0	µg/L									
Fluoranthene	ND	2.0	µg/L									
Pyrene	ND	2.0	µg/L									
Benz(a)anthracene	ND	2.0	µg/L									
Chrysene	ND	2.0	µg/L									
Benzo(b)fluoranthene	ND	2.0	µg/L									
Benzo(k)fluoranthene	ND	2.0	µg/L									
Benzo(a)pyrene	ND	2.0	µg/L									
Dibenz(a,h)anthracene	ND	2.0	µg/L									
Indeno(1,2,3-cd)pyrene	ND	2.0	µg/L									
Benzo(g,h,i)perylene	ND	2.0	µg/L									
Surr: 2-Bromonaphthalene	29.98	1.0	µg/L	40	0	75	40	140	0			
Surr: 2-Fluorobiphenyl	31.31	1.0	µg/L	40	0	78.3	40	140	0			
Surr: o-Terphenyl	27.44	1.0	µg/L	40	0	68.6	40	140	0			

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit: defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23480** Batch ID: **23480** Test Code: **MAEPH** Units: **µg/L** Analysis Date **8/21/2013 1:24:00 PM** Prep Date: **8/19/2013**
Client ID: Run ID: **SV-2_130821A** SeqNo: **860036**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	23.34	2.0	µg/L	50	0	46.7	40	140	0			
n-Docosane	44.03	2.0	µg/L	50	0	88.1	40	140	0			
n-Dodecane	26.98	2.0	µg/L	50	0	54	40	140	0			
n-Eicosane	41.98	2.0	µg/L	50	0	84	40	140	0			
n-Hexacosane	46.16	2.0	µg/L	50	0	92.3	40	140	0			
n-Hexadecane	40.47	2.0	µg/L	50	0	80.9	40	140	0			
n-Hexatriacontane	35.52	2.0	µg/L	50	0	71	40	140	0			
n-Nonadecane	42.59	2.0	µg/L	50	0	85.2	40	140	0			
n-Nonane	20.48	2.0	µg/L	50	0	41	30	140	0			
n-Octacosane	40.87	2.0	µg/L	50	0	81.7	40	140	0			
n-Octadecane	40.94	2.0	µg/L	50	0	81.9	40	140	0			
n-Tetracosane	44.95	2.0	µg/L	50	0	89.9	40	140	0			
n-Tetradecane	35.54	2.0	µg/L	50	0	71.1	40	140	0			
n-Triacontane	42.31	2.0	µg/L	50	0	84.6	40	140	0			
Surr: 1-Chlorooctadecane	27.34	1.0	µg/L	40	0	68.4	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID: **LCS-23480** Batch ID: **23480** Test Code: **MAEPH** Units: **µg/L** Analysis Date **8/21/2013 1:59:00 PM** Prep Date: **8/19/2013**
Client ID: Run ID: **SV-2_130821A** SeqNo: **860037**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Naphthalene	26.07	2.0	µg/L	50	0	52.1	40	140	0			
2-Methylnaphthalene	27.4	2.0	µg/L	50	0	54.8	40	140	0			
Acenaphthylene	32.39	2.0	µg/L	50	0	64.8	40	140	0			
Acenaphthene	33.35	2.0	µg/L	50	0	66.7	40	140	0			
Fluorene	35.64	2.0	µg/L	50	0	71.3	40	140	0			
Phenanthrene	37.07	2.0	µg/L	50	0	74.1	40	140	0			
Anthracene	38.52	2.0	µg/L	50	0	77	40	140	0			
Fluoranthene	37.76	2.0	µg/L	50	0	75.5	40	140	0			
Pyrene	37.09	2.0	µg/L	50	0	74.2	40	140	0			
Benz(a)anthracene	37.4	2.0	µg/L	50	0	74.8	40	140	0			
Chrysene	33.81	2.0	µg/L	50	0	67.6	40	140	0			
Benzo(b)fluoranthene	38.46	2.0	µg/L	50	0	76.9	40	140	0			
Benzo(k)fluoranthene	36.86	2.0	µg/L	50	0	73.7	40	140	0			
Benzo(a)pyrene	36.11	2.0	µg/L	50	0	72.2	40	140	0			
Dibenz(a,h)anthracene	37.9	2.0	µg/L	50	0	75.8	40	140	0			
Indeno(1,2,3-cd)pyrene	39.17	2.0	µg/L	50	0	78.3	40	140	0			
Benzo(g,h,i)perylene	38.31	2.0	µg/L	50	0	76.6	40	140	0			
Surr: 2-Bromonaphthalene	32.66	1.0	µg/L	40	0	81.7	40	140	0			
Surr: 2-Fluorobiphenyl	31.72	1.0	µg/L	40	0	79.3	40	140	0			
Surr: o-Terphenyl	35.6	1.0	µg/L	40	0	89	40	140	0			

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **LCSD-23480** Batch ID: **23480** Test Code: **MAEPH** Units: **µg/L** Analysis Date **8/21/2013 2:34:00 PM** Prep Date: **8/19/2013**

Client ID: Run ID: **SV-2_130821A** SeqNo: **860038**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
n-Decane	25.08	2.0	µg/L	50	0	50.2	40	140	23.34	7.19	25	
n-Docosane	41.49	2.0	µg/L	50	0	83	40	140	44.03	5.94	25	
n-Dodecane	27.54	2.0	µg/L	50	0	55.1	40	140	26.98	2.05	25	
n-Eicosane	39.67	2.0	µg/L	50	0	79.3	40	140	41.98	5.66	25	
n-Hexacosane	44.01	2.0	µg/L	50	0	88	40	140	46.16	4.77	25	
n-Hexadecane	37.22	2.0	µg/L	50	0	74.4	40	140	40.47	8.37	25	
n-Hexatriacontane	31.85	2.0	µg/L	50	0	63.7	40	140	35.52	10.9	25	
n-Nonadecane	40.45	2.0	µg/L	50	0	80.9	40	140	42.59	5.15	25	
n-Nonane	22.71	2.0	µg/L	50	0	45.4	30	140	20.48	10.3	25	
n-Octacosane	39.76	2.0	µg/L	50	0	79.5	40	140	40.87	2.75	25	
n-Octadecane	39.14	2.0	µg/L	50	0	78.3	40	140	40.94	4.5	25	
n-Tetracosane	42.49	2.0	µg/L	50	0	85	40	140	44.95	5.63	25	
n-Tetradecane	34.93	2.0	µg/L	50	0	69.9	40	140	35.54	1.73	25	
n-Triacontane	38.77	2.0	µg/L	50	0	77.5	40	140	42.31	8.73	25	
Surr: 1-Chlorooctadecane	21.83	1.0	µg/L	40	0	54.6	40	140	0	0	25	

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308044
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Laboratory Control Spike Duplicate

Sample ID: **LCSD-23480** Batch ID: **23480** Test Code: **MAEPH** Units: **µg/L** Analysis Date **8/21/2013 3:09:00 PM** Prep Date: **8/19/2013**

Client ID: Run ID: **SV-2_130821A** SeqNo: **860039**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Naphthalene	27.89	2.0	µg/L	50	0	55.8	40	140	26.07	6.75	25	
2-Methylnaphthalene	29.21	2.0	µg/L	50	0	58.4	40	140	27.4	6.39	25	
Acenaphthylene	33.57	2.0	µg/L	50	0	67.1	40	140	32.39	3.58	25	
Acenaphthene	35.2	2.0	µg/L	50	0	70.4	40	140	33.35	5.4	25	
Fluorene	36.95	2.0	µg/L	50	0	73.9	40	140	35.64	3.61	25	
Phenanthrene	37.85	2.0	µg/L	50	0	75.7	40	140	37.07	2.08	25	
Anthracene	39.36	2.0	µg/L	50	0	78.7	40	140	38.52	2.16	25	
Fluoranthene	38.58	2.0	µg/L	50	0	77.2	40	140	37.76	2.15	25	
Pyrene	38.38	2.0	µg/L	50	0	76.8	40	140	37.09	3.42	25	
Benz(a)anthracene	39.45	2.0	µg/L	50	0	78.9	40	140	37.4	5.34	25	
Chrysene	36.47	2.0	µg/L	50	0	72.9	40	140	33.81	7.57	25	
Benzo(b)fluoranthene	41.09	2.0	µg/L	50	0	82.2	40	140	38.46	6.61	25	
Benzo(k)fluoranthene	38.65	2.0	µg/L	50	0	77.3	40	140	36.86	4.74	25	
Benzo(a)pyrene	37.32	2.0	µg/L	50	0	74.6	40	140	36.11	3.3	25	
Dibenz(a,h)anthracene	39.34	2.0	µg/L	50	0	78.7	40	140	37.9	3.73	25	
Indeno(1,2,3-cd)pyrene	40.41	2.0	µg/L	50	0	80.8	40	140	39.17	3.12	25	
Benzo(g,h,i)perylene	39.51	2.0	µg/L	50	0	79	40	140	38.31	3.08	25	
Surr: 2-Bromonaphthalene	31.76	1.0	µg/L	40	0	79.4	40	140	0	0	20	
Surr: 2-Fluorobiphenyl	32.42	1.0	µg/L	40	0	81	40	140	0	0	20	
Surr: o-Terphenyl	31.83	1.0	µg/L	40	0	79.6	40	140	0	0	20	

Qualifiers: ND - Not Detected at the Reporting Limit
S - Spike Recovery outside accepted recovery limits
B - Analyte detected in the associated Method Blank
J - Analyte detected below quantitation limits
R - RPD outside accepted recovery limits
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

Send to Database

Breakthrough Report

LIMS Sample ID: LCS-23480
Test Code: EPH1.1W
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\082113E\2B10812.D	26.067
2-Methylnaphthalene	C:\HPCHEM\1\DATA\082113E\2B10812.D	27.3953

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\082113E\2B10811.D	0.033833
2-Methylnaphthalene	C:\HPCHEM\1\DATA\082113E\2B10811.D	0

Naphthalene Breakthrough: 0.129622302 %

2-Methylnaphthalene Breakthrough: 0 %

Send to Database

Breakthrough Report

LIMS Sample ID: LCSD-23480
Test Code: EPH1.1W
Instrument ID: SV2

AROMATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\082113E\2B10814.D	27.8878
2-Methylnaphthalene	C:\HPCHEM\1\DATA\082113E\2B10814.D	29.206

ALIPHATIC FRACTION(S):

Analyte	File ID	Amount
Naphthalene	C:\HPCHEM\1\DATA\082113E\2B10813.D	0.199284
2-Methylnaphthalene	C:\HPCHEM\1\DATA\082113E\2B10813.D	0.082268

Naphthalene Breakthrough: 0.709521857 %

2-Methylnaphthalene Breakthrough: 0.280889266 %

AMRO Environmental Laboratories Corporation

111 Herrick Street, Merrimack, NH 03054
TEL: (603) 424-2022 • FAX: (603) 429-8496
www.amrolabs.com

August 22, 2013

ANALYTICAL TEST RESULTS

Matthew Steele
GZA GeoEnvironmental, Inc.
372 Merrimac Street
Newburyport, MA 01950
TEL: (781) 278-4805
FAX:

Subject: 18.0171593.00 NRA

Workorder No.: 1308047

Dear Matthew Steele:

AMRO Environmental Laboratories Corp. received 4 samples on 8/19/2013 for the analyses presented in the following report.

The enclosed results are additional analyses requested after the original report was issued. AMRO is accredited in accordance with NELAC and certifies that these test results meet all the requirements of NELAC, where applicable, unless otherwise noted in the case narrative.

The enclosed Sample Receipt Checklist details the condition of your sample(s) upon receipt. Please be advised that any unused sample volume and sample extracts will be stored for a period of thirty (30) days from this report date. After this time, AMRO will properly dispose of the remaining sample(s). If you require further analysis, or need th samples held for a longer period, please contact us immediately.

This report consists of a total of 15 pages. This letter is an integral part of your data report. If you have any questions regarding this project in the future, please refer to the Order Number above.

Sincerely,

Nancy Stewart
Vice President

State Certifications: NH (NELAC): 1001, MA: M-NH012, CT: PH-0758, NY: 11278 (NELAC), ME: NH012 and 1001.

Hard copy of the State Certification is available upon request.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308047
Date Received: 8/19/2013

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Collection Date	Collection Time
1308047-01A	GZ-19 4'	8/6/2013	2:23 PM
1308047-02A	GZ-2	8/5/2013	1:58 PM
1308047-03A	GZ-6 2'	8/6/2013	9:14 AM
1308047-04A	GZ-17 2'	8/9/2013	7:32 AM

AMRO Environmental Laboratories Corp.

22-Aug-13

Lab Order: 1308047
Client: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA

DATES REPORT

Sample ID	Client Sample ID	Collection Date	Matrix	Analytical Test Name / Preparatory Test Name	Prep Date	Analysis Date / Batch ID	TCLP Date
1308047-01A	GZ-19 4'	8/6/2013 2:23:00 PM	Soil	EPA 6010B ICP METALS, TCLP		8/21/2013	
				EPA 3010 TCLP PREP FOR ICP	8/20/2013	23477	8/19/2013
1308047-02A	GZ-2	8/5/2013 1:58:00 PM		EPA 6010B ICP METALS, TCLP		8/21/2013	
					8/20/2013	23477	8/19/2013
1308047-03A	GZ-6 2'	8/6/2013 9:14:00 AM		EPA 6010B ICP METALS, TCLP		8/21/2013	
					8/20/2013	23477	8/19/2013
1308047-04A	GZ-17 2'	8/9/2013 7:32:00 AM		EPA 6010B ICP METALS, TCLP		8/21/2013	
					8/20/2013	23477	8/19/2013

TCLP Analyses for Newburyport Ma

From: Matthew Steele
Sent: Mon, Aug 19, 2013 at 9:44 am
To: nancy@amrolabs.com

image001.png (10.7 KB)

Hi Nancy,
I would like to run the following additional TCLP Analyses:
GZ-19 4' – Lead
GZ-2 – Lead
GZ -6 2' – Arsenic
GZ-17 2' – Lead

Can you let me know what kind of turn-around we will be looking at?
Thanks,
Matt

Matthew L. Steele, EIT, LEED GA
Engineer
GZA GeoEnvironmental, Inc.
372 Merrimac Street
Newburyport, Massachusetts 01950
(781) 278-4805 (direct)
(781) 278-4800 (office)
(978) 992-2157 (cell)
(978) 465-2640 (fax)
matthew.steele@gza.com

GZA *Proactive by Design*

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For information about GZA GeoEnvironmental, Inc. and its services, please visit our website at www.gza.com.

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

NO: 63087

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
0171593.00	NRA	MA	M. Steele		130811

P.O.#:	Results Needed by:	Matrix	Total # of Cont. & Size	Comp.	Grab	REQUESTED ANALYSES																Remarks
						EPH	UPH	RCRA 8 Metals	pH	flashpoint	PCB's	reactivity/conductivity	SVOCs	TPH	VOCs	TCLP Metals - HOLD						
QUOTE #:	Seal Intact? Yes No N/A																					
Sample ID.:	Date/Time Sampled																					HOLD ALL TCLP METALS
GZ 1	8-5-13 1206	SL	3 4oz jars		X	X	X	X														
GZ 2	8/5/13 1358	SL	3 4oz/jars		X	X	X	X														
GZ 4	8/6/13 0756	SL	3 4oz/jars		X	X	X	X														
GZ 6 2'	0914	SL	4		X			X	X	X	X	X	X	X	X	X						
GZ 6 6'	0941	SL	4		X			X	X	X	X	X	X	X	X	X						
GZ 19 4'	1416	SL	4		X			X	X	X	X	X	X	X	X	X						
GZ 19 6'-8'	1423	SL	4		X			X	X	X	X	X	X	X	X	X						

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

Send Results To: Matt Steele
matthew.steele@gza.com

PHONE #: 781-278-4805 FAX #:
E-mail: matthew.steele@gza.com

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must *have a coded AUTHORIZATION NUMBER*
AUTHORIZATION No.: BY:

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:

Dissolved Metals Field Filtered? YES ☐ NO ☐

MCP Presumptive Certainty Required? YES ☐ NO ☐

MCP Methods Needed: YES ☒ NO ☐

AMRO report package level needed:

EDD required:

Required Reporting Limits:
S-1 ☐ GW-1 ☐
S-2 ☐ GW-2 ☐
S-3 ☐ GW-3 ☐
Other:

Relinquished By:	Date/Time	Received By
	8/6/13 1505	
	8/6/13 1600	

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

KNOWN SITE CONTAMINATION: Metals

White: Lab Copy Yellow: Client Copy

SHEET OF

AMROCOC2004, Rev.3 08/18/04

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: GZA
Project Name: 18.0171593.00 NRA
Ship via: (circle one) Fed Ex., UPS, ~~AMRO Courier,~~
Hand Del., Other Courier, Other:

AMRO ID: 1308011
Date Rec.: 8-6-13
Date Due: 8-13-13

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. Is COC signed and dated by client?	✓			
7. Laboratory receipt temperature. TEMP = 4° Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled?	✓	✓		Sampled 8-5/6-13
Is client temperature = or <6°C ?	✓			
If no obtain authorization from the client for the analyses.				
Client authorization from: Date: Obtained by:				
9. Is the COC filled out correctly and completely?	✓			
10. Does the info on the COC match the samples?	✓			See Revised COC
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓			
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?	✓			
17. Were the sample volumes sufficient for requested analysis?			✓	
18. Were all samples received?	✓			
19. VPH and VOA Soils only:	✓			
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?				
If NO then client must be faxed.	✓			
Does preservation level come close to the fill line on the vial?				
If NO then client must be faxed.	✓			
Were vials provided by AMRO?				
If NO then weights MUST be obtained from client	✓			
Was dry weight aliquot provided?				
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:				
What samples sent:			✓	
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: NS Date: 8-6-13
Labeled By: MG Date: 8-7-13
Logged in By: MG Date: 8-7-13
Checked By: [signature] Date: 8-7-13

NA= Not Applicable

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

NO: 63087

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.: 60.0171543.00	**Project Name:** NRA	**Project State:** MA	**Project Manager:** M. Steele	**Samplers (Signature):**	**AMRO Project No.:**	
P.O.#:	**Results Needed by:**					
QUOTE #:	**Seal Intact?** Yes No N/A					

REQUESTED ANALYSES

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	EPH	VPH	RCRA 8 Metals	pH	Flashpoint	PCB's	Reactivity/Cyanide/Sulfide	SVOCs	~~EPH~~ EPH w/o targets	VOCs	TCLP Metals - HOLD	VPH w/o targets	Remarks
GZ 1	8-5-13 1206	SL	3 4oz jars		X	X	X	X										HOLD ALL - TCLP METALS
GZ 2	8/5/13 1358	SL	3 4oz jars		X	X	X	X										
GZ 4	8/6/13 0756	SL	3 4oz jars		X	X	X	X										
GZ 6 2'	0914	SL	4		X			X	X	X	X	X	X	X	X	X	X	
GZ 6 6'	0941	SL	4		X			X	X	X	X	X	X	X	X	X	X	
GZ 9 4'	1416	SL	4		X			X	X	X	X	X	X	X	X	X	X	
GZ 9 6'-8'	1423	SL	4		X			X	X	X	X	X	X	X	X	X	X	

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other

Send Results To: Matt Steele
Matthew.Steele@gza.com

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must have a coded AUTHORIZATION NUMBER
AUTHORIZATION No.: BY:

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:
Dissolved Metals Field Filtered? YES ☐ NO ☐

PHONE #: 781-278-4705 FAX #:
Email: matthew.steele@gza.com

MCP Presumptive Certainty Required? YES ☐ NO ☐

MCP Methods Needed: YES ☒ NO ☐

AMRO report package level needed:

EDD required:

Required Reporting Limits: S-1 ☐ GW-1 ☐ S-2 ☐ GW-2 ☐ S-3 ☐ GW-3 ☐ Other:

Relinquished By:	Date/Time	Received By
	8/6/13 1305	

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

Samples arriving after 12:00 noon will be tracked and billed as received on the following day.

AMRO policy requires notification in writing to the laboratory in cases where the samples were collected from highly contaminated sites.

