April 30, 2021

Christopher Allan
Environmental Engineer
New York State Department of Environmental Conservation
Superfund and Brownfield Cleanup Section, Division of Environmental Remediation
47-20 21st Street
Long Island City, NY 11101
Christopher.Allen@dec.ny.gov

Re: Remediation Test Pilot Work Plan Addendum
ABC Block 26
Long Island City, NY
BCP Site No.: C241174
Langan Project No.: 170340203

Dear Mr. Allan:

Langan Engineering, Environmental, Survey, Landscape Architecture and Geology, D.P.C (Langan) presents this addendum to the Remediation Pilot Test Work Plan, dated February 18, 2021 on behalf of PLAX B26, LLC for the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Site No. C241174. As suggested by the NYSDEC in the conditional approval letter for Remediation Pilot Test Work Plan (dated March 12, 2021), soil samples will also be collected to assess the performance of sulfate and carbon treatment technologies in reducing soil contaminants.

The soil sampling will be completed in accordance with this addendum, relevant procedures set forth in Langan's Remediation Pilot Test Work Plan (dated February 18, 2021), and the Revised Quality Assurance Work Plan (QAPP) (Attachment 1). The QAPP was revised to include protocols for the collection of soil samples for laboratory analysis of volatile organic compounds (VOCs) and to address additional comments received from the NYSDEC.

The soil sampling plan will consist of two events; baseline soil sample collection concurrent with the installation of monitoring wells and injection wells (as stipulated in the Remediation Pilot Test Work Plan) and post-pilot test sample collection concurrent with the last performance monitoring groundwater sampling event. Post-pilot test boring locations will be off-set from the baseline sampling locations by about 5 feet. The two events will include the following:

- Advancement of three soil borings via a direct push drilling rig or sonic drilling rig (if needed) within sulfate and activated carbon pilot test injection areas (see Figures 1 and 2);

- Classification of extracted soil cores and preparation of soil boring logs;

- Collection of two soil samples for laboratory analysis from each soil boring within the sulfate injection area; one from the 7-to 12-foot below