KNOWN SITE CONTAMINATION: Metals

White: Lab Copy Yellow: Client Copy

SHEET OF

AMROCOC2004, Rev.2 08/1404

AMRO Environmental Laboratories Corporation
111 Herrick Street
Merrimack, NH 03054

CHAIN-OF-CUSTODY RECORD

NO: 63086

Office: (603) 424-2022
Fax: (603) 429-8496
web: www.amrolabs.com

Project No.:	Project Name:	Project State:	Project Manager:	Samplers (Signature):	AMRO Project No.:
17.0171593.00	NRA	MA	MATT STEELE		13080/8

P.O.#:	Results Needed by:

QUOTE #:	Seal Intact? Yes No N/A

Sample ID.:	Date/Time Sampled	Matrix	Total # of Cont. & Size	Comp.	Grab	EPH - RANGES	VPH - RANGES	RCRA 8 METALS	pH	Flashpoint	PCB's	Reactivity/conductivity	SVOCs	VOCs	TCLP-metals (HOLD)	Remarks
GZ-14 2'	8/8/13 1417	SL	5	X		X	X	X	X	X	X	X	X	X	X	HOLD TCLP metals
GZ-14 7'	8/8/13 1427	SL	5	X		X	X	X	X	X	X	X	X	X	X	
GZ-17 2'	8/8/13 0732	SL	5	X		X	X	X	X	X	X	X	X	X	X	
GZ-17 6-8	8/8/13 0749	SL	5	X		X	X	X	X	X	X	X	X	X	X	
~~MW-1~~ GZ-20 1-3'	8/9/13 0839	SL	5	X		X	X	X	X	X	X	X	X	X	X	
~~MW-2~~ GZ-206-8	8/9/13 0851	SL	5	X		X	X	X	X	X	X	X	X	X	X	
BLANK																

REQUESTED ANALYSES

Preservative: Cl-HCl, MeOH, N-HN03, S-H2SO4, Na-NaOH, O- Other — VOCs: X

Send Results To: MAT STEELE, GZA Newburyport

PHONE #: 781-278-4805 FAX #:

E-mail: MATTHEW.STEELE@GZA.com

PRIORITY TURNAROUND TIME AUTHORIZATION
Before submitting samples for expedited TAT, you must *have a coded AUTHORIZATION NUMBER*
AUTHORIZATION No.: BY:

METALS 8 RCRA ☐ 13 PP ☐ 23 TAL ☐ 14 MCP ☐
Method: 6010 ☐ 200.7 ☐ Other Metals:
Dissolved Metals Field Filtered? YES ☐ NO ☐

MCP Presumptive Certainty Required? YES ☒ NO ☐

MCP Methods Needed: YES ☒ NO ☐

Relinquished By:	Date/Time	Received By
	8/9/13 1410	
	8/9/13 1525	

AMRO report package level needed:

EDD required:

Required Reporting Limits:
S-1 ☒ GW-1 ☐
S-2 ☐ GW-2 ☒
S-3 ☐ GW-3 ☐
Other:

Please print clearly, legibly and completely. Samples can not be logged in and the turnaround time clock will not start until any ambiguities are resolved.

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KNOWN SITE CONTAMINATION:

White: Lab Copy Yellow: Client Copy

SHEET OF

AMROCOC2004, Rev.3 08/18/04

AMRO Environmental Laboratories Corporation

SAMPLE RECEIPT CHECKLIST

111 Herrick Street
Merrimack, NH 03054
(603) 424-2022

Client: GZA-MA
Project Name: 18.0171593.00 NRA
Ship via: (circle one) Fed Ex., UPS, AMRO Courier,
Hand Del., Other Courier, Other:

AMRO ID: 1308018
Date Rec.: 8-9-13
Date Due: 8-16-13

Items to be Checked Upon Receipt	Yes	No	NA	Comments
1. Army Samples received in individual plastic bags?			✓	
2. Custody Seals present?			✓	
3. Custody Seals Intact?			✓	
4. Air Bill included in folder if received?			✓	
5. Is COC included with samples?	✓			
6. *Is COC signed and dated by client?*	✓			
7. Laboratory receipt temperature. TEMP = 3° Samples rec. with ice ✓ ice packs ___ neither ___				
8. Were samples received the same day they were sampled? Is client temperature = or <6°C ?		✓		
If no obtain authorization from the client for the analyses. Client authorization from: Date: Obtained by:	✓			
9. Is the COC filled out correctly and completely?				
10. Does the info on the COC match the samples?	✓			
11. Were samples rec. within holding time?	✓			
12. Were all samples properly labeled?	✓	✓		PH OUT OF HOLDING TIME
13. Were all samples properly preserved?	✓			
14. Were proper sample containers used?	✓			
15. Were all samples received intact? (none broken or leaking)	✓			
16. Were VOA vials rec. with no air bubbles?	✓			
17. Were the sample volumes sufficient for requested analysis?			✓	
18. Were all samples received?	✓			
19. VPH and VOA Soils only:	✓			
Sampling Method VPH (circle one): M=Methanol, E=EnCore (air-tight container)				
Sampling Method VOA (circle one): M=Methanol, SB=Sodium Bisulfate, E=EnCore, B=Bulk				
If M or SB:				
Does preservative cover the soil?	✓			
If NO then client must be faxed.				
Does preservation level come close to the fill line on the vial?	✓			
If NO then client must be faxed.				
Were vials provided by AMRO?			✓	
If NO then weights MUST be obtained from client				
Was dry weight aliquot provided?	✓			
If NO then fax client and inform the VOA lab ASAP.				
20. Subcontracted Samples:			✓	
What samples sent:				
Where sent:				
Date:				
Analysis:				
TAT:				
21. Information entered into:				
Internal Tracking Log?	✓			
Dry Weight Log?	✓			
Client Log?			✓	
Composite Log?			✓	
Filtration Log?			✓	

Received By: MS Date: 8-9-13
Labeled By: MG Date: 8-12-13
Logged in By: MG Date: 8-12-13
Checked By: [illegible] Date: 8-12-13

NA= Not Applicable

METALS:

1. Samples were analyzed for TCLP Arsenic and Lead.

2. No QC deviations were noted.

MassDEP Analytical Protocol Certification Form

Laboratory Name: AMRO Environmental Lab. Corp. Project #: 18.0171593.00

Project Location: NRA RTN:

This Form provides certifications for the following data set: list Laboratory Sample ID Number(s):

1308047-01 → 04

Matrices: Groundwater/Surface Water (Soil/Sediment) Drinking Water Air Other:

CAM Protocol (check all that apply below):

8260 VOC CAM II A	7470/7471 Hg CAM III B	MassDEP VPH CAM IV A	8081 Pesticides CAM V B	7196 Hex Cr CAM VI B	MassDEP APH CAM IX A
8270 SVOC CAM II B	7010 Metals CAM III C	MassDEP EPH CAM IV B	8151 Herbicides CAM V C	8330 Explosives CAM VIII A	TO-15 VOC CAM IX B
6010 Metals ✓ CAM III A	6020 Metals CAM III D	8082 PCB CAM V A	9014 Total Cyanide/PAC CAM VI A	6860 Perchlorate CAM VIII B	

Affirmative Responses to Questions A through F are required for "Presumptive Certainty" status

A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	(Yes) No
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	(Yes) No
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	(Yes) No
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	(Yes) No
E	VPH, EPH, APH, and TO-15 only: a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications). b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?	N/A Yes No Yes No
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	(Yes) No

Responses to Questions G, H and I below are required for "Presumptive Certainty" status

G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	(Yes) No[1]

***Data User Note:** Data that achieve "Presumptive Certainty" status may not necessarily meet the data usability and representativeness requirements described in 310 CMR 40. 1056 (2)(k) and WSC-07-350.*

H	Were **all** QC performance standards specified in the CAM protocol(s) achieved?	(Yes) No[1]
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	Yes (No)

[1] *All negative responses must be addressed in an attached laboratory narrative.*

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: Nancy Stewart **Position:** Vice President

Printed Name: Nancy Stewart **Date:** 8-23-13

DATA COMMENT PAGE

Organic Data Qualifiers

ND	Indicates compound was analyzed for, but not detected at or above the reporting limit.
J	Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds where a 1:1 response is assumed, or when the data indicates the presence of a compound that meets the identification criteria but the result is less than the sample quantitation limit but greater than the method detection limit.
H	Method prescribed holding time exceeded.
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
B	This flag is used when the analyte is found in the associated blank as well as in the sample.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
#	See Case Narrative

Micro Data Qualifiers

TNTC	Too numerous to count

Inorganic Data Qualifiers

ND or U	Indicates element was analyzed for, but not detected at or above the reporting limit.
J	Indicates a value greater than or equal to the method detection limit, but less than the quantitation limit.
H	Indicates analytical holding time exceedance.
B	Indicates that the analyte is found in the associated blank, as well as in the sample.
MSA	Indicates value determined by the Method of Standard Addition
+	Indicates the correlation coefficient for the Method of Standard Addition is less than 0.995
E	This flag identifies compounds whose concentrations exceed the calibration range of the instrument for that specific analysis.
R	RPD outside accepted recovery limits
RL	Reporting limit; defined as the lowest concentration the laboratory can accurately quantitate.
S	Spike Recovery outside accepted recovery limits.
PS	The analyte was below the Reporting Limit but has significant matrix interference as noted by the poor recovery of the Post Digestion Spike.
#	See Case Narrative
*	MCL Exceeded

Report Comments:

1. Soil, sediment and sludge sample results are reported on a "dry weight" basis.
2. Reporting limits are adjusted for sample size used, dilutions and moisture content, if applicable.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Project: 18.0171593.00 NRA
Lab Order: 1308047

Lab ID: 1308047-01
Collection Date: 8/6/2013 2:23:00 PM
Collection Time:
Client Sample ID: GZ-19 4'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP		**SW1311/6010B**				Analyst: **AL**
Lead	ND	0.25		mg/L	1	8/21/2013 7:01:30 PM

Lab ID: 1308047-02
Collection Date: 8/5/2013 1:58:00 PM
Collection Time:
Client Sample ID: GZ-2
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP		**SW1311/6010B**				Analyst: **AL**
Lead	1.7	0.25		mg/L	1	8/21/2013 7:07:32 PM

Lab ID: 1308047-03
Collection Date: 8/6/2013 9:14:00 AM
Collection Time:
Client Sample ID: GZ-6 2'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP		**SW1311/6010B**				Analyst: **AL**
Arsenic	ND	0.25		mg/L	1	8/21/2013 7:13:28 PM

Lab ID: 1308047-04
Collection Date: 8/9/2013 7:32:00 AM
Collection Time:
Client Sample ID: GZ-17 2'
Matrix: SOIL

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
ICP METALS, TCLP		**SW1311/6010B**				Analyst: **AL**
Lead	0.53	0.25		mg/L	1	8/21/2013 7:19:26 PM

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308047
Project: 18.0171593.00 NRA

QC SUMMARY REPORT

Method Blank

Sample ID **mb-23477** Batch ID: **23477** Test Code: **SW1311/6010** Units: **mg/L** Analysis Date **8/21/13 5:22:25 PM** Prep Date **8/20/13**

Client ID: Run ID: **ICP-OPTIMA_130821A** SeqNo: **859968**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	ND	0.25	mg/L									
Lead	ND	0.25	mg/L									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

AMRO Environmental Laboratories Corp.

Date: *22-Aug-13*

CLIENT: GZA GeoEnvironmental, Inc.
Work Order: 1308047
Project: 18.0171593.00 NRA

QC SUMMARY REPORT
Laboratory Control Spike

Sample ID **lcs-23477** Batch ID: **23477** Test Code: **SW1311/6010** Units: **mg/L** Analysis Date **8/21/13 5:28:20 PM** Prep Date **8/20/13**
Client ID: Run ID: **ICP-OPTIMA_130821A** SeqNo: **859969**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	10.04	0.25	mg/L	10	0	100	80	120	0			
Lead	10.32	0.25	mg/L	10	0	103	80	120	0			

Sample ID **lcsd-23477** Batch ID: **23477** Test Code: **SW1311/6010** Units: **mg/L** Analysis Date **8/21/13 5:33:48 PM** Prep Date **8/20/13**
Client ID: Run ID: **ICP-OPTIMA_130821A** SeqNo: **859970**

Analyte	QC Sample Result	RL	Units	QC Spike Amount	Original Sample Result	%REC	LowLimit	HighLimit	Original Sample or MS Result	%RPD	RPDLimit	Qua
Arsenic	10.17	0.25	mg/L	10	0	102	80	120	10.04	1.26	20	
Lead	10.41	0.25	mg/L	10	0	104	80	120	10.32	0.91	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
NA - Not applicable where J values or ND results occur
RL - Reporting Limit; defined as the lowest concentration the laboratory can accurately quantitate.

LABORATORY TESTING DATA SHEET

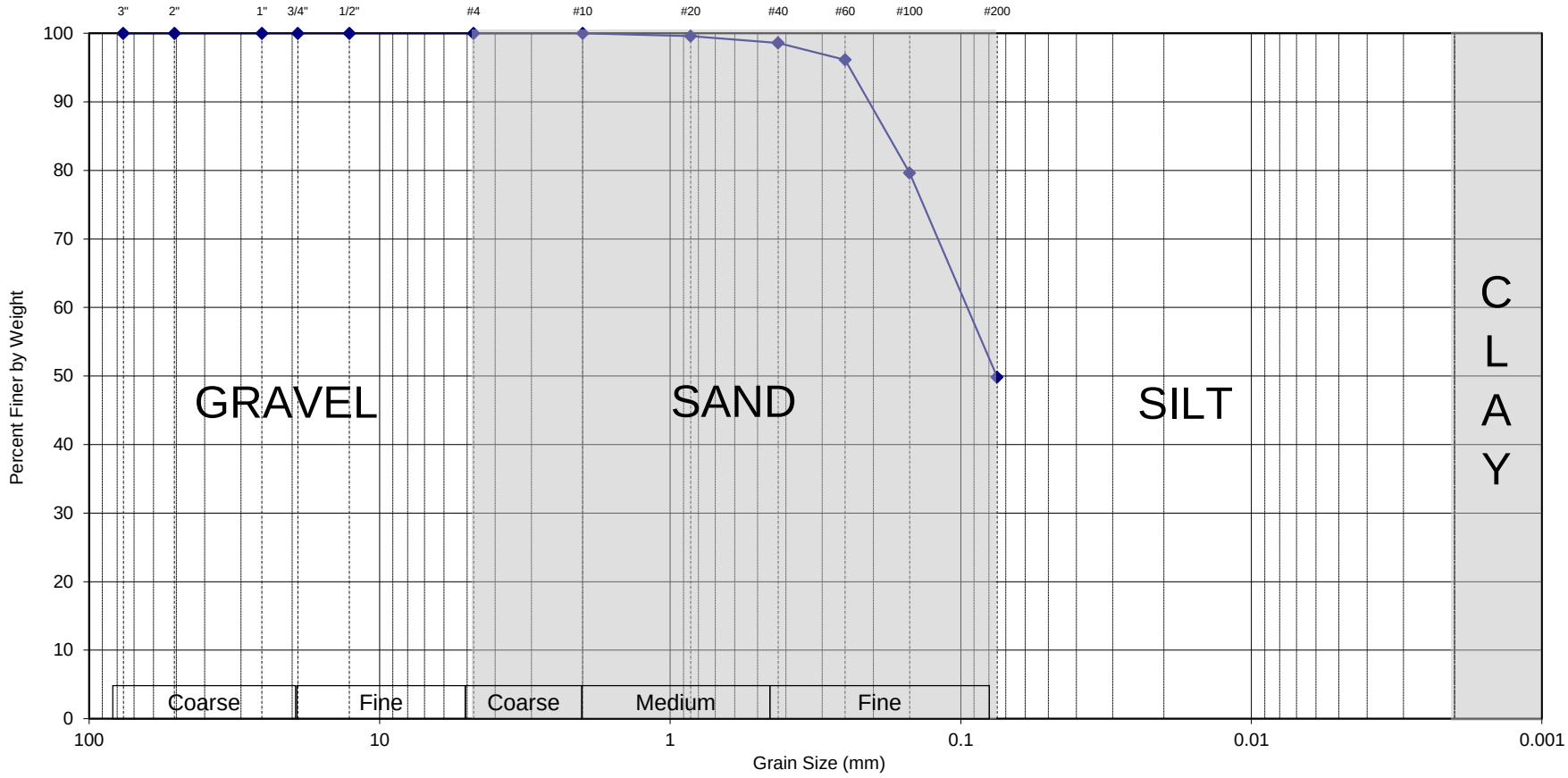
Project Name NRA Waterfront Parking Lots | Location Newburyport, MA | Reviewed By
Project No. 18.0171593.00 | Assigned By Matthew Steele
Project Manager Matthew Steele | Report Date 8/26/2013 | Date Reviewed 8/26/2013

Boring/ Test Pit No.	Sample No.	Depth ft.	Lab No.	Identification Tests								Strength Tests					
				Water Content %	LL %	PL %	Sieve -200 %	Hyd -2μ %	ORG %	G_s	Dry unit wt. pcf	Torvane or Type Test	σ_c psf	Failure Criteria	$\sigma_1 - \sigma_3$ psf	Strain %	Laboratory Log and Soil Description
GZ-1	S-6	19-21	1				49.8										Brown fine SAND and SILT
GZ-3	S-6	19-21	2				5.8										Light brown f-m SAND, trace Silt, trace Gravel
GZ-15	S-6	24-26	3				79.7										Light brown SILT, some fine Sand
GZ-8	S-2	4-6	4				20.8										Brown f-c SAND, some Silt, little fine Gravel
GZ-17	S-4	9-11	5				13.0										Brown f-c SAND, little Silt, trace fine Gravel

THIELSCH ENGINEERING
195 Frances Avenue
Cranston, RI 02910
401-467-6454

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	50.2%	49.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
1	GZ-1	S-6	19-21'	Brown fine SAND and SILT				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.6
#40	98.6
#60	96.1
#100	79.6
#200	49.8

THIELSCH ENGINEERING
195 Frances Ave., Cranston, RI 02910
401-467-6454

CTS-74-13-0003
NRA Waterfront Parking Lots
Newburyport, MA
GZA File # 18.0171593.00

Tested by: LM/RM Date: 8/24/13
Reviewed by: MBP Date: 8/26/13

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
1.1%	93.0%	5.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
2	GZ-3	S-6	19-21'	Light brown f-m SAND, trace Silt, trace Gravel				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	98.9
#10	96.9
#20	95.3
#40	90.6
#60	67.5
#100	26.7
#200	5.8

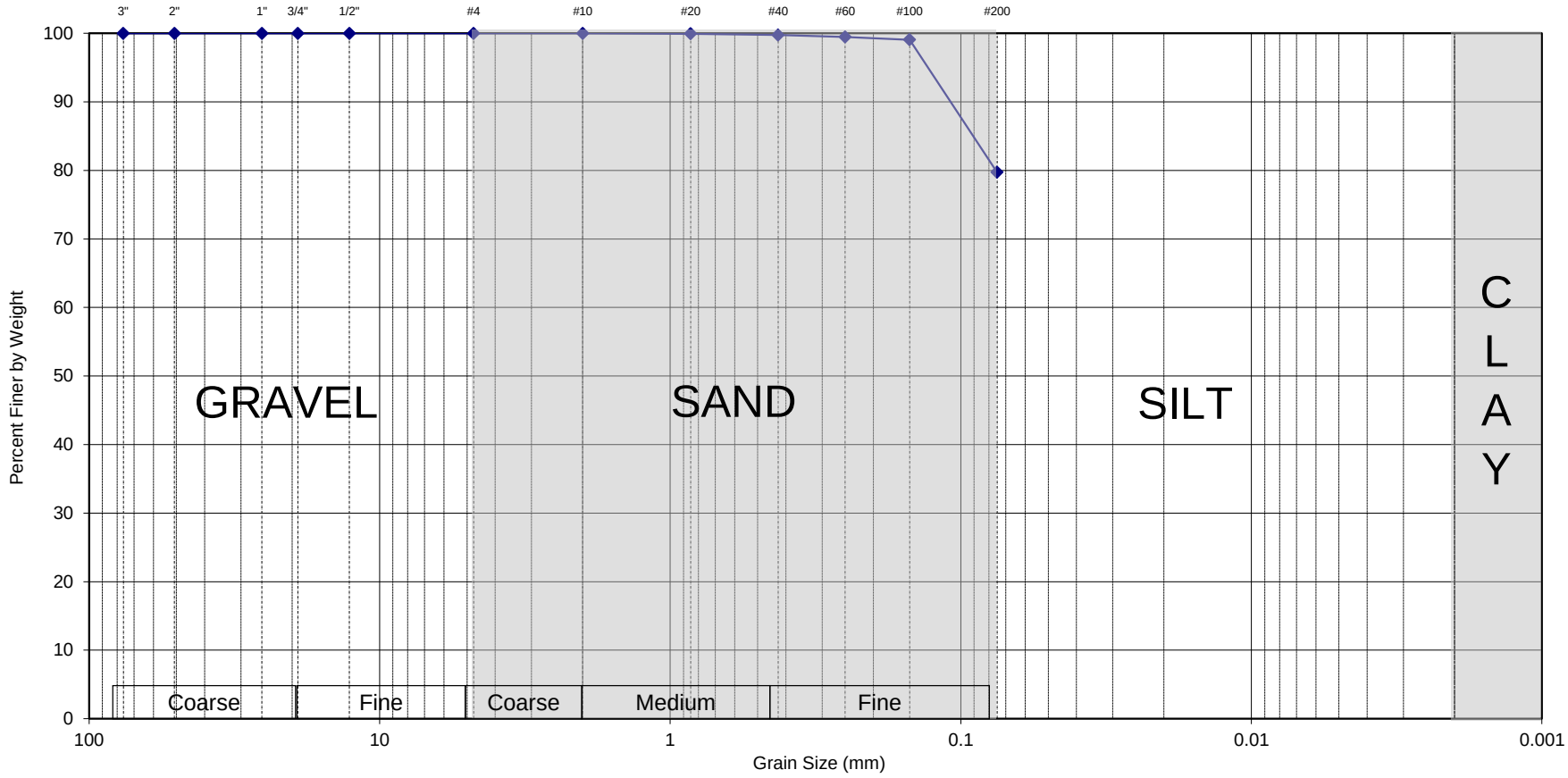
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401-467-6454

CTS-74-13-0003
NRA Waterfront Parking Lots
Newburyport, MA
GZA File # 18.0171593.00

Tested by: LM/RM Date: 8/24/13
Reviewed by: MBP Date: 8/26/13

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
0.0%	20.3%	79.7%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
3	GZ-15	S-6	24-26'	Light brown SILT, some fine Sand				

Sieve Size	% Passing
¾"	100.0
½"	100.0
#4	100.0
#10	100.0
#20	99.9
#40	99.7
#60	99.5
#100	99.1
#200	79.7

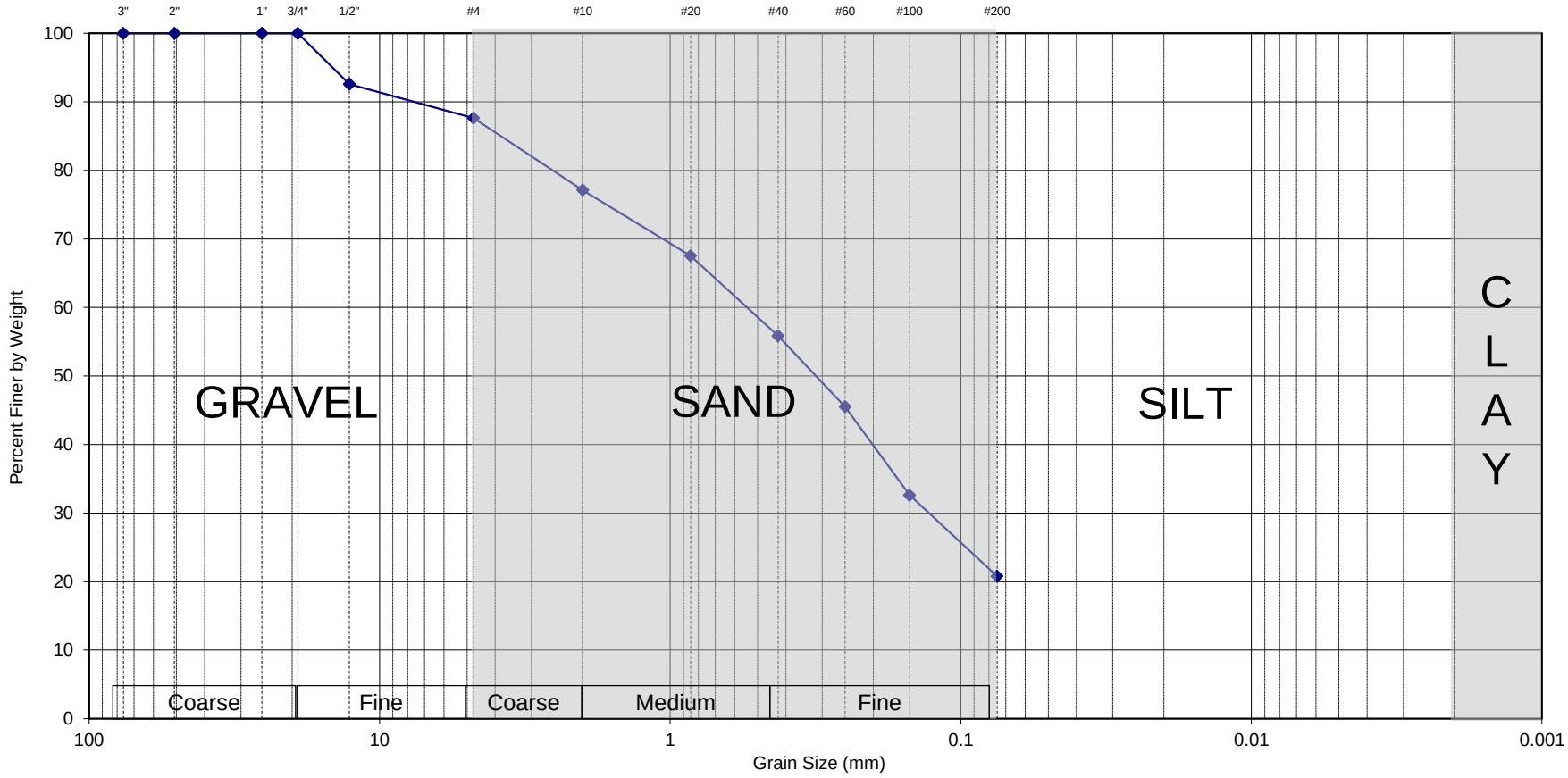
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CTS-74-13-0003
NRA Waterfront Parking Lots
Newburyport, MA
GZA File # 18.0171593.00

Tested by: LM/RM Date: 8/24/13
Reviewed by: MBP Date: 8/26/13

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
12.4%	66.9%	20.8%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
4	GZ-8	S-2	4-6'	Brown f-c SAND, some Silt, little fine Gravel				

Sieve Size	% Passing
¾"	100.0
½"	92.6
#4	87.6
#10	77.1
#20	67.5
#40	55.8
#60	45.5
#100	32.6
#200	20.8

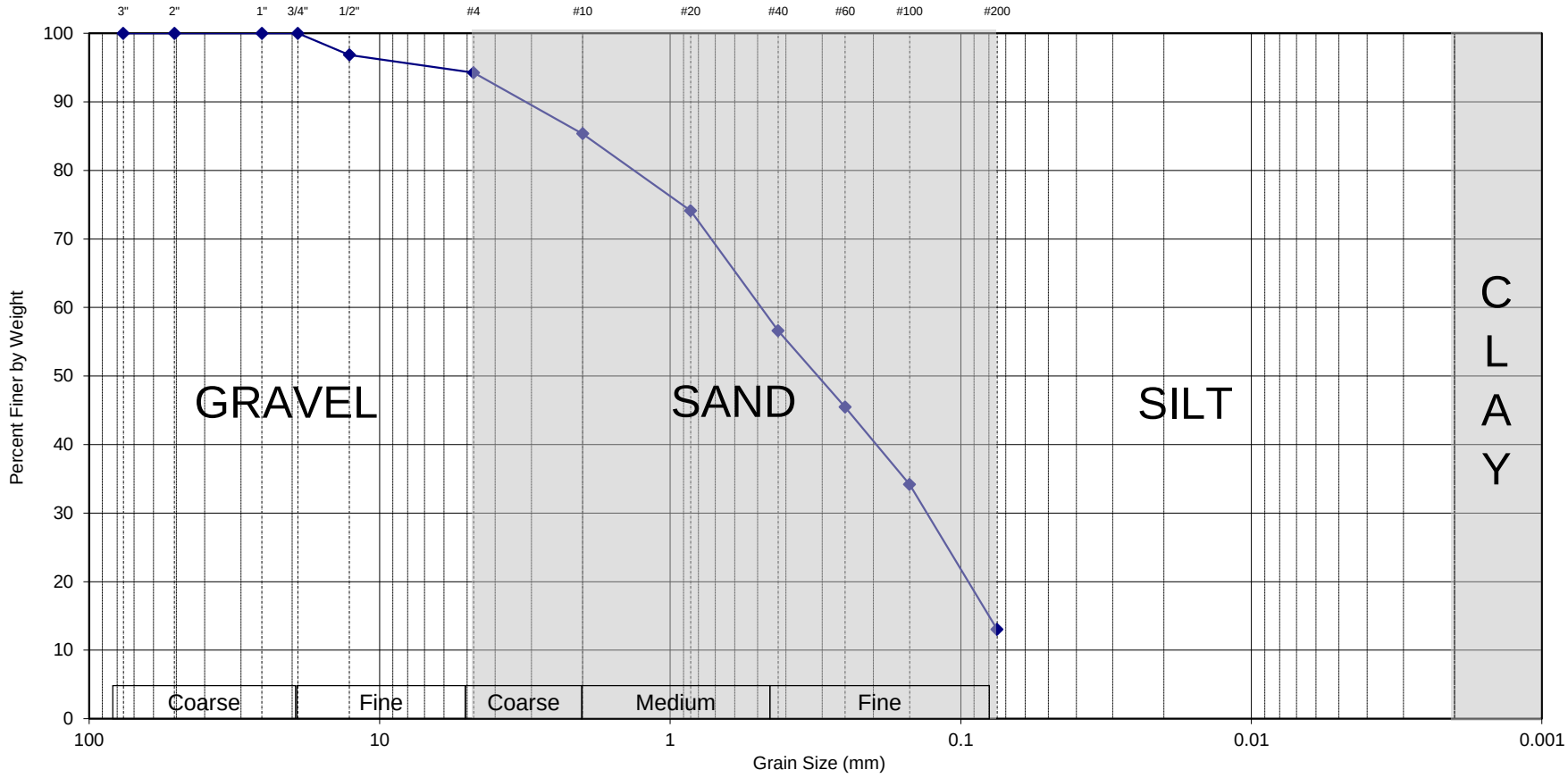
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401-467-6454

CTS-74-13-0003
NRA Waterfront Parking Lots
Newburyport, MA
GZA File # 18.0171593.00

Tested by: LM/RM Date: 8/24/13
Reviewed by: MBP Date: 8/26/13

ASTM D422

U.S. STANDARD SIEVE AND HYDROMETER



Gravel	Sand	Fines
5.8%	81.2%	13.0%

Lab #	Exploration	Sample	Depth	Description	WC	LL	PL	PI
5	GZ-17	S-4	9-11'	Brown f-c SAND, little Silt, trace fine Gravel				

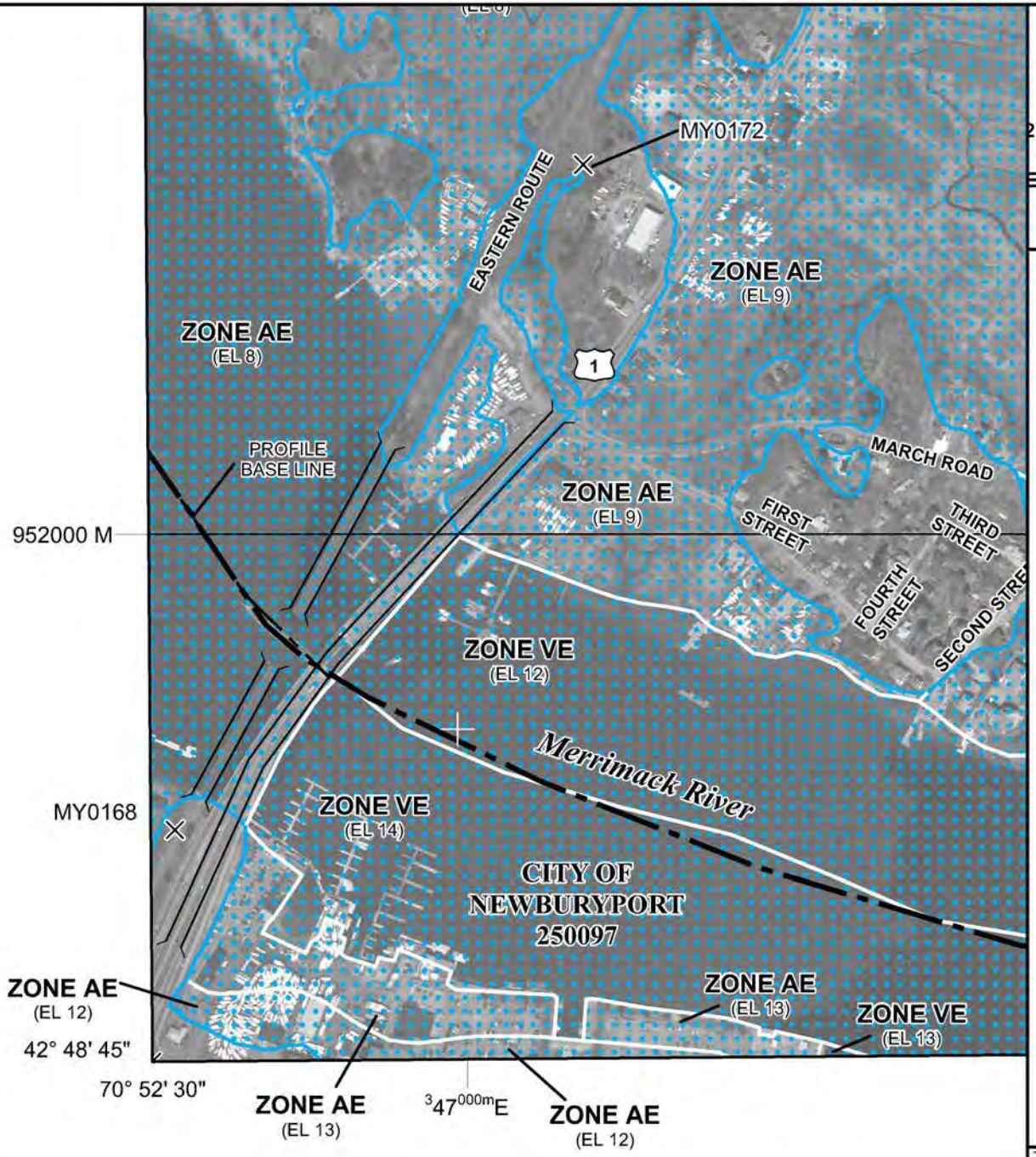
Sieve Size	% Passing
¾"	100.0
½"	96.9
#4	94.2
#10	85.3
#20	74.1
#40	56.6
#60	45.5
#100	34.2
#200	13.0

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195 Frances Ave., Cranston, RI 02910
401-467-6454

CTS-74-13-0003
NRA Waterfront Parking Lots
Newburyport, MA
GZA File # 18.0171593.00

Tested by: LM/RM Date: 8/24/13
Reviewed by: MBP Date: 8/26/13

APPENDIX G
FEMA FLOOD INSURANCE MAPS



MAP SCALE 1" = 500'

250 0 500 1000

FEET

METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0128F

FIRM

FLOOD INSURANCE RATE MAP

ESSEX COUNTY, MASSACHUSETTS (ALL JURISDICTIONS)

PANEL 128 OF 600

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NEWBURYPORT, CITY OF	250097	0128	F
SALISBURY, TOWN OF	250103	0128	F

-NOTE-

THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION.

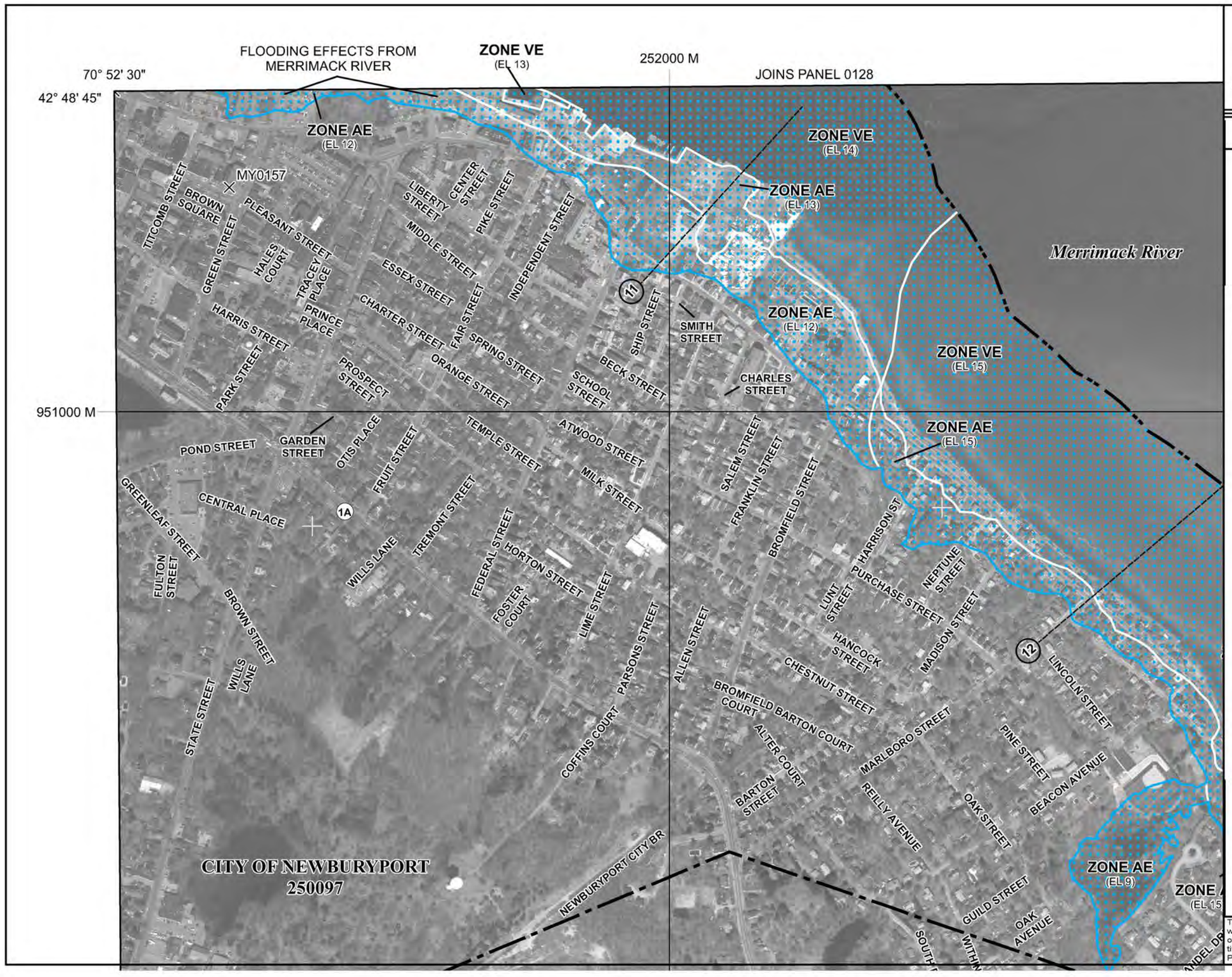
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25009C0128F

EFFECTIVE DATE
JULY 3, 2012

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov



NFIP

PANEL 0136F

FIRM

FLOOD INSURANCE RATE MAP

ESSEX COUNTY, MASSACHUSETTS (ALL JURISDICTIONS)

PANEL 136 OF 600

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
NEWBURY, TOWN OF	250096	0136	F
NEWBURYPORT, CITY OF	250097	0136	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
25009C0136F

EFFECTIVE DATE
JULY 3, 2012

Federal Emergency Management Agency

NATIONAL FLOOD INSURANCE PROGRAM

This is an official copy of a portion of the above referenced flood map. It was extracted using F-MIT On-Line. This map does not reflect changes or amendments which may have been made subsequent to the date on the title block. For the latest product information about National Flood Insurance Program flood maps check the FEMA Flood Map Store at www.msc.fema.gov

APPENDIX H

RESUMES

Frank S. Vetere, P.E., L.S.P.

Associate Principal

RESUME

Education

B.S.C.E., 1971, Civil Engineering, Polytechnic University, Brooklyn, NY

M.S.C.E., 1973, Civil Engineering and Environmental Engineering, Rutgers University, New Brunswick, NJ

Graduate Courses in Soil Mechanics and Hydrogeology, 1974 and 1982, Massachusetts Institute of Technology, Cambridge MA

Professional Registrations

1993, Licensed Site Professional, Massachusetts, 2413
2007, Professional Engineer, Florida, 57755
1998, Professional Engineer, Illinois, 062.051116
1998, Professional Engineer, Ohio, 62568
1996, Professional Engineer, North Carolina, 21803
1988, Professional Engineer, Maine, 5908
1987, Professional Engineer, New Hampshire, 6750
1979, Professional Engineer, Massachusetts, 29834
1976, Professional Engineer, Connecticut, 10110
1974, Professional Engineer, New York 053483-1

Areas of Specialization

Environmental Engineering
Geotechnical Engineering
Construction Oversight
Remediation Systems
Hazardous Waste Assessments

Summary of Experience

Mr. Vetere has over 37 years of experience in all aspects of Geotechnical Engineering, Environmental Analyses, Hazardous Waste Remediation, and Construction Monitoring. Mr. Vetere's experience in geotechnical engineering includes subsurface and groundwater investigations, static and dynamic foundation analyses and design, geotechnical instrumentation, construction monitoring, preparation of licensing documents for submission to regulatory agencies, and preparation of specifications for all aspects of geotechnical construction. Mr. Vetere has been involved in numerous forensic engineering projects related to construction failures due to Geotechnical design deficiencies. Mr. Vetere's experience in environmental engineering includes hazardous waste investigations, groundwater modeling, remedial system design and implementation, Public Involvement, and risk assessment. Mr. Vetere has also provided Expert Witness Testimony in support of both Geotechnical and Environmental based claims and legal proceedings. Relevant project experience includes:

Relevant Project Experience

LICENSED SITE PROFESSIONAL EXPERIENCE

Messina Plaza Dry Cleaner Release, North Andover, Massachusetts. In accordance with the Massachusetts Contingency Plan (MCP), performed a hazardous waste assessment and remediation of a chlorinated volatile organic compound (cVOC) release at a shopping center that had two former dry cleaner stores and a currently operating facility. A Phase 2 environmental site assessment reported the presence of tetrachloroethene (PCE) in groundwater and PCE vapor concentrations significantly greater than indoor air standards at two locations within the retail facility. Assessment work included indoor air sampling in an operating store, installing and sampling an extensive network of shallow and deep groundwater monitoring wells both inside and outside of the buildings, and excavating test pits inside the building to locate the source area. Implemented a source area excavation and subsequent soil vapor extraction treatment for the excavated soil, together with the *in-situ* bioremediation of the groundwater, resulting in significant savings to the client by minimizing the amount of excavation required inside the existing buildings. The injection of the proprietary Enhanced Reductive Dechlorination (ERD) additive led to implementing a long-term remedial program of Monitored Natural Attenuation that will ultimately result in groundwater cVOC concentrations that meet the indoor air standards of the MCP.

Former Slavits Construction Site, Haverhill, Massachusetts. In accordance with the Massachusetts Contingency Plan (MCP), performed Phase 1 and Phase II site investigations and a Phase III Remedial Action Plan at a former airport and construction yard that had petroleum, lead, and arsenic contamination in soil, groundwater and sediments. A Method 3 Risk Assessment and a Stage I Ecological screening were performed to support the Phase III recommendations.

Concord Baptist Church, Boston, Massachusetts. In accordance with the Massachusetts Contingency Plan (MCP), performed an investigation of fuel oil release in a basement of a church that included soil, groundwater, and indoor air sampling and analyses. Issued a Response Action Outcome Statement with an Activity and Use Limitation after performing a Method 3 Risk Assessment.

Former Salvage Yard, Arlington, Massachusetts. In accordance with the Massachusetts Contingency Plan (MCP), performed Phase 1 and Phase II site investigations and a Phase III Remedial Action Plan at a former salvage yard that is a TSCA site due to PCB contamination in soil.

Town of Brookline, Transformer Release, Brookline, Massachusetts. Performed an Immediate Response Action (IRA) for a sudden release of transformer oil that entered the storm drainage system and a downstream pond. Responsibilities included oversight of pond cleanup, excavation of soil, and assessment activities related to soil and groundwater analyses. Prepared RAO using a Method 1 Risk Assessment.

Town of Brookline, Chestnut Street Drainage System/ former Brookline DPW Garage, Brookline, Massachusetts. In accordance with the M.C.P., performed product recovery under an IRA as a result of a release of diesel fuel from the garage into the storm drain, and eventually into Willow Pond. Soil and groundwater remediation continued through Comprehensive Actions, with a partial RAO issued after completion of Phase V activities. Remedial actions in Willow Pond will be completed as part of the Muddy River restoration project.

Tannin Corp, Former Monnier Building, Peabody, Massachusetts. In accordance with the M.C.P., performed an emergency response after fire to a former chromium handling facility included pump & treatment of contaminated water in the basement. Removed chromium from vats and excavated chromium contaminated soils under an IRA. The excavated soils were chemically stabilized for disposal as non-hazardous waste under a subsequent RAM. A Phase II Comprehensive Assessment was performed after the RAM activities were completed.

Premier Homes/ Omni Development, Old Main Street, Tewksbury, Massachusetts. In accordance with M.C.P., performed groundwater pump & treatment and soil vapor extraction at a chlorinated solvent spill site under an IRA. Installed a sub-slab venting system and performed indoor air monitoring, with an RAO issued.

Massachusetts College of Art, Fuel Oil Tank Release, Boston, Massachusetts. Due to a release of No.6 fuel oil to soil and groundwater, performed remedial actions that included the preparation of a Method 3 Risk assessment and implementation of an AUL and RAO, in accordance with the M.C.P.

Town of Brookline, Heath School, Brookline, Massachusetts. Due to a release of No.4 fuel oil to soil and groundwater, performed remedial actions in accordance with the M.C.P., that included soil excavation and oil recovery from groundwater and the Brookline Reservoir under a IRA after oil was detected in the reservoir.

MIT, Vassar Street utility excavation, Cambridge, Massachusetts. In accordance with the M.C.P., an RAO C issued with an O&M plan that included product recovery and groundwater monitoring, ultimately leading to implementation of a Class A RAO

Arbella Insurance & P. Allinson, Strong Place, Beacon Hill, Boston, Massachusetts. In accordance with the M.C.P., performed groundwater monitoring and a Method 3 Risk Assessment for indoor air exposures related to a home heating oil release. NAPL gauging and monitoring was performed under an IRA.

MIT, Hayward Street Fuel Oil Tank Release, Cambridge, Massachusetts. Due to a release of No.6 fuel oil to soil and groundwater, performed remedial actions that included oil recovery, groundwater monitoring, and preparation of a Method 3 Risk Assessment, in accordance with the M.C.P.

Terraces of Brookline, Tappan Street, Brookline, Massachusetts. In accordance with the M.C.P., performed groundwater treatment and product recovery using a single-fluid recovery system with an oil/water separator under an IRA as a result of oil seeping through a retaining wall. An RAO was issued at the conclusion of remedial activities.

Brookline High School, Town of Brookline - Brookline, Massachusetts. Mr. Vetere provided design and oversight for the public procurement process for the removal and replacement of a 10,000-gallon fuel oil UST.

The tank was found to have leaked, and subsequent investigations including preparation of a Phase I Initial Site Investigation and Phase II Comprehensive Site Assessment to the DEP. During the investigations a coal ash disposal area was discovered, and a Method 3 Risk Assessment was performed that lead to issuing a Remedial Action Outcome with an Activity and Use Limitation.

Jamaica Plain Neighborhood Development Corp., Nate Smith House - Jamaica Plain, Massachusetts. As part of the geotechnical investigation of the project property, environmental characteristics were accessed in accordance with Massachusetts General Law 21E and the Massachusetts Contingency Plan (MCP). Historical and site information indicated the presence of an existing No. 2 fuel oil underground storage tank on-site. Mr. Vetere performed a Limited Removal Action (LRA) when oil contaminated soils were encountered at a UST excavation. The LRA entailed removal of significantly contaminated soils and soil sampling of the UST excavation and nearby areas. A Response Action Outcome (RAO) form, and submitted all to MADEP on behalf of the owner.

DAM EXPERIENCE

U.S. Environmental Protection Agency- Dam Inspections for Coal Ash Pond- Marshall Steam Station, Catawba County, North Carolina. Responsible Engineer conducting dam safety engineering inspections of combustible coal ash impoundments for the United States Environmental Protection Agency (EPA) as part of a nationwide program under the Response Engineering and Analytical Contract (REAC) being management by Lockheed Martin. The inspections, conducted under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), are in response to the December 2008 coal ash dike failure at TVA/Kingston, Tennessee.

Martin, Manatee, and Sanford Cooling Water Reservoirs - Florida Power & Light Co. Responsible as Project Engineer for managing multidiscipline effort to assist client in responding to safety, environmental, and licensing issues related to the Martin reservoir, and reviewing dam inspection report data and conducting periodic safety inspections. Also responsible for providing technical support for maintenance and safety items and annual safety inspections for the Manatee and Sanford reservoirs.

Manatee and Sanford Cooling Ponds, Florida Power & Light Company. As Project Engineer, responsible for cooling pond embankment modifications. Work included coordination of interdisciplinary activities related to design and installations of a downstream drainage system for two existing earth fill embankments. Modifications included the installation of 80,000 feet of downstream filter drain, relief wells, hydraulic structures, and pumping stations.

Spickett River Drainage Basin - Methuen Falls Hydroelectric Project, Methuen, Massachusetts - Olson Hydroelectric Energy Corporation. Conducted a hydrologic field investigation and issued a reconnaissance report regarding the impact of the Methuen Falls Hydroelectric Project on the Spickett River. The project concentrated on Harris Brook and outlying wetlands storage areas. The investigation and response were prepared upon the request of the Federal Energy Regulatory Commission, Division of Project Compliance and Administration, and resulted in the client's ability to obtain necessary approvals and permits applicable to the project.

Centennial Island Hydroelectric Plant, Lowell, MA -Olson Electric Energy Corporation. Provided Geotechnical Engineering Design and Civil, Structural and overall project management for the renovation of an existing canal and site development and construction of the Centennial Island Hydroelectric Plant. Completed a Geotechnical Engineering Field Investigation, developed the Foundation Design, managed all structural and civil engineering field and design services, and provided engineering field monitoring for this facility, which was constructed on the Concord River.

ENERGY EXPERIENCE

Millstone Nuclear Power Station - Unit No. 3, Northeast Utilities, Waterford, Connecticut. Responsible as Lead Geotechnical Engineer for all geotechnical aspects of licensing, design, and construction for a $5 billion power plant project. Areas of design and construction responsibility include building foundations, shorefront facilities, rock excavation and blasting, rock bolting, compacted fill, temporary cofferdams, dewatering,

anchored sheetpiling systems, permanent rock anchor installation, geotechnical instrumentation and machine foundations. Other responsibilities include liquefaction and seismic analyses, coordination of geologic mapping and fault investigation program and preparation of licensing documents.

Maine Yankee Atomic Power Station, Maine Yankee Atomic Power Co., Wiscasset, Maine. Machine foundation design for turbine-driven feedwater pump using 2 degree of freedom analysis. Design of embankment on soft clay to divert cooling water.

Danskammer Coal Reconversion - Central Hudson Gas & Electric Corp., Newburgh, New York. Responsible as Lead Geotechnical Engineer for conceptual engineering and licensing report preparation for a solid waste management facility and coal pile storage with respect to protection of the ground water aquifer at the site. Responsibilities include supervision of field investigations and laboratory testing and preparation of New York State Draft Environmental Impact Statement (DEIS) and Part 360 reports. Expert testimony was presented in support of the facility at public hearings.

Pilgrim Station - Unit 1, Boston Edison Company, Plymouth, Massachusetts. Responsible as Lead Geotechnical Engineer for relocation of service water lines and construction of new pipe vault. Work included design of anchored and braced sheetpile walls in confined areas and buried piping analysis.

Surry Power Station - Units 1 & 2, Virginia Electric and Power Co., Surry County, Virginia. Performed seismic analysis to determine dynamic soil parameters, using computer program SHAKE, for input into soil-structure interaction analysis. Responsible as Lead Geotechnical Engineer for condensate polisher and steam generator projects with responsible charge for all aspects of foundation design and construction. Work included supervision of site investigations and laboratory testing program, performance of settlement and stability analyses of several structures and tanks on clay, and preliminary pile foundation design. Also analyzed groundwater conditions at the site and established remedial measures for the containment subsurface drainage system.

Beaver Valley Office Building, Duquesne Light Company, Shippingport, Pennsylvania. Design of foundation for office building, including settlement analysis and slope stability study. Field inspected the installation of Franki Pressure Injected Footings (PIFs).

New Warehouse Building, Connecticut Yankee Atomic Power Plant, Haddam, Connecticut. Consultant to client engineering department for blasting at operating nuclear plant. Responsibilities included marketing of services, establishing blasting program, vibration monitoring, and reviewing contractor field operations during construction.

Montague Nuclear Power Station, Northeast Utilities, Montague, Massachusetts. Support Engineer for proposed nuclear power plant siting study and preliminary design development. Responsible for interpretation of subsurface exploration data and development of geotechnical design criteria.

Salem Harbor Station, New England Power Company, Salem, Massachusetts. Support Engineer responsible for subsurface investigations and development of geotechnical design criteria for oil conversion, proposed new power plant unit, and waterfront structures.

INTERNATIONAL EXPERIENCE

Kureimat Power Station - Egyptian Electric Authority. Responsible as Lead Geotechnical Engineer for geotechnical feasibility study and preliminary report preparation for a coal-oil power plant 90 km south of Cairo, Egypt. Responsibilities include preparation of field and laboratory testing program, coordination of testing with Egyptian laboratories, and preparation of the geotechnical report.

KIMA Fertilizer plant, Pre-investment Study - Egyptian Chemical Industries. Responsible for siting study for new fertilizer plant in Upper Egypt, including evaluation of all aspects of existing plant site in Aswan and three alternate sites. Responsible for defining infrastructure requirements at each site and preparing cost estimate for site development, infrastructure, and housing colony.

VIWAPA Project, Krum Bay, St. Thomas, Virgin Islands - Stowe Engineering Corporation, Inc., Quincy, Massachusetts. Performed Geotechnical Engineering Field Investigations and Geotechnical Engineering

Foundation Designs were completed for the proposed site development and construction of the existing power plant facility expansion. Provided engineering consultation to client during the design phase and engineering and field support during the construction phase.

GEOTECHNICAL ENGINEERING EXPERIENCE

Fenway Community Development Corporation, Massachusetts Ave. & St. Botolph Street, Boston Massachusetts. Responsible for design and construction oversight of the foundation for a 5-story masonry building in Boston. The foundation included the installation of over 100 steel H-piles to a depth of 150 feet, pile load testing, and handling the removal of contaminated soils prior to construction.

Correctional Facilities, Plymouth, Massachusetts and Central Falls, Rhode Island - Brown & Root/ Durrant & Flickinger. Conducted Geotechnical Engineering Field Investigations and completed Geotechnical Engineering Foundation Designs for the proposed correction facilities. In addition, engineering and environmental services related to completion of hydrogeologic investigations, environmental site assessments and the environmental acceptability of the site were provided. Functioned as intermediary in discussions with the respective State and Local Environmental Agencies.

Wireless Acquisitions, Sprint PCS, Omni-Point Communications. Responsible for Geotechnical Engineering Investigations and Foundation Design criteria for over 200 proposed cellular tower sites, providing Geotechnical Field Investigations and Geotechnical Design Criteria for proposed cellular tower locations throughout the Southern Maine, New Hampshire, and Northern Massachusetts area. Earth resistivity surveys were also conducted at each of the proposed tower location sites.

DuPont Building *122, Boston, Massachusetts - Salemi Associates/DuPont, Boston, Massachusetts.* Conducted a Geotechnical Field Investigation and completed Geotechnical Engineering Foundation Designs for the DuPont Boston Consolidation Study relative to the Building 122 addition. The subsurface exploration program included undisturbed sampling of encountered clay soils and subsequent one-dimensional consolidation analysis and Atterberg limits. The resulting "mini pile" design required administration of a pile load test and full-time pile installation monitoring.

Seaport Landing, Lynn, Massachusetts. Analysis of a significant slab settlement problem in the below grade parking garage. Designed and provided construction oversight of drilled mini-piles inside the occupied building.

Pine Street Inn, Boston, Massachusetts. Responsible for design and construction oversight of the foundation for a new extension to the existing building in downtown Boston. The foundation included the installation of over 50 Pressure Injected Footings to a depth of 50 feet.

ENVIRONMENTAL ENGINEERING EXPERIENCE

Zale Companies - Vernon Hills, Illinois. Mr. Vetere performed numerous site investigations on a 940-acre site that our client was developing into residential housing and public park land. A comprehensive Risk-Based Site Characterization for four isolated areas of the site was conducted. The characterizations were performed within the framework of Illinois EPA's then fledging Site Remediation Program. A health risk assessment, a groundwater resource study, and a remedial design plan were performed for each of the sites, including modeling the site using SESOIL and MT3D. For two of the sites, fate and transport modeling was an essential component in advocating a natural attenuation remedial design. Over 2 million gallons were extracted and disposed into the local POTW for a significant time and cost savings over traditional groundwater pump and treat systems. The Illinois EPA issued a No Further Remediation Letter for each of the four sites.

Northcliff Shopping Center, LLC - Brooklyn, Ohio. Mr. Vetere performed a site investigation for an underutilized industrial property that our client wanted to develop into a commercial shopping center. The property had been utilized for disposal of spent foundry sand, which contained elevated levels of lead and PAH compounds. Mr. Vetere conducted a comprehensive Risk-based Site Characterization of the foundry sand and site groundwater under the umbrella of the newly implemented Ohio EPA Voluntary Action Program. A health risk assessment and fate and transport modeling were performed to develop an operation and maintenance plan that allowed for cost effective development of the site.

Underground Storage Tank Designs, Miscellaneous Clients. Performed engineering design and permitting for approximately 100 gasoline and fuel oil installations in New Hampshire and Massachusetts. Also provided oversight and monitoring of the UST removals and closure reporting.

New Hampshire Oil Distribution and Disbursement (ODD) Fund. Responsible Professional Engineer for over 75 ODD Fund Site Characterizations, Site Investigations, Remedial Action Plans, and Remediations at various sites throughout New Hampshire.

Phase 1 and Phase 2 Environmental Site Assessments (ESA), Miscellaneous Financial and Private Clients. Performed or oversaw the preparation of over 1,000 property transaction ESAs throughout the United States in accordance with ASTM E 1527, including both Phase 1 and follow-up Phase 2 reports.

EXPERT WITNESS EXPERIENCE

Town of Oyster Bay, NY vs. Northrop/ Grumman – Rivkin Radler, Uniondale NY. Expert Witness for legal proceedings in Federal Court related to PCB and other hazardous wastes disposed on former Grumman property granted to the Town for use as a park in the early 1960s. Prepared a rebuttal report and support of Summary Judgment hearing, and was deposed. Testimony included interpretation of Geotechnical and Environmental issues at the site related to construction methodology and procedures, aerial photograph interpretation, and hazardous waste disposal.

Glenbridge Manor, Cincinnati Ohio, Retaining Wall Failure. Herfel Law Firm, Covington, KY Expert Witness preparation in support of an architectural firm defending against a lawsuit for damages due to a retaining wall failure by a third party engineer. Reviewed depositions of witnesses and provided assistance to counsel. Currently awaiting deposition.

Johnson Products vs. Irving Oil, Belmont New Hampshire - Casassa & Ryan, Hampton NH. Expert Witness preparation in support of a claim of responsibility for a gasoline station release. Testimony at the deposition included interpretation of Environmental issues at the site related to oil tank systems and hydrogeologic conditions causing offsite migration of contaminants.

Danskammer Coal Reconversion - Central Hudson Gas & Electric Corp., Newburgh, New York. Expert testimony presented in support of New York State Draft Environmental Impact Statement (DEIS) and Part 360 report at public hearings before state Public Utilities Commission on behalf of a solid waste management facility and coal pile storage with respect to protection of the ground water aquifer at the site.

Experience Prior To GZA

Mr. Vetere was a co-founder and principal of Gemini Geotechnical Associates, where he directed all of the firm's activities related to Geotechnical and Environmental engineering, hazardous waste investigation, assessment, remediation, risk assessment, and underground storage tank management. Mr. Vetere was formerly the Director of Geotechnical and Environmental Services for New England and Manager of Briggs Associates, Inc. Geotechnical Department, where he was directly responsible for managing all Geotechnical engineering and environmental projects throughout the New England region.

Mr. Vetere was previously a Project Engineer and Lead Geotechnical Engineer with Stone & Webster Engineering Corporation, responsible for managing continuing engineering services related to groundwater monitoring and embankment safety and performance, and providing engineering, environmental, and licensing services to the client. Prior experience included responsibility as lead geotechnical engineer for the millstone nuclear power plant in Connecticut, where he was responsible for all aspects of engineering, licensing, and construction monitoring related to the project. In addition, Mr. Vetere has prepared geotechnical reports and environmental assessments for a wide variety of industrial and commercial projects.

Professional Activities

Member, American Society of Civil Engineers, Boston Society of Civil Engineers Section, ASCE

Member, Licensed Site Professionals Association, Massachusetts

Matthew L. Steele, EIT, LEED GA

Assistant Project Manager

RESUME

Education

B.S., 1997, Natural Sciences,
University of Puget Sound

M.S., 2010, Civil Engineering,
University of New Hampshire

Certifications

Engineer-in-Training
New Hampshire 2009
LEED Green Associate, 2010
40 hr HAZWOPER Training

Areas of Specialization

Environmental Science
Site Assessments
Building Condition Assessments
Structural Engineering
Construction Inspection
CADD Technician
Survey

Professional Associations

Timber Framers Guild,
American Society of Civil Engineers

Teaching Experience

Strength of Materials

Teaching Assistant,
University of New Hampshire, 2008

Summary of Experience

Mr. Steele has been involved in design and planning for various civil/structural engineering applications throughout eastern Massachusetts and environmental site assessments in several eastern states. His responsibilities have included monitoring investigation phases, environmental site assessments, and construction monitoring. Some of Mr. Steele's recent projects include

Relevant Project Experience

- **Environmental Engineer** providing oversight of environmental field activities including field observations, maintaining boring logs, soil and groundwater sampling and miscellaneous field testing for Phase II Environmental Site Assessments in nine states. Work included management of subcontractor contract and field activities.
- Prepared numerous Phase II ESA Reports for a wide variety of hazardous waste, asbestos, and water intrusion sites in **Tennessee, Georgia, Florida, Connecticut, New York, and Ohio**.
- **Researcher, designer and installer** of weather station and instrumented highway pavement section in New Hampshire for the local calibration of the Mechanistic Empirical Pavement Design Guide pavement design software.
- **Field Engineer** providing construction oversight and inspections for dam rehabilitation in **Lake Ladore, Pennsylvania**.
- **Field Engineer** providing construction oversight and inspections for wharf construction in **Beverly, Massachusetts**.
- **Field Engineer** providing field observations and maintain boring log for geotechnical investigation in **Essex, Massachusetts.**
- **Field Engineer** providing field observations and maintain boring log for geotechnical investigation in **East Boston, Massachusetts**.
- **Field Engineer** providing field observations for a building condition survey in **Atlanta, Georgia**.
- **Field Engineer** providing site survey services for sites in **Groveland, Massachusetts and Newbury Massachusetts**.
- Structural calculations for the design of a gangway ramp bulkhead wall in **Exeter, New Hampshire**.
- **Field Engineer** for survey services and conditions assessment of a seawall in **Rockport, Massachusetts**.
- **Civil Engineer** providing volume calculations for potential dredging in **Florida.**
- Structural calculations to assess the condition of a large commercial wharf in **South Boston, Massachusetts.**

Anders Bjarngard, P.E.
Principal

RESUME

Education

B.S., 1983, Civil Engineering, University of Massachusetts

M.S., 1989, Civil Engineering (Geotechnical), Tufts University

Professional Registrations

Professional Engineer, MA, #39766

Areas of Specialization

Dam Inspections
Dam Engineering
Geotechnical Engineering

Summary of Experience

Mr. Bjarngard's areas of experience include: dam safety inspections and investigations, subsurface investigations; foundation, lateral earth support, dam rehabilitation; construction monitoring and documentation; slope stability, seepage and settlement analyses; and preparation of plans, specifications and contract documents. Relevant project experience includes:

Relevant Project Experience

GEOTECHNICAL

Senior Geotechnical Engineer, Second Avenue Subway Project, New York, New York. GZA was the lead geotechnical engineer for preliminary design of 8-1/2 miles of new subway tunnel with 16 new stations. Tunnels will be excavated by combinations of bored tunnels in rock, mined tunnels, mixed-face tunnels and soft-ground tunnels. The majority of stations will be cut and cover excavations in soil or soil and rock with some mined caverns for stations entirely in rock. Underpinning of some existing structures will be required for constructing some station entrances and ancillary ventilation structures and to pass under some existing subway lines. Mr. Bjarngard assisted in the development of laboratory test program and design parameters for soil and rock, as well as the preparation of geotechnical data and interpretive reports for the tunnels and stations.

Principal-in-Charge, Confidential Site. Performed subsurface investigations and forensic engineering to evaluate several feet of settlement resulting from freezing of a deep clay layer. Subsurface investigation consisted of sampling and laboratory testing of frozen and thawed clay samples. Installed and monitor monthly geotechnical instrumentation including crack gauges, SAAF, piezometers, MPBXs, and Inclinometers.

Principal-in-Charge, Route 139 Embankment, Stoughton, Massachusetts. Performed subsurface investigations and forensic engineering to evaluate settlement of an 800-foot long roadway embankment recently reconstructed over a wetland. Developed time-rate of settlement predictions and evaluated potential damage to utilities and the roadway. Developed remedial alternatives.

Principal-in-Charge, Geotechnical Evaluation/Design at Several National Grid Substations. Performed subsurface investigations and developed geotechnical recommendations for foundations and earth retaining walls. Developed drilled mini-pile foundation design. Provided technical specifications and drawings as well as construction phase services.

Principal-in-Charge, Bay Street Bridge, Taunton, Massachusetts. Performed subsurface investigations, geotechnical analysis and provided design recommendations for this MassDOT Accelerated Bridge Construction in conjunction with dam rehabilitation project. Bridge abutments were supported on Secant Pile abutment walls.

Principal-in-Charge, Geotechnical Evaluation for Mystic Pier Improvements, Charlestown, Massachusetts. Performed subsurface investigations, geotechnical settlement analysis and provided design recommendations for slab on grade within Marine pier constructed over highly compressible marine deposits of organics, silt and clay.

Principal-in-Charge, Geotechnical Evaluation for Sovereign Banks. Performed subsurface investigations, geotechnical analysis and provided design recommendations for several proposed developments of single-story structures and associated pavement.

Principal-in-Charge, Construction Observation and As-Built Documentation for Lowe's Building, Milford, Massachusetts. Responsible for construction observation and testing to document that earthwork and foundation preparation was performed in accordance with our recommendations and Lowe's development criteria. Prepared construction documentation report.

Principal-in-Charge, Massachusetts Highway Department Bridge Route 122 Bridge over Route 20, Worcester, Massachusetts. Observed and logged subsurface exploration program for proposed single-span bridge with a reinforced concrete deck. Reviewed subsurface data, evaluated geotechnical and construction design issues, performed engineering calculations including bearing pressures. Prepared geotechnical engineering reports summarizing geotechnical issues and design recommendations which include re-use of the existing bridge abutment foundations.

Principal-in-Charge, Massachusetts Highway Department, West River Bridge over Route 2, Orange, Massachusetts. GZA planned and logged subsurface explorations and developed recommendations for the new foundations and geotechnical construction issues. Prepared geotechnical engineering reports summarizing geotechnical issues and design recommendations for spread footings, drilled shafts, abutment retaining walls and seismic design.

Principal-in-Charge, Retaining Wall Recommendations, Ashland, Massachusetts. Performed subsurface explorations and geotechnical laboratory tests to evaluate 14-foot high retaining wall alternatives. Prepared report summarizing conclusions and retaining wall recommendations. Prepared construction documentation report.

Principal-in-Charge, Retaining Wall Design, Hopkinton, Massachusetts. Designed gravity retaining wall using owner's selected proprietary pre-cast concrete block system. Provided construction observation and statement of completion for building inspector.

Principal-in-Charge, Construction Observation and As-Built Documentation for Sports Authority Building, Milford, Massachusetts. Responsible for construction observation and testing to document that earthwork and foundation preparation was performed in accordance with our recommendations and Sports Authority's development criteria. Prepared construction documentation report.

Principal-in-Charge, BMW Service Center, Peabody, Massachusetts. Performed subsurface investigation and provided geotechnical design and construction recommendations for building renovation. Frost protection concerns for footings at garage entrance with minimum cover required the use of geofoam capable of withstanding traffic loading.

Principal-in-Charge, The Highlands at Faxon Woods, Quincy, Massachusetts. Performed reconnaissance and evaluation of existing rock cuts and boulder walls. Provided recommendations to improve/stabilize.

Principal-in-Charge, Merchants Way Substation, Barnstable, Massachusetts. Reviewed calculations for a cantilevered, permanent, 17-foot high steel sheet pile wall. Modified site grades to reduce maximum wall height to 14 feet and provided conceptual design for retaining wall alternatives including Mechanically Stabilized Earth (MSE) and proprietary pre-cast gravity walls.

Principal-in-Charge, Route 3 Flyover Project, Bourne, Massachusetts. Performed global stability evaluations and prepared foundation recommendations for bridge abutments. Subsequently served as consultant/reviewer for value engineering proposal at permanent bridge and embankments.

Associate-in Charge, Whispering Lane Development, Natick, Massachusetts. Performed stability analysis and prepared as-built condition report of 16-foot high battered boulder retaining wall.

Principal-in-Charge, Rolling Green Apartments, Andover, Massachusetts. Performed subsurface investigations and provided geotechnical design and construction recommendations for 3 to 4 story multi-unit apartment buildings. Spread footings were utilized and recycled concrete from demolished on-site structures were used as structural fill. Performed construction monitoring and soil and concrete quality assurance testing.

Principal-in-Charge, Review of Various Retaining Wall Designs. Performed independent analyses as part of peer reviews for various retaining wall designs performed by others. Most reviews consisted of Mechanically Stabilized Earth (MSE) Walls and precast concrete block (gravity) walls. MSE Walls were evaluated using MSEW software developed by ADAMA Engineering and in accordance with Federal Highway Administration (FHWA) guidelines.

Consultant Reviewer, Shrewsbury High School Rock Slope, Shrewsbury, Massachusetts. Evaluated the stability of 900 linear feet of rock slope along access road to high school. Provided phased recommendations with estimated costs for maintenance and repair for 1, 5 and 20 year period.

Principal-in-Charge, UMASS Dartmouth Athletic Fields. Provided geotechnical evaluation and consultation in forensic evaluation of soccer, football and softball fields with alleged drainage problems. Services included review of contract documentation, field explorations, laboratory testing and cost estimating.

Project Manager, I-90/Route 1A Interchange, Central Artery/Tunnel Project – Contract 8A1, East Boston, Massachusetts. As the project manager for the geotechnical design consultant, Mr. Bjarngard was responsible for geotechnical aspects of the design of this 110 million dollar Massachusetts Highway Department Project which includes construction of numerous roads of varying widths at-grade, on retained fill, on viaduct and a boat section. Also included in the contract are new utilities, a pump station 70 feet below grade, and construction of two multi-million dollar parks and recreational facilities. Responsible for the design of shallow and deep foundations including up 9-foot-diameter drilled shafts for support of viaducts, 155-ton 16-inch end-bearing precast concrete piles for support of bridge abutments, 100-ton drilled mini-piles in areas of limited access, and 40-ton 12-inch precast concrete friction piles for support of retaining walls. Also designed lightweight foam concrete embankments for retained fills constructed over soft clay deposit over 150 feet deep. Designed geotechnical instrumentation program. Provided geotechnical design criteria and developed geotechnical special provisions and drawings. Currently responsible for inspection of Construction-phase exploration program and contractor submittal review.

Project Manager, I-90/Route 1A Interchange, Central Artery/Tunnel Project – Contract 8A5, East Boston, Massachusetts. This 7 million dollar Massachusetts Highway Department consisted of construction of detour roads including viaducts and retained fills. Designed shallow and deep foundations consisting of 125-ton drilled mini-piles as well as a geotechnical instrumentation program. Provided geotechnical design criteria and developed geotechnical special provisions and drawings. Reviewed contractor submittals.

Project Manager, I-90/Logan Airport Interchange, CA/T Design Section D007D1, East Boston, Massachusetts. As geotechnical consultant to the section designer, responsible for geotechnical analysis, design recommendations, and development of project specifications. This 27 million dollar Project includes the use of high capacity precast, prestressed concrete piles up to 200 feet long and construction of lightweight cellular concrete fill embankments for support of an elevated multilane highway ramp. Also responsible for review of geotechnical contractor submittals and consultation during construction.

Project Manager, I-90/Logan Airport Interchange, CA/T Design Section D007D2, East Boston, Massachusetts. This 160 million dollar project includes a combination of multilane tunnels, boat sections, at-grade roadways, embankments, and elevated roadways. As geotechnical consultant to the section designer, responsible for geotechnical analysis, design recommendations, and development of geotechnical project specifications and drawings. Also designed geotechnical instrumentation program and reviewed geotechnical contractor submittals.

Project Manager, Proposed Elementary/Middle School, West Revere, Massachusetts. Managed an exploration program of test borings and monitoring well installation. Performed engineering analysis and provided design recommendations for foundation type, allowable bearing pressure, lateral earth pressures, geotechnical seismic design parameters, groundwater control and earthwork.

Project Manager, Proposed Residential Development, Brookline, Massachusetts. Designed and managed an exploration program consisting of Ground Penetrating Radar (GPR), test pits, test borings and monitoring well installation. Site development consisted of a three-story luxury condominium with 2 additional levels of below grade parking. Performed engineering analysis and provided design recommendations for foundation type, allowable bearing pressure, lateral earth pressures, geotechnical seismic design parameters, rock excavation guidelines, groundwater control and earthwork.

Project Manager, Foundation Recommendations for Proposed Storage Silo and Conveyor at Bird Roofing Plant, Norwood, Massachusetts. Managed subsurface exploration program, developed foundation design recommendations consisting of spread footings (Conveyor) and intermediate depth mini-piles (Silo). Prepared technical specifications and foundation design drawings.

Project Manager, Forest Avenue Substation Expansion, Hudson, Massachusetts. Designed and managed a subsurface exploration program consisting of test pits and borings and resistivity measurements. Provided foundation recommendations with settlement estimates, lateral earth pressures and geotechnical seismic design parameters.

Project Manager, Orchard Cove, Canton, Massachusetts. Responsible for compliance with project plans and specifications during construction of this 38-acre development, including: construction of footings on sensitive soils several feet below water table; blasting and rock excavation; and underdrain and slab-on-grade construction. Developed geotechnical recommendations to address field conditions encountered in a timely manner.

Project Engineer, Site Approval Plans, Mansfield, Massachusetts. Designed and prepared site approval plans for a two-story, 80,000-square-foot office building and the associated development of a 6-acre site. This design was accomplished directly on a computer-aided design system and included zoning, utility and parking layout, grading and stormwater analysis.

Project Engineer, Pump Station Excavation/Construction, North Charleston, South Carolina. Performed lateral earth support, settlement, pump test and relief well analyses and reviewed an extensive instrumentation program during excavation and construction of an addition to an existing pump station approximately 40 feet below grade.

Project Engineer, Slope Stabilization Project, Norwood, Massachusetts. Monitored remediation of a slope in failure. Supervised field personnel during construction which consisted of excavation of organics several feet below the adjacent river level, subsequent placement of blast rock and granular fill, and settlement monitoring.

Project Engineer, Preliminary Geotechnical Investigation for Home Depot, Quincy, Massachusetts. Executed subsurface exploration program of test pits and borings and provided recommendations for the potential development of a Home Depot Store in a filled Granite Quarry.

Project Engineer, Great Road Shopping Center, Bedford, Massachusetts. Executed an exploration program of test borings and monitoring wells. Performed groundwater sampling. Performed engineering analysis and provided design recommendations for foundation type, allowable bearing pressure, lateral earth pressures, pavements, slopes, groundwater control and earthwork.

Project Engineer, Excavation Impact Report, Peabody, Massachusetts. Coordinated exploration program, estimated rock excavation quantities, evaluated impacts of rock excavation and provided blasting recommendations.

Project Engineer, Underpinning of Building Addition, Quincy, Massachusetts. Coordinated and supervised exploration and settlement monitoring program. Performed computer and manual settlement analyses and developed alternative underpinning schemes.

Project Engineer, Underpinning of 170 Worcester Street, Wellesley, Massachusetts. Coordinated exploration and settlement monitoring program. Inspected the construction of mini-piles used to underpin an existing one-story brick building.

Project Engineer, Geotechnical Evaluation of 770 Gallivan Boulevard, Quincy, Massachusetts. Coordinated exploration and laboratory testing programs. Provided design recommendations and foundation alternatives.

Project Engineer, Geotechnical Evaluation for A&P Store Addition, Duxbury, Massachusetts. Coordinated exploration and laboratory testing programs. Performed settlement calculations, provided design recommendations.

Staff Engineer, Proposed Milford Shopping Center, Milford, Massachusetts. Responsible for environmental field investigations and sampling, geotechnical field investigations, design recommendations, and report preparation.

Staff Engineer, 101 Federal Street Building, Boston, Massachusetts. Responsible for quality control procedures during construction of a load-bearing diaphragm wall. These included viscosity, pH and sand content testing on bentonite slurry, as well as excavation probing using a specially developed neutral buoyancy rod.

Staff Engineer, Massachusetts Fire Fighting Academy, Stow, Massachusetts. Responsible for environmental investigations and sampling, geotechnical field investigations and report preparation.

GENERAL CIVIL

Principal-in-Charge, NYPA St. Lawrence/FDR Power Project, Erosion Remediation, Waddington, New York. Designed and supervised subsurface exploration program consisting of test borings along the St. Lawrence shoreline and adjacent bluff as well as laboratory tests to evaluate erodibility strength and settlement of soils, including the highly sensitive "Leda" clay. Developed soil properties and prepared geotechnical data report.

Principal-in-Charge, Stormwater/Groundwater Management Recommendations, Chestnut Hill, Massachusetts. Evaluated causes of historic flooding and the potential impact of construction of adjacent detention basin. Developed recommendations to mitigate flooding.

Principal-in-Charge, Hydrologic Analysis and Design, Ridgecrest Development, Haverhill, Massachusetts. Evaluated pre- and post-development hydrology and the associated impact to abutting property already experiencing flooding problems. Developed recommendations and design for site improvements to improve hydrology of both the proposed development and the abutting property.

LANDFILLS

Principal-in-Charge, Solid Waste Permitting under Consent Order, Auburn, Massachusetts. Site consisted of approximately 11 acres with demolition debris and soil fill greater than 30 feet thick and creating steep slopes (1H:1V) of exposed fill. Coordinated and prepared permitting documents under Massachusetts Solid Waste Regulations including an Initial Site Assessment (ISA) and Comprehensive Site Assessment (CSA) as well as a Waste Removal/Processing Plan which included slope stabilization.

Project Manager, Bird Landfill ISA, CSA, CAAA, and Closure Design and Construction, Walpole, Massachusetts. Managed the preparation of an Initial Site Assessment, a Comprehensive Site Assessment (including a quantitative risk assessment), a Corrective Action Alternatives Analysis, design and construction contract plans and specifications and construction monitoring/certification for an 8-acre industrial landfill. The above was successfully accomplished in a difficult local permitting environment and under the scrutiny of the Town's peer review consultant, Camp Dresser and McKee. Inc. Post-closure use of the site is expected to consist of light industrial development.

Project Manager, ISA, CSA, CAAA and Closure Design and Construction, MDC Unquity Road Landfill, Milton, Massachusetts. Execution of Initial Site Assessment, Comprehensive Site Assessment, Corrective Action Alternatives Analysis, permitting, closure design and construction monitoring for a municipal landfill in the Blue Hills Reservation.

Project Manager, Bird, Inc. Landfill, Walpole, Massachusetts. Conducted or supervised bi-monthly inspections and bi-annual groundwater quality monitoring studies of Bird's by-product landfill and prepared associated documentation for submission to regulatory agencies.

Project Manager, Modification of Permit Application, Bird, Inc. Landfill, Walpole, Massachusetts. Responsible for design and permitting related to plans to construct a recycling facility at an existing landfill. Plans were approved by the Massachusetts Department of Environmental Protection and included mining and separation of previously landfilled industrial waste, as well as closure and post-closure design.

Project Manager, Modification of Permit Application, Louis M. Kmito & Son Sanitary Landfill, Randolph, Massachusetts. Responsible for the design and permitting required to obtain approval of an unlined vertical expansion for a municipal solid waste landfill.

Project Manager, Existing Facility Permit Application, Louis M. Kmito & Son Sanitary Landfill, Randolph, Massachusetts. Prepared existing facility permit application and supporting documentation.

Project Manager, Existing Facility Permit Application, BFI Holliston Transfer Station, Holliston, Massachusetts. Prepared existing facility permit application and supporting documentation.

Project Manager, Closure Assessment and Design, Ravenbrook Demolition Debris Landfill, Carver, Massachusetts. Responsible for preparation of a full solid waste site assessment (combined initial, comprehensive and corrective action alternative analysis), closure design and permitting for this 27-acre demolition debris landfill.

Project Manager, Closure Assessment and Design, Louis M. Kmito & Son Sanitary Landfill, Randolph, Massachusetts. Responsible for preparation of an initial site assessment, closure design and permitting for this 90-acre municipal solid waste landfill.

Project Engineer, GLSD Ash Disposal Landfill Design, North Andover, Massachusetts. Performed independent review of siting and design of a lined sewage sludge ash landfill. Provided recommendations for deficient areas of design.

Project Engineer, Ravenbrook Demolition Debris Landfill, Carver, Massachusetts. Responsible for construction of a 3+-acre lateral expansion, and design elements of proposed lateral and vertical expansions.

Project Engineer, Foxborough Landfill Cap Evaluation, Foxborough, Massachusetts. Responsible for hydrogeologic modeling using the EPA HELP Model. Also responsible for cap alternative preliminary designs and report preparations.

Project Engineer, Louis M. Kmito Sanitary Landfill, Randolph, Massachusetts. Responsible for closure design and preparation of closure plans. Also prepared conceptual vertical expansion design drawings for use in meetings with town and state agencies.

Project Engineer, Phase I Closure - Ravenbrook Demolition Debris Landfill, Carver, Massachusetts. Responsible for the design of closure and post-closure plans and compliance with 1990 Massachusetts regulatory requirements for closure of a landfill, including preparation of a landfill assessment.

Project Engineer, Existing Facility Permit Application, Bird, Inc. Landfill, Walpole, Massachusetts. Prepared existing facility application and supporting documentation for this 15-acre by-product landfill located within a designated sole source aquifer area.

Project Engineer, Existing Facility Permit Application, Ravenbrook Demolition Debris Landfill, Carver, Massachusetts. Prepared existing facility application and supporting documentation for this 25-acre landfill accepting roughly 250 tons per day of demolition debris.

Staff Engineer, BFI Chicopee Landfill Closure Study, Chicopee, Massachusetts. Responsible for conducting field investigations and sampling.

SOIL AND GROUNDWATER CONTAMINATION

Principal-in-Charge, Ward Hill Substation Precharacterization Report, Haverhill, Massachusetts. Performed subsurface investigation and collected composite soil samples for precharacterization testing at GZA's Environmental Chemical Laboratory. Summarized results in data report.

Geotechnical Consultant, Immediate Response Action Plan, Fitchburg, Massachusetts. Responsible for geotechnical evaluation and conceptual design associated with riverbank stabilization and capping of arsenic-contaminated soils.

Geotechnical Consultant, Norwood PCB Site, Norwood, Massachusetts. Responsible for geotechnical analysis, design and construction recommendations for capping of PCB contaminated soils and building debris. The design served to isolate the debris including a large amount of contaminated wood chips while preparing the site for future commercial development.

Staff Engineer, Yaworski Superfund Site, Canterbury, Connecticut. Responsible for the construction and monitoring of a large-scale test fill to determine the settlement behavior of construction debris and hazardous waste sludge. Also responsible for closure design including hydrogeologic, stability, erosion control and drainage analyses.

Project Engineer, Gas Barrier Design and Construction, Walmart Store, Auburn, Maine. Responsible for "fast-track" design and construction QA/QC of a subslab passive gas barrier for a 110,000-square-foot retail store constructed next to an existing municipal solid waste landfill. The gas barrier system consisted of a network of remotely sampled gas monitoring probes and small-diameter wells, and a 40-mil HDPE membrane barrier.

Project Manager, Groundwater Monitoring, Ravenbrook Demolition Debris Landfill, Carver, Massachusetts. Responsible for the development of a computerized database for groundwater quality monitoring of over 50 wells sampled quarterly initially and then reduced to a frequency of bi-annually for a period of four years.

Project Manager, Bird, Inc. Landfill, Walpole, Massachusetts. Conducted or supervised bi-monthly inspections and bi-annual groundwater quality monitoring studies (from 1992 to present) of Bird's by-product landfill and prepared associated documentation for submission to regulatory agencies.

Project Engineer, Varian Vacuum Products, Lexington, Massachusetts. Developed and executed cost effective soil sampling program. Coordinated phased-chemical analysis program which conclusively characterized subsurface conditions at a minimal cost and turnaround time.

DAMS AND SMALL HYDROPOWER

Project Manager, Geotechnical IDIQ Contract with the North Atlantic Division of the USACE. Currently managing this Contract for the US Army Corps of Engineers (USACE) North Atlantic Division (NAD) through the New England District in Concord, Massachusetts. To date have performed geological and geotechnical investigation and instrumentation installation at several New England Flood Control Dams. Most of the dams consist of zoned-earth embankments used for flood Control. The Contract has also included geophysical investigation and survey. Mr. Bjarngard is responsible planning, coordination with USACE and subcontractors, supervision of field investigations and geotechnical report preparation as well as Health and Safety and overall project Quality Control.

Principal-In-Charge, Periodic Inspection for Various Flood Protection Systems in New England. This project included Periodic Inspections (PIs) of 21 Flood Control Systems for the US Army Corps of Engineers (USACE) under subcontract to Watermark. The systems were typically comprised of multiple components such as earth embankments, concrete flood walls, culverts, tunnels, closure structures and pumping stations. Inspections were performed using USACE's Levee Inspection System (LIS). Mr. Bjarngard had overall responsibility for GZA's inspection and report preparation for the 10 GZA systems. In addition, Mr. Bjarngard

served as Team Leader or Independent Technical Reviewer (ITR) for GZA's systems and provided ITR for the 11 Systems inspected by Watermark.

Geotechnical Principal-In-Charge, Chicopee Levee Accreditation, Chicopee, Massachusetts. GZA successfully accredited four independent flood control systems consisting of over 25,000 linear feet of earthen levee, 7,500 feet of concrete floodwall, eight pump stations and three closure structures on a fast track basis. Mr. Bjarngard was responsible for geotechnical aspects of this work which included: 1) An extensive subsurface investigation program consisting of 79 test borings up to 125 feet in depth, test pits and geotechnical laboratory testing; 2) detailed seepage, slope stability and settlement analysis of earthen structures; 3) development of geotechnical recommendations for flood wall and appurtenant structures and; 4) report preparation.

Principal-in-Charge, Replacement of the Morey's Bridge Dam in Taunton, Massachusetts. Responsible for the design, permitting and preparation of contract plans and specifications required for the construction of a new earthen embankment and concrete dam. Features of the new dam inlcude the use of secant-pile training walls which also served as abutments for the new Bay Street Bridge, a fish ladder, eel passage a crest gate and low level outlets and a large Ogee shaped spillway. Challenges of the project included sequenced water control during construction and piggy backing with the Massachusetts Department of Transportation's (MassDOT) integrated new bridge which is being constructed under MassDOT's Accelerated Bridge Program. Mr. Bjarngard is also responsible for geotechnical engineering associated with the bridge foundation and construction phase consulting for MassDOT and the Dam owner the Massachusetts Department of Conservation (DCR).

Principal-in-Charge, Phase II Dam Safety Investigation at 5 High Hazard Dams in Northampton, Massachusetts. Ongoing Phase II Dam Safety Investigations at 5 dams ranging from 20 to over 100-foot high zoned earth embankments. Deficiencies at the dams include inadequate spillway capacity, seepage, potential slope instability and sink holes on embankments, concrete and masonry deterioration and movement. GZA's work includes design and execution of a subsurface exploration program consisting of test borings and piezometer and observation well installation. Wetlands delineation and subcontracting of topographical survey. Also performing slope stability, gravity dam stability, seepage, and hydrology and hydraulic calculations in order to develop repair alternatives.

Principal-in-Charge, Dam Removal Permitting and Design at Upper Roberts Meadow Dam, Northampton, Massachusetts. Permitting and Design of proposed Dam Removal Project at a 30-foot high archared masonry high hazard dam in poor condition. Major deficiencies at the dam include sink hole on embankments, masonry deterioration and movement and inadequate spillway capacity. GZA's work included repair and removal alternatives analysis. Major issues include public initial opposition to the removal and the technical challenge associated with a large amount of sediment impounded by the existing dam. .

Principal-in-Charge, Phase II Dam Safety Investigation, Remedial Design and Repairs at Otis Reservoir Dam, Massachusetts. Phase II Dam Safety Investigation at a 30-foot high high-hazard dam in poor condition. The high hazard dam consists of an earthen dam with a downstream stone masonry wall. Major deficiencies at the dam include masonry deterioration, possible crest settlement and inadequate spillway capacity. GZA's work includes design and execution of a subsurface exploration program consisting of test borings and piezometer and observation well installation. Wetlands delineation, and subcontracting of topographical survey to create base map for design and construction of final repairs. Also performing slope stability, seepage, and hydrology and hydraulic calculations in order to develop repair alternatives. Prepared permits and final design and bid documents for the required repairs. Supervised construction monitoring and as-built documentation of repairs which consisted of spillway enlargement, a heated crest gate reconstruction of the low-level outlet, earth embankment and masonry wall stabilization, installation of a toe drain system and a remote monitoring and gate operation system.

Principal-In-Charge, Rockwell Pond Dam Repair, Leominster, Massachusetts. GZA has undertaken dam investigation, permitting and repair engineering services on behalf of the City of Leominster at Rockwell Pond Dam. The dam is a concrete and stone masonry gravity structure located below on active local roadway. Mr.

Bjarngard was responsible for the repair design, which includes subsurface explorations, hydrologic and hydraulic analyses, stability analyses, structural and civil engineering design, and permitting coordination. The repairs consisted of a post-tension anchored concrete buttress to stabilize the primary spillway as well as concrete-capped sheetpile cut-off/parapet wall to raise the crest of the right embankment. Mr. Bjarngard was also responsible for supervision of construction monitoring and as-built documentation.

Principal-in-Charge, Investigations, Design and Repairs of the Blatz Pond Dam in Kent, Connecticut. Performed subsurface investigations and topographic survey as well as geotechnical and Hydrologic and Hydraulic analysis required for the permitting and design of repairs to this 15-foot high privately owned dam. Deficiencies included inadequate spillway capacity, embankment seepage, stability and erosion. Prepared bid documents (plans and specifications) for the construction of a gabion wall supported downstream filtered embankment and the modification of the primary spillway and reconstruction of an enlarged rip rap-lined secondary spillway. Responsible for supervision of construction monitoring and as-built documentation.

Principal-in-Charge, Phase II Dam Safety Investigation and Remedial Design at Ashby Reservoir Dam, Ashby, Massachusetts. Phase II Dam Safety Investigation at a 40-foot high earthen high hazard dam in poor condition. Major deficiencies at the dam include sink hole on crest, cloudy discharge at toe, inadequate spillway capacity and general deterioration. GZA's work includes design and execution of a subsurface exploration program consisting of test borings and piezometer and observation well installation. Wetlands delineation, topographical survey, camera survey of outlet pipe. Also performing slope stability, seepage, and hydrology and hydraulic calculations in order to develop repair alternatives. Upon selection of remedial alternatives will prepare permit drawings and permits and final design and bid documents for the required repairs.

Principal-in-Charge, Follow-up Inspections for High Hazard, Unsafe and Poor Condition Dams in Massachusetts. Conducted 6-month follow-up inspections for the Office of Dam Safety's highest-priority dams located throughout Massachusetts. Led inspection team, prepared reports and recommendations.

Principal-in-Charge, First Fill Monitoring of Clam Lake Dam, Sandisfield, Massachusetts. Conducted periodic visual inspections and survey and flow monitoring at this 100-foot high flood control dam.

Principal-in-Charge, Phase I Dam Safety Inspections and EAPs for 7 dams owned by the City of Northampton, Massachusetts. Led team of engineers in conducting Phase I dam safety inspections and preparing Emergency Action Plans (EAPs) for 7 dams owned and operated by the City of Northampton. The dams generally consisted of 20 to 80 foot high, earthen embankment dams with stone masonry or concrete spillways. Inundation maps of flooding predicted by DAMBRK modeling were produced on color Orthophoto imagery as well as on topographic maps. The EAPs also included notification plans, surveillance plans, emergency measures, and plans for training, testing and annual review.

Principal-in-Charge, Phase I Dam Safety Inspections and EAPs for 7 dams owned by the City of Leominster, Massachusetts. Led team of engineers in conducting Phase I dam safety inspections and preparing Emergency Action Plans (EAPs) for 14 dams owned and operated by the City of Leominster. The dams generally consisted of 15 to 60 foot high, earthen embankment dams with stone masonry or concrete spillways. Inundation maps of flooding predicted by DAMBRK modeling were produced on color Orthophoto imagery as well as on topographic maps. The EAPs also included notification plans, surveillance plans, emergency measures, and plans for training, testing and annual review.

Principal-in-Charge, Inspection and Evaluation of Repairs for Two Dams and Two Dikes at the Ames Pond Corporate Center, Tewksbury, Massachusetts. Performed safety inspections, performed technical analyses, developed rehabilitation recommendations and cost-estimates in support of real estate transaction.

Project Manager/Engineer, Investigation of New York City's Catskill and Delaware District Dams. Performed detailed safety inspections of, and developed investigation/instrumentation contract for, six of the City's largest water supply reservoirs, located in the Catskill and Delaware River watersheds. Mr. Bjarngard served as GZA's Project Engineer/Manager for the dam safety inspections and the development and execution of the multi-million dollar investigation/instrumentation installation contract for the dams, which are up to 250 feet high and 4,500 feet long, and miles of earth dikes up to 200 feet high. The inspections consisted of

topographic and bathymetric survey, underwater inspection, and visual inspection (including rope-accessed inspection). The investigation/instrumentation contract consists of test borings, test pits, geophysical and video camera surveys, and the installation of multi-level piezometers within and below earth embankment and gravity dams. Drilling and piezometer instrumentation includes over 20,000 linear feet of drilling and coring and the installation of over 142 vibrating wire piezometers to depths of up to approximately 350 feet. Mr. Bjarngard is also managed GZA's evaluation phase of this work that included static and seismic stability of earth embankments and concrete gravity sections; seepage analysis; drainage feasibility; and an extensive laboratory-testing program on soil, rock and concrete. Mr. Bjarngard was also responsible for the preparation of reports summarizing results of field investigations, laboratory-testing, technical analyses and conceptual rehabilitation recommendations.

Project Manager, Gilboa Dam Interim Spillway Repair Project, Gilboa, New York. This was an emergency project to repair large erosion holes at the toe of the masonry overflow portion of Gilboa Dam. Performed survey to assess extent of damage and provide basis for design. Designed and prepared construction contract for repairs, including mass concrete filling of major erosion holes at toe of dam and reinforced concrete channel paving, within a one month period. Applied for and rapidly secured expedited permits from NYDEC for execution of work. Provided resident engineering services for the 1.2 million dollar repair contract. Entire project (design through construction) was completed within 4 months and within budget.

Project Manager, Geotechnical Investigation for Bluff Stabilization on the Banks of the St. Lawrence River in Massena, New York. Prepared contract documents for subsurface exploration program on the shoreline and bluff at the south bank of the St. Lawrence River which is experiencing on-going erosion. Provided field observation, and supervised field-testing and sample collection. Performed laboratory testing and prepared geotechnical data report.

Principal-in-Charge, Phase 3, 4 and 5 Repairs to Willow Mill Dam, Lee, Massachusetts. Provided design and construction engineering for the stabilization of a run-of-the-river spillway using grouted tie-down anchors and masonry restoration. Provided resident engineering services and prepared construction documentation report upon successful conclusion of this FERC regulated project.

Principal-in-Charge, Dam Safety Engineering for the Lake Ladore Dam in Waymart, Pennsylvania. Performed dam safety inspection, hydrologic and hydraulic analysis, preliminary security assessment and developed emergency action plan for this high-hazard earth embankment and concrete gravity dam. Also performed Phase II Investigations including test borings conduit camera and underwater survey and permitting required to develop rehabilitation plans and specifications. Improvements included downstream concrete buttressing, a new low-level outlet system, spillway improvements and overtopping protection including the use of Articulated Concrete Block. Also responsible for supervision of construction monitoring and as-built documentation.

Principal-in-Charge, Repairs to the Blue Lake Dam in North Stonington, Connecticut. Performed dam safety inspection, subsurface investigations, and hydrologic/hydraulic analysis. Developed cost-effective, rapidly constructible design to increase spillway capacity, decrease seepage through the dam, and stabilize embankment slopes. Provided construction observation/documentation services.

Principal-in-Charge, Exploratory Grouting and Remedial Repairs to Lovell Pond Dam in Fitchburg, Massachusetts. Developed bid documents and provided bid-phase services for a remedial grouting program to address potential internal erosion at this 80 foot high earth-fill embankment dam. Remedial repairs also included filtered blanket drains along the downstream toe and abutment, downstream slope flatirons, repair of deteriorate concrete spillway and supplemental instrumentation. Provided resident engineering services and prepared detailed as-built records for the project.

Senior Dam Safety Engineer, Emergency Consulting at the Spicket River Dam in Methuen, Massachusetts. Immediate mobilization to the site to provide emergency dam engineering consulting services to the Massachusetts DCR Office of Dam Safety. Evaluated the stability of this 120 long 20-foot high run-of-the-river stone masonry dam during sever flooding which occurred in May of 2006 after a week long period of heavy rainfall which resulted in approximately 1 foot of rainfall. Supervised hydraulic analyses for hypothetical

Dam Breach and flash board failure to evaluate inundation extent downstream. Reported directly to Chief of Dam Safety and coordinated on site with Emergency personnel, the dam owner, FERC and other State and Municipal personnel. Provided follow up inspection, documentation and recommendations until the emergency condition was over.

Senior Dam Safety Engineer/Team Leader, Emergency Inspections of High Hazard Dams in Middlesex County, Massachusetts. Immediate mobilization of multi-engineer inspection teams to conduct emergency inspection of high hazard dams as ordered by Governor Mitt Romney in October of 2005 following back-to-back storms resulting in severe flooding and potential dam failure. Led inspection team conducting inspection of 12 high hazard dams over a period of 48 hours. Also provided follow-up visits and emergency recommendations for two high hazard dams in need of immediate action.

Principal-in-Charge, Emergency Action Plan, Turner Dam in Pepperell, Massachusetts. Oversaw the development of a comprehensive EAP for this high-hazard dam. The EAP included Dam-break modeling and inundation mapping and provided the dam owner and local emergency personnel with pre-planned procedures in case of an uncontrolled release at the dam.

Principal-in-Charge, Dam Safety Engineering and Dam Removal Design and Permitting for two Dams in Rochester, New Hampshire. Performed dam safety inspection, subsurface investigations, and hydrologic/hydraulic analysis for feasibility evaluation of repairing or breaching two earthen dams. Performed final design and permitting and repaired construction drawings and specifications for breaching of the two structures. Will provided construction observation/documentation services.

Principal-in-Charge, Sudbury Reservoir Dam Stone Masonry Spillway Inspection and Maintenance, Southborough, Massachusetts. Inspected existing masonry and cleared weap holes using rope-accessed methods on this 60-foot high stone-masonry spillway. Developed detailed record of masonry condition and prepared inspection report documenting conditions and providing recommendations.

Principal-in-Charge. Dam Safety Inspection of 13 Water Supply Dams, Fitchburg, Massachusetts. Ongoing dam safety inspection program for the City of Fitchburg's water supply dams. The dams generally consist of earth embankment structures which range from 20 to 80 feet in height.

Principal-in-Charge, Phase I Dam Safety Inspections and EAPs for 14 dams owned by the City of Fitchburg, Massachusetts. Led team of engineers in conducting Phase I dam safety inspections and preparing Emergency Action Plans (EAPs) for 14 dams owned and operated by the City of Fitchburg. The dams generally consisted of 10 to 90 foot high, earthen embankment dams with stone masonry or concrete spillways. Inundation maps of flooding predicted by DAMBRK modeling were produced on color Orthophoto imagery as well as on topographic maps. The EAPs also included notification plans, surveillance plans, emergency measures, and plans for training, testing and annual review.

Principal-in-Charge, Sink Hole Evaluation at Two New York Power Authority Facilities. Performed subsurface investigations including test borings, test pits and geophysical and laboratory testing to evaluate the cause for observed sink holes. Performed geotechnical analysis and provided recommendations and conclusions in geotechnical reports.

Principal-in-Charge, Dam Safety Inspection of the Fox River Paper Company Dam in Great Barrington, Massachusetts. Performed safety inspections, performed technical analyses, developed conceptual rehabilitation recommendations and cost-estimates. Performed detailed stability analyses in accordance with FERC and US Army Corps of Engineers Standards.

Principal-in-Charge, Small-Hydro Pre-Feasibility Studies and Grant Applications, Massachusetts. Performed pre-feasibility investigations for several potential small hydroelectric projects at existing Massachusetts dams. Assisted Owners in securing grants from the Massachusetts Technology Collaborative (MTC) for full feasibility studies.

Principal-in-Charge, Small-Hydro Feasibility Studies and Grant Applications, Massachusetts. Performed feasibility investigations for several potential small hydroelectric projects at existing Massachusetts dams.

Assisted 3 Owners in filing for Final Design and Construction Grants from the Massachusetts Technology Collaborative (MTC). All three of these grants have been awarded for the sum of approximately $500,000.

Principal-in-Charge, Clock Tower Place Hydroelectric Project Phase 1 Design, Maynard, Massachusetts. Following the completion of the feasibility study and construction grant application by GZA, the Owner was awarded over $500,000 in grant funds to design and construct the proposed hydroelectric project. GZA designed and oversaw the construction of a 300kW cross-flow turbine installation at this facility. GZA also prepared technical exhibits for FERC filings for this project.

Principal-in-Charge, Museum of Science Hydrokinetic Power Resource Assessment, Boston, Massachusetts. Assessed the potential for renewable energy generation using hydrokinetic (flowing water) technology at the Museum of Science on the Charles River in Boston. Worked with the Museum to generate interest in the project and then completed a preliminary resource assessment designed to investigate available technologies and estimate the power production potential at the site. Flow velocity measurements made be GZA ultimately led to the conclusion that the project would not produce sufficient power to warrant a full feasibility study.

Principal-in-Charge, Massachusetts DCR Statewide Hydropower Resource Assessment. As part of an overall project to provide the Massachusetts Department of Conservation and Recreation (DCR) Dam Maintenance Program with input on the prioritization of actions in their overall dam inventory, GZA is making conceptual estimates of hydropower potential at more than 250 DCR-owned dams in Massachusetts. Estimates of power and energy production are based on simplified methodologies using 25 and 50 percent exceedence flows, respectively. Flows are generated by analysis of all real-time USGS streamflow gages in Massachusetts and spatial analysis of dam position with respect to gage locations. Gross design heads are being estimated based on information contained in the dam safety database and in Phase I dam safety reports provided by DCR.

Project Manager, Willow Mill Dam, South Lee, Massachusetts. Responsible for the evaluation of a run-of-the-river masonry mill dam and development of conceptual alternatives for needed repairs. Services included an exploration program consisting of borings drilled through the dam from a floating barge in the impoundment, field permeability testing and installation of vibrating wire piezometers. Performed static and seismic stability analysis for gravity section as per FERC requirements. Developed conceptual rehabilitation design and cost estimates. Developed and submitted to client, a multi-year plan for implementing rehabilitation program.

Project Manager, Inspection and Evaluation of Dam Safety Program for 28 Privately-Owned Dams, Western Connecticut and Southeastern New York. Managed the safety inspections of 28 water storage and supply dams for a private utility client. They range in size and type from large, high hazard concrete gravity and earth embankment dams more than 100 feet high and 1,000 feet long, to small, low hazard stone masonry and/or earth dams less than 10 feet high. The dams were constructed between about 1890 and 1966, with most constructed before 1935. In addition to performing field inspections, Mr. Bjarngard prepared a Summary Report, which included a tabular summary of the condition of the dams, as well as maintenance, repair and further investigation recommendations. Activities were prioritized based on condition the dam, hazard potential and reservoir use.

Project Manager, Structural Inspection and Evaluation of 6 Concrete Gravity Dams, Western Connecticut. Managed the structural inspections of six concrete gravity dams owned by a private utility client. The dams are up to 120 feet high and 1,000 feet long, and were constructed between about 1905 to 1941. Field investigations included rope-accessed visual inspection of surficial concrete by Mr. Bjarngard, underwater inspection, coring and concrete testing. Separate summary reports were prepared for each structure that presented the results of the investigations and recommendations for maintenance, repairs and further investigations.

Project Manager, Inspection and Evaluation of Dam Safety Program for 86 Dams, Commonwealth of Massachusetts Metropolitan District Commission. Managed the safety inspections of over 86 MDC Division of Watershed Management dams or dikes ranging in size and type from large, high hazard concrete stone masonry and earth embankment dams more than 50 feet high and 1,500 feet long, to small, low hazard stone

masonry and/or earth dams less than 10 feet high. Mr. Bjarngard performed visual inspection of each of these structures and prepared a Summary Report that included a tabular summary of the condition of the dams, maintenance, repair and further investigation recommendations. Activities were prioritized based on condition the dam, hazard potential and reservoir use.

Project Manager, Sudbury Reservoir Dam, Final Design of Remedial Repairs, Southborough, Massachusetts. Responsible for geotechnical analysis and design for remedial repairs to this 100-year-old stone masonry/earth embankment dam. Design components included repointing of existing masonry, a comprehensive instrumentation program, installation of a drainage blanket and relief well/toe drain system, excavation and replacement of unsuitable soils, and miscellaneous site improvements. Prepared project specifications and construction drawings. Also managed underwater survey program that was accomplished by a team of three GZA engineers.

Project Manager, Goodwin Dam, Colbrook/Hartland, Connecticut. Managed FERC Dam Safety Inspection for this 120-foot-high, zoned earth dam. Also developed recommendations, specifications and drawings for an upgrade of the existing instrumentation.

Project Manager, Wachusett Reservoir Dam Underwater Inspection, Clinton, Massachusetts. Managed underwater survey program that was accomplished by a team of three GZA divers.

Project Manager/Engineer, Fletcher Pond Dam, Westford, Massachusetts. Performed an underwater engineering inspection and coordinated a video camera survey of outlet pipes and gate seals. The objective of the work was to establish the presence and condition of trash racks at the pipe inlets, and obtain information relating to the internal condition of the pipes. Provided design and maintenance recommendations.

Project Engineer, Rainbow Pond Dam, Walpole, Massachusetts. Performed an underwater engineering inspection of upstream face of dam and spillway.

Project Engineer, North Dike Seismic Stability Analysis, Wachusett Dam, Clinton, Massachusetts. Performed seismic stability analyses on the embankments and their foundations using Seed's Standard Penetration Resistance Method to determine liquefaction potential, triaxial tests to determine shear strengths and STABL5 to determine slope stability. Provided recommendations to improve seismic stability which minimized the impacts to reservoir operation. Later as Project Manager developed final design and prepared construction specifications and drawings.

Project Engineer, Expedient Repairs to Rising Paper Company Dam, Housatonic, Massachusetts. Administrated contract, performed stability and other analyses, supervised exploration and instrumentation program as well as resident engineer on site during construction.

Project Manager, Engineering Evaluation and Conceptual Design of Repairs to a Large Concrete Gravity Dam in Southern Connecticut. Performed engineering analyses and developed conceptual design and cost estimates for the repair of a 60-foot-high concrete gravity dam. The design consisted of reconstruction of reinforced cast-in-place concrete spillway training walls, surficial concrete repair and sealing, reconstruction of handrail.

Project Manager, Emergency Response and Safety Evaluation of the Bluehills Reservoir Dam, Quincy Massachusetts. Served as team member providing emergency engineering services to address excessive seepage observed through the dam during a heavy rainfall event. Managed subsequent investigations, engineering analyses, conceptual design and feasibility evaluation for safety improvements to this intermediate sized reinforced earth dam. The Safety evaluation included underwater inspection and video survey, test pits and test borings, hydrologic and hydraulic evaluation, camera survey of outlet and drainage pipes and topographic survey. GZA formulated an opinion as to the cause of the observed seepage and developed and recommended conceptual design/operating alternatives and associated costs to address the condition.

EXPERT WITNESS

Principal-in-Charge/Expert Witness, Jackson Summit Reservoir Spillway, Gloversville, New York. Performed forensic engineering services to evaluate the cause of internal erosion failure of primary spillway. Provided expert testimony.

Principal-in-Charge/Expert Witness, Hadlock Pond Dam Failure, Fort Ann, New York. Performing forensic engineering to provide expert witness services relative to the cause of internal erosion failure of this earthen dam.

Principal-in-Charge, UMASS Dartmouth Athletic Fields, Dartmouth, Massachusetts. Provided geotechnical evaluation and consultation in forensic evaluation of soccer, football and softball fields with alleged drainage problems. Services included review of contract documentation, field explorations, laboratory testing and cost estimating.

Principal-in-Charge, Confidential Landfill Site. Provided geotechnical evaluation and expert witness services in a forensic evaluation of a solid waste landfill. Provided technical expertise regarding settlement, fill density, filling rates and standard practice.

In-House Consultant Reviewer, Confidential Landfill Site. Provided internal Quality Assurance review and technical assistance to expert witnesses evaluating instability of a final cover system of a large solid waste landfill.

Professional Activities

American Society of Civil Engineers
Boston Society of Civil Engineers
U.S. Society on Dams
Association of State Dam Safety Officials
American Concrete Institute
National Hydropower Association
Northeast Sustainable Energy Association

Publications

Hughes, Edward and Bjarngard, Anders, Thirteen Bad Apples and what Massachusetts is Doing with Them, Presented at Dam Safety 2008, The annual Conference of the Association of State Dam Safety Officials (ASDSO) in Indian Wells, California, September 7-11, 2008

Levergood, Grace and Bjarngard, Anders, New Hampshire's Innovative Approach to Dam Removals. Presented at Dam Safety 2006, The annual Conference of the Association of State Dam Safety Officials (ASDSO) in Boston September 10-14, 2006 and Published in the Fall 2007 Journal of the ASDSO.

Bjarngard, A.B., Hover, W.H. Exploratory Grouting Program to Improve the Lovell Pond Dam. Presented at the 26th USSD Annual Meeting and Conference, San Antonio, Texas, on May 1-5, 2006

Cox, C.W., Bjarngard, A.B., Hover, W.H. Investigations of Rock Foundation and Cyclopean Concrete at Gilboa Dam. *Proceedings of Soil/Rock America Conference*. 2003

Hover, W.H., Bjarngard, A.B., Cox, C.W., Costa, P. Stability Analysis and Interim Safety Improvements, Gilboa Dam Spillway, Schoharie Reservoir, New York. *Proceedings of the USSD National Conference*, 2003.

Hover, W, Bjarngard, A., and K Flood, "Inspection and Treatment of Surficial Conditions of Several Concrete Gravity Dams" Presented at the Twentieth U.S. Committee on Large Dams (USCOLD) Annual Meeting and Lecture. Seattle, Washington. July 10-14, 2000.

Bjarngard, A., and L. Edgers, "Settlement of Municipal Solid Waste Landfills." Presented at the Thirteenth Annual Madison Waste Conference. Department of Engineering Professional Development, University of Wisconsin-Madison. September 19 and 20, 1990.

Bjarngard, A., Thesis - "The Compression Characteristics of MSW Landfills." Tufts University, 1989.

Presentations

BSCES GeoInstitute "Dam Safety: From Big to Small" January 26, 2006

Guest Lecturer: Dam Engineering (2006) and Geotechnical Design with GeoSynthetics (1995) for a graduate level course in Soil Engineering, University of Massachusetts, Lowell, Massachusetts

Guest Lecturer: Central Artery/Tunnel – I90/Logan Airport Interchange, Foundation Design and Construction, graduate level foundation design class, Tufts University, Medford, Massachusetts, November 2002.

Guest Lecturer: Dam Engineering for undergraduate soil mechanics class, Tufts University, Medford, Massachusetts, March 2006.

William R. Norman, P.G., L.S.P.
Principal

RESUME

Education

B.S., 1974, Geology, Bridgewater State College
M.S., 1982, Geology (Concentration in Hydrogeology), Western Michigan University

Professional Registrations

1993, Licensed Site Professional, Massachusetts, 8945
1996, Professional Geologist, Wisconsin, 792
2002, Professional Geologist, New Hampshire, 74

Areas of Specialization

Massachusetts Contingency Plan & MGL 21E Studies
Licensed Site Professional Services
Remedial Investigations/Feasibility Studies
Manufactured Gas Plant Evaluations
Industrial Site Evaluations

Summary of Experience

Mr. Norman is responsible for technical oversight, project management, and QA/QC on environmental assessment and groundwater related projects. He also serves as a company-wide technical advisor on major environmental projects. He has field and project management experience in the areas of Remedial Investigations/Feasibility Studies (RI/FS), industrial site assessments, hydrogeologic evaluations of landfill sites, Massachusetts General Law (MGL) Chapter 21E assessments, Massachusetts Contingency Plan (MCP) evaluations, underground storage tank assessments, and groundwater supply development projects. Mr. Norman has authored numerous papers dealing with techniques for assessing contaminated sites, case histories of hazardous waste site investigations and development of models for assessing risks posed by underground storage tanks. He has provided expert testimony for private and public agency clients. Relevant project experience includes:

Relevant Project Experience

MASSACHUSETTS CONTINGENCY PLAN (MCP) STUDIES

Principal-in-Charge, Environmental Remediation Program, Massachusetts Port Authority, Boston, Massachusetts. Project involved a multitude of environmental services under the Massachusetts Contingency Plan (MCP), including "up front" activities such as Immediate Response Activities (IRAs), Utility Related Abatement Measures (URAMs), Release Abatement Measures (RAMs), Phase I's and II's, as well as "back-end" MCP activities such as Phase III's, IV's and V's. The work resulted in the closure Response Action Outcomes (RAOs) for nine disposal sites.

Principal-In-Charge and LSP of Record, Phase I, II, III and IV Studies, Confidential Client, Waltham, Massachusetts. Serving as PIC and LSP of Record of a former facility where a release of trichloroethylene (TCE) has impacted groundwater in bedrock. Assessment activities included a soil gas survey, a geophysical survey, fracture trace analysis, shallow soil borings, deep (> 200 feet) bedrock borings with extraction packer testing and a long-term pump test to evaluate the feasibility of containing the impacted groundwater on the property. A groundwater pump and treat system was installed to intercept VOC impacted groundwater. The site is currently in Remedy Operation Status (ROS) under the MCP.

Project Manager, Hazardous Waste Abatement Services, Massachusetts Port Authority, Boston, Massachusetts. Project involved environmental consulting services for hazardous waste site investigations and remediation pursuant to MGL Chapter 21E and the Massachusetts Contingency Plan (MCP) at Logan International Airport and MASSPORT's Maritime Facilities. Projects included pre-characterizations of areas to be involved in future construction activities, air quality surveys, Phase I investigations, evaluation of soil and groundwater quality in the vicinity of subsurface fuel distribution lines, and UST removals and soil characterizations.

Principal-in-Charge, Former NIKE Missile Site, Needham, Massachusetts. Overall project responsibility for an environmental assessment of a former NIKE Missile site where the Town of Needham was considering development of the site. The assessment involved geophysical surveys, subsurface investigations and testing, UST removals, test pitting and remediation of lead impacted soil at a firing range. Project involved presentations at public meetings and coordination with multiple town boards.

Project Manager, Phase I Site Investigations, Massachusetts Port Authority, Boston, Massachusetts. Provided technical oversight, project management and LSP services for Phase I Investigations of 30 sites at Logan International Airport in East Boston. Projects involved evaluating the nature and extent of known or suspected contaminated source areas at the airport and evaluating contaminant migration pathways. Response Action Outcomes (ROAs) were achieved at 12 sites.

Associate-in-Charge, Confidential Industrial Client, Southeastern Massachusetts. Phase II investigation focusing on evaluating the source and extent of volatile organic compounds in groundwater and potential impacts to a municipal groundwater supply.

Associate-in-Charge, Right-of-Way Assessment and Remediation Services, Central Artery (I-93)/Third Harbor Tunnel (I-90), Boston, Massachusetts. Overall project responsibility for technical oversight and technical quality control of multiple property site assessments located on the proposed right-of-way. Individual site assessments focused on identifying whether or not a past release of oil or hazardous waste had occurred.

Associate-in-Charge, Kerr Mill Site, Fall River, Massachusetts. Provided technical oversight and review of a Phase II assessment conducted at a former textile mill complex where volatile organic compounds and oils impacted groundwater and soil quality. Assisted in conceptual design of groundwater recovery and treatment and soil gas extraction systems.

Associate-in-Charge, Confidential Industrial Client, Northeastern Massachusetts. Provided technical oversight and review of a Phase II assessment conducted at an industrial site where releases of volatile organic compounds have threatened municipal groundwater supplies.

Associate-in-Charge, Confidential Client, Cambridge, Massachusetts. Provided technical oversight and review of a Phase II study conducted at a metal stamping facility where volatile organics and oils had contaminated soil and groundwater. Provided oversight for an extensive field exploratory program to define the nature and extent of contamination.

Associate-in-Charge, Polaroid Site, Waltham, Massachusetts. Coordinated and provided technical oversight of a hydrogeologic assessment and Short Term Measure (STM) conducted at this site where a release of butanol impacted soil and groundwater quality.

Associate-in-Charge, Berdon Plaza Site, Fairhaven, Massachusetts. Provided technical oversight and coordinated a Phase II study of a site where groundwater and soil had been impacted by gasoline and dry cleaning solvent. Coordinated assessment activities which included a soil gas survey, monitoring well installation and sampling and evaluation of the impact that subsurface utilities had on contaminant migration.

Associate-in-Charge, Phase I Assessments, Various Sites. Mr. Norman has provided technical oversight and input for over 30 Phase I - Limited Site Investigations conducted pursuant to the Massachusetts Contingency Plan (MCP).

Associate-in-Charge, Massachusetts General Law, Chapter 21E (MGL 21E) Site Assessments. During his career, Mr. Norman has conducted, managed, or provided technical oversight on over 200 MGL 21E assessments of properties in Massachusetts. He has provided review of over 50 assessment reports of sites throughout the United States for attorneys and banks.

REMEDIAL INVESTIGATIONS/FEASIBILITY STUDIES

Remedial Investigation/Feasibility Studies. Mr. Norman has served as Project Manager, Technical Advisor, or Principal-in-Charge on the following RI/FS projects: Tansitor Electronics, Bennington, Vermont; Willow Drum Site, New Boston, Michigan; Blue Lake Site, Indianapolis, Indiana; Baird & McGuire, Holbrook,

Massachusetts; Stamina Mills, North Smithfield, Rhode Island; Pine Street Canal, Burlington, Vermont; Kerry Chemical, Hancock, New York; Brewster Wellfield, Brewster, New York; Spring Valley Wellfield, Spring Valley, New York; Hiteman Leather, West Winfield, New York; and Gladding Cordage, South Otselic, New York.

Associate-in-Charge, Tansitor Electronics, Inc., Bennington, Vermont. Managed RI/FS of industrial property where volatile organics had been disposed of into an unlined area. Investigation focused on establishing the extent and fate of groundwater contamination in a multi-aquifer system and the potential for contaminants to impact nearby bedrock water supply wells. Managed a Technical Impracticability (TI) study to demonstrate that a pump and treat option was not feasible. First site in the United States where a TI Waiver was accepted by the U.S. EPA prior to the Record of Decision. Currently serving as the Project Coordinator overseeing long-term groundwater monitoring at the site.

Technical Advisor, National Gas Dehydration Sites, Michigan. Currently serving as technical advisor to one of GZA's Michigan offices relative to assessment and remedial activities at eight sites where dehydration water have impacted soil and groundwater quality. Mr. Norman's involvement has included development and review of investigation and remedial plans, review of technical reports, interpretation of hydrogeologic and analytical data and negotiations with regulators.

Project Reviewer, Willow Drum Site, New Boston, Michigan. Provided technical oversight of an RI conducted at a drum disposal site to evaluate the nature and extent of contamination in environmental media. Field work included geophysic surveys, test pit excavations, soil borings and well installation and sampling and analysis of environmental media.

Project Reviewer, Blue Lake Site, Indianapolis, Indiana. Ongoing RI of a landfill site where foundry sands containing elevated metals and wastewater treatment sludges were landfilled. RI focuses on evaluating the distribution of these wastes and determining the impact on downgradient surface water bodies and production wells.

Project Manager, Baird & McGuire Site, Holbrook, Massachusetts. Managed RI/FS of property and surrounding area where over 100 organic and inorganic chemicals had contaminated soil, groundwater, wetlands, and surface water. Assessment involved soil borings, test pit excavation, well installations, seepage meter installation, and sampling and analysis of environmental media. Evaluated analytical and hydrogeologic data and authored RI/FS report. Participated in development of Emergency Response Action including an interim cap and groundwater recirculation system.

Project Manager, Pine Street Canal Site, Burlington, Vermont. Pre-remedial investigation conducted to determine extent of coal tar wastes at a former coal gasification facility. Assessment included soil borings, sampling and analysis, and determination of hydraulic relationship between site and a shipping canal adjacent to Lake Champlain.

Senior Hydrogeologist, Stamina Mills Site, North Smithfield, Rhode Island. RI/FS conducted on behalf of the Army Corps of Engineers involved overburden and bedrock monitoring well installation, a soil gas survey, test pit excavation, downhole geophysics, surface water and sediment sampling, and a five-day pump test to define the hydraulic relationship between the site and adjacent private bedrock wells. Evaluated remedial alternatives for recovery of VOC-contaminated groundwater from fractured media. Served as an expert witness in court proceedings.

Senior Hydrogeologist, Kerry Chemical Site RI/FS, Hancock, New York. Remedial investigation involved delineating the extent of tar residues from wood distillation processes in soil, groundwater, surface water and sediment. Investigation involved surface geophysics, test pitting, monitoring well installation and sampling and analysis of environmental media. Participated in development of remedial alternatives for the Feasibility Study.

Senior Hydrogeologist, Brewster Wellfield Site, Brewster, New York. Remedial investigation focused on identifying the source area(s) of PCE contamination to a municipal water supply wellfield. Investigation involved surface geophysics, test pitting, monitoring well installation, sampling and analysis of environmental media and groundwater modeling. Participated in Feasibility Study process.

Senior Technical Consultant, Spring Valley Wellfield Site, Ramapo, New York. Assessment focused on identifying the source(s) of VOC contamination to a municipal water supply wellfield pumping from a bedrock aquifer. Field investigation involved a soil gas survey, downhole geophysics, soil borings, test pitting, overburden and bedrock monitoring well installation and sampling and analysis of environmental media.

Senior Technical Consultant, Hiteman Leather Company, West Winfield, New York. RI/FS of a property formerly occupied by a leather tanning and processing industry. Property contained sludge lagoons and hide piles. Assessment involved surface geophysics, test pitting, well installation and sampling and analysis of environmental media. Evaluated remedial alternatives.

Senior Technical Consultant, Gladding Cordage Company Site, South Otselic, New York. Remedial investigation involved assessing the nature and extent of VOC contamination originating from a property formerly occupied by a cordage industry and evaluating potential impacts to a downgradient municipal groundwater supply. Participated in design of groundwater recovery system.

Project Manager, Various Candidate NPL Sites. As a former employee of a subcontractor to the U.S. EPA, Mr. Norman was responsible for conducting Preliminary Assessments, Site Investigations and Hazard Ranking System (HRS) scoring for over 100 sites.

FORMER MANUFACTURED GAS PLANTS

Licensed Site Professional (LSP) Services, Former MGP Site, Cambridge, Massachusetts. Served as LSP of record for a Phase II Comprehensive Site Assessment at a former MGP on behalf of Commonwealth Gas Company. The Phase II assessment involved an intensive field exploration and sampling program and a risk characterization to evaluate potential impacts to human health and the environment, which DEP approved.

Licensed Site Professional (LSP) Services, Former MGP Site, Worcester, Massachusetts. Provided LSP services to Commonwealth Gas Company relative to a former MGP site which the Massachusetts Department of Environmental Protection classified as a Tier 1A site under the revised Massachusetts Contingency Plan of October 1993. Services included reviewing DEP files and reports of assessments conducted at the site and performing a DEP Numerical Ranking System (NRS) scoring. The NRS did not indicate that the site classified as a Tier 1A. Meetings were held with the DEP to discuss reclassification of the site and a Major Permit Modification/Tier Classification was prepared and submitted to the DEP, which DEP approved.

Consulting Services, Pine Street Canal Superfund Site, Burlington, Vermont. Contracted by a confidential client to review information relative to the Pine Street Canal site, a former MGP, in order to assess the client's potential liability with respect to gasification wastes and apportionment of response action costs by the EPA. Services included review of historical and site assessment reports, modeling of contaminant distribution and fate, and development of remedial cost estimates.

Environmental Assessment, Former MGP Site, Foxboro, Massachusetts. Contracted by a confidential client who owned industrial property which was the site of a former MGP operated by a major industry in the late 1800s and early 1900s. The MGP supplied gas to the industry and surrounding neighborhood. The objective of the assessment was to evaluate if gasification wastes were present on the property, and if so, the extent of the waste in soil and groundwater and the potential risks which the wastes would pose to human health and the environment.

The investigation identified the nature and extent of gasification wastes at the site. A risk assessment was conducted to evaluate potential impacts to human health and the environment and remedial alternatives for controlling contaminant migration were evaluated.

Site Evaluation, Former Coal Gasification Site, Eastern Massachusetts. Contracted by a developer who intended to construct buildings on a portion of property formerly occupied by a MGP. The evaluation included review of existing technical documents and pertinent correspondence concerning the site, an evaluation of surface and subsurface organic vapor emissions, and sampling and analysis of water from a brook adjacent and downgradient of the site. The objective of the evaluation was to determine the current surface and subsurface

contamination conditions at the site and to evaluate the actual or potential impact of site development on public health, safety and the environment.

Based on the results of the site evaluation, a number of recommendations were made for the planning and implementation of site development. These recommendations included limiting foundation and construction excavations, implementing construction dust control measures and air quality monitoring during construction, providing for adequate ventilation in buildings to minimize accumulation of hazardous vapors, establishment of vegetation cover to minimize direct contact with wastes and site grading to minimize infiltration of precipitation through contaminated areas.

Technical Advisor, Former MGP Site, Bridgeton, New Jersey. Currently serving as technical advisor to one of GZA's New Jersey offices relative to assessment and remedial activities at this former MGP located adjacent to a tidal river. Provided input and review of Scopes of Work and remedial alternatives.

RCRA FACILITY INVESTIGATIONS

Quality Assurance Coordinator/Project Reviewer, Hampshire Chemical Corporation(formerly W.R. Grace and Company), Nashua, New Hampshire. RCRA Facility Investigation (RFI) involving the assessment of the potential impact to soil, groundwater, sediment and surface water of 16 Solid Waste Management Units (SWMUs) at this facility which manufactures organic chemicals. Investigation included a geophysical survey, soil borings and well installations, test pits and sampling and analysis of environmental media. Responsible for surveillance of project activities to help ensure compliance with the RFI Work Plan. Responsible for review of deliverables, conducting performance audits, reviewing analytical data, providing QA reports to the project manager, and developing and initiating preventative and corrective actions.

Technical Reviewer, Columbia Manufacturing Company, Westfield, Massachusetts. Provided technical services to a consulting firm who had conducted a Phase I RFI of a school furniture (and former bicycle) manufacturing facility. Services included review and comment on the Phase I report, addressing EPA's review comments and assistance in developing a Scope of Work for the Phase II RFI.

INDUSTRIAL SITE EVALUATIONS

Project Manager, Kilburn Glass Industries, Norton, Massachusetts. Managed a project involving a hydrogeologic evaluation of a 20-acre site contaminated with TCE and PCE. Evaluation included test pitting in waste disposal areas, overburden and bedrock monitoring well installation and aquifer testing. A groundwater recovery and treatability assessment involving a three-day pump test, groundwater modeling and a pilot treatability test was conducted.

Senior Technical Consultant, Whitney Barrel Company, Woburn, Massachusetts. Provided oversight and technical input for an assessment which focused on establishing the nature and extent of VOC and PAH contamination of property located near Woburn municipal wells G and H. Assessment included subsurface explorations and sampling and analysis of environmental media.

Project Manager, Handy and Harmon Electronics, Attleboro, Massachusetts. Managed a hydrogeologic evaluation of area surrounding a former metals plating waste lagoon to determine if wastes remaining after an incomplete closure had impacted groundwater quality. Provided input for preparation of closure plans.

Project Manager, Parks Corporation, Somerset, Massachusetts. Managed an environmental assessment to determine nature and extent of contamination resulting from improper storage and disposal of paints and solvents. Assessment involved definition of hydrogeologic regime which was complicated by the presence of underground tunnels and utilities and changes in groundwater levels caused by tidal fluctuations.

Project Manager, Seekonk Manufacturing, Seekonk, Massachusetts. Managed a hydrogeologic assessment of area including wetlands and surface water body adjacent to a lagoon formerly used for disposal of metal plating wastes. Assessment focused on establishing relationship between groundwater under lagoon and wetland/surface water and fate of metals in groundwater.

Senior Technical Consultant, Taunton Municipal Lighting Plant, Taunton, Massachusetts. Provided technical oversight of an assessment of lagoons adjacent to Taunton River which received demineralization wastes from fuel processing activities. Investigation focused on establishing impact to Taunton River and involved resistivity and EM surveys, well installation and piezometer/seepage meter assessments.

Project Manager, Former Tannery, Woburn, Massachusetts. Managed assessment of tannery waste disposal areas including hide piles, tanning pits, waste lagoons, trickling filters and plasticizer material storage areas. Evaluation included test pitting, well installation, waste sampling and assessment of impact to wastes to groundwater, surface water and wetlands.

Principal-in-Charge, Confidential Client, Southeastern Massachusetts. Provided technical oversight and management of Phase II assessment of industrial site where volatile organics had threatened a municipal wellfield.

Consultant Reviewer, General Electric site, Massachusetts. Overall project reviewer for field investigation of property and surrounding area where organic and inorganic chemicals had contaminated soil, groundwater and adjacent wetlands.

LANDFILL HYDROGEOLOGIC ASSESSMENTS

Project Reviewer, Montmorency/Oscoda Sanitary Landfill, Montmorency County, Michigan. Hydrogeologic investigation of a 40-acre landfill to evaluate potential impacts to groundwater quality in the vicinity. The investigation included a geophysical survey, soil borings and well installation and sampling and analysis of groundwater. Hydrogeologic and contaminant distribution conditions were evaluated and a Remedial Action Plan (RAP) developed to monitor contaminated groundwater.

Project Reviewer, Gratiot County Landfill, St. Louis, Michigan. Hydrogeologic evaluation of a landfill surrounded by a slurry wall to identify portions of the wall which were leaking. Remedial alternatives including wall repair and hydraulic controls to contain leakage were evaluated and cost estimates developed.

Project Manager, Cohasset Heights Landfill, Cohasset, Massachusetts. Conducted three phases of hydrogeologic assessments to establish hydrologic relationship between the landfill and a water supply reservoir and to support landfill expansion. Represented client at public meetings and provided expert testimony. Evaluated groundwater recovery options to manage leachate.

Project Manager, Pond Street Landfill, Billerica, Massachusetts. Conducted a hydrogeologic assessment to further define limits of contamination in support of an Environmental Impact Report (EIR). Evaluated fate of leachate relative to wetlands and surface water bodies. Conducted pump test to assist in design of a groundwater recovery system.

Project Manager, Attleboro Landfill, Attleboro, Massachusetts. Conducted three phases of hydrogeologic assessments in support of an EIR for landfill expansion. Made presentations before City boards. Provided expert testimony.

Project Manager, Fall River Landfill, Fall River, Massachusetts. Conducted hydrogeologic assessments in support of an EIR for landfill expansion and to establish the relationship between the landfill and the City of Fall River water supply reservoir.

Senior Technical Consultant, Duxbury Demolition Landfill, Duxbury, Massachusetts. Provided technical oversight of a hydrogeologic assessment conducted as part of an EIR to support excavating an existing demolition landfill, lining the landfill area, redepositing debris and continuing operation of the landfill. Assessment included groundwater modeling to establish Zone II areas for three municipal wells in vicinity of the landfill.

Project Manager, GCR Landfill, Peabody, Massachusetts. Conducted two hydrogeologic assessments; one in the vicinity of an existing landfill, the other in a proposed expansion area. Assessment included installation and sampling of piezometers and seepage meters, a resistivity survey and well installation and sampling.

Senior Technical Consultant, Ravenbrook Landfill, Carver, Massachusetts. Provided technical oversight of an investigation that focused on establishing if a concrete polymer material buried in a portion of the landfill was leaching PCE into the groundwater. Assessment involved a soil gas survey, drilling through landfill debris, and installation and sampling of overburden and bedrock wells.

Project Manager, Municipal Landfills in Marshfield, Hingham, Dartmouth, Dennis, West Newbury, and Bridgewater, Massachusetts. Conducted hydrogeologic assessments which included services such as surface geophysics, well installation, groundwater sampling and analysis, groundwater modeling and Zone II delineations of water supply wells.

UNDERGROUND STORAGE TANK ASSESSMENTS--GENERAL

Project Manager, Charter Marketing, New England and New York. Developed and implemented a risk assessment model for prioritizing an investigation and tank replacement program for over 200 sites in New England and New York.

Senior Technical Consultant, U.S. Postal Service, 50 Underground Storage Tank Sites in New England, New York and New Jersey. Conducted hydrogeologic assessment and provided recommendations for remedial design. Assisted in development of environmental risk assessment model and design of soil and groundwater remediation systems.

Senior Technical Consultant, Mobil Oil and Exxon Stations, Massachusetts. Provided oversight of hydrogeologic assessment and remediation of over 20 gasoline station sites for these major petroleum distribution companies.

Senior Technical Consultant, U.S. Fish and Wildlife Service, Eastern Seaboard. Provided oversight of application of a risk assessment model to prioritize investigations and tank replacement at 25 government facilities with underground storage tanks.

Project Manager, Hydrogeologic Assessments and Remedial Design on over 50 sites in New England, New Jersey, and New York. Services have included development of environmental risk assessment models, hydrogeologic assessments, and design of soil and groundwater remediation systems.

UNDERGROUND STORAGE TANK ASSESSMENTS (EXAMPLES OF SITE-SPECIFIC EXPERIENCE)

Charter Marketing (Old Colony Stations), Randolph, Littleton, Norwood, Hyannis, Braintree, Walpole, Wakefield, Waltham, Amesbury, Massachusetts. Managed hydrogeologic investigations of sites to evaluate extent of on- and off-site contamination due to releases from USTs and/or delivery lines. Investigations included evaluation of off-site impacts to sensitive receptors and assessment of the effects of subsurface utilities on aqueous and vapor containment transport, which in some cases, affected residents in areas of the site. Evaluated hydrologic characteristics of the aquifer to assist in design of groundwater recovery wells and recharge trench systems. Provided oversight of UST and contaminated soil removal and installation of groundwater recovery air stripping (treatment) systems.

Charter Marketing (Old Colony Stations), Randolph, Littleton, Norwood, Hyannis, Braintree, Walpole, Wakefield, Waltham, Amesbury, Massachusetts. Managed hydrogeologic investigations of 25 gasoline station sites determined by a risk assessment model to be "priority" sites based on potential impacts to sensitive receptors, and the potential for release of gasoline to the environment. Remedial activities were accomplished at the nine stations indicated above.

Mobil Station, Norwood, Massachusetts. Managed a hydrogeologic investigation to determine the extent of on- and off-site contamination. Assisted in design of groundwater recovery and recharge system that addressed contamination migrating along sewer and drain lines.

Mobil Station, Foxboro, Massachusetts. Managed an assessment to determine the routes of migration of gasoline vapors into adjacent residences. Assessment involved an integrated program of subsurface utility research, soil gas surveys, test pit excavations, and monitoring well installation and sampling.

Mobil Stations, Swansea, Massachusetts and Providence, Rhode Island. Conducted hydrogeologic assessments to evaluate the extent of soil and groundwater contamination. Provided oversight of UST and contaminated soil removal.

Associate-in-Charge, Parker Hill Hospital, Roxbury, Massachusetts. Site investigation and emergency response action involving excavation and removal of PHC-contaminated soil in an area from which a 5,000-gallon No. 2 fuel oil UST was removed. Investigation and soil removal was prompted by the infiltration of petroleum products through the basement well of the hospital.

Privately Owned Gas Station, Multiple Sites, Massachusetts. Provided investigation and remediation services, including UST and contaminated soil removal and groundwater recovery and treatment at over ten sites in various towns.

LITIGATION SUPPORT

L.R. Realty vs. Quebecor Printing USA. Served as an expert on behalf of Quebecor Printing relative to the adequacy of an environmental assessment conducted as part of a due diligence study at a former printing facility.

DeSangro et al vs. Town of Lakeville, MA. Served as an expert on behalf of a group of residents whose water supply wells were impacted by a release of gasoline from a town-owned garage.

Green Mountain Power Corporation vs. Certain Underwriters. Served as an expert on behalf of underwriters involved in litigation concerning the Pine Street Canal Superfund site in Burlington, Vermont.

General Electric vs. Converse Inc. Provided expert testimony on behalf of General Electric concerning the extent of soil and groundwater contamination attributable to a release from an underground storage tank.

U.S. Government vs. Ottati and Goss. Provided expert testimony on behalf of the U.S. Government relative to the results of a hydrogeologic assessment. Also participated in a lengthy deposition prior to the trial.

U.S. Government vs. Keyser Roth Corporation. Provided expert testimony on behalf of the U.S. Government in a suit which claimed that the defendant caused contamination of residential wells adjacent to the Stamina Mills property, a former textile manufacturing facility in North Smithfield, Rhode Island. Mr. Norman's testimony focused on the results of a long-term pump test that defined the hydraulic relationships between the facility and residential wells.

LeBlanc vs. Commonwealth of Massachusetts. Provided expert testimony on behalf of homeowners who claimed that a salt storage facility, operated by the Massachusetts Department of Public Works, was responsible for contamination of their water supply wells. Testimony focused on results of a hydrogeologic assessment that defined the source and extent of sodium chloride contamination groundwater related to the salt storage area and the supply well.

A. Hall, Trustee vs. C. K. Smith and Company. Provided expert testimony on behalf of C.K. Smith, distributor of gasoline to a station owned by A. Hall. Testimony focused on establishing responsibility for release of gasoline to soil and groundwater. Reviewed site assessment documents prepared by plaintiff's consultant to identify deficiencies and assisted attorneys with preparation of defense.

Bird Island Flats Limited Partnership vs. Massachusetts Highway Department. Provided litigation support services on behalf of the Massachusetts Port Authority in a land -taking case at Logan Airport.

Depositions, Various Projects. Mr. Norman has provided over ten depositions related to assessment work he conducted or managed at landfills and hazardous waste sites.

GROUNDWATER SUPPLY DEVELOPMENT/ASSESSMENT

Senior Technical Consultant, Study of Local Sources of Water in Non-MWRA Communities in Eastern Massachusetts. Project involved survey of local water sources to identify yield, quality and vulnerability to contamination. Provided hydrogeologic and aquifer protection planning services.

Project Manager, SEMASS Waste-to-Energy Facility, Rochester, Massachusetts. Developed supplemental 200-gpm groundwater supply wells. Project involved mapping of surficial geology, exploration program, and installation and development of production wells and performance of a long-term pump test to evaluate impacts on adjacent surface water bodies and cranberry bogs.

Project Manager, Hydrogeologic Assessment and Zone II Delineation, Massachusetts Correctional Institute, Shirley, Massachusetts. Project involved determination of whether current groundwater supply could support proposed expansion. Project included hydrogeologic assessment, a five-day pump test and groundwater modeling to delineate Zone II.

Senior Technical Consultant, Hydrogeologic Assessment of Furnace Brook and South River Wells, Marshfield, Massachusetts. Provided technical input for a hydrogeologic assessment to delineate the source(s) of VOC contamination to municipal wells. Services included a soil gas survey, a subsurface investigation and groundwater modeling to evaluate zones of contribution to the production wells.

Senior Technical Consultant, Groundwater Supply Exploration and Development, Various Municipalities. Projects included groundwater exploration, pump tests and modeling necessary to permit public groundwater supplies under the Massachusetts New Source Approval Guidelines.

Professional Activities

National Groundwater Association
Licensed Site Professional Association

Publications

Norman, W.R. and J.J. Spirito, Litigation Involving Gasoline Contamination of Private Wells: The Proof Was In The MTBE. Presented at the National Groundwater Association Conference on "MTBE and Perchlorate", June 3-4 2004, Costa Mesa, California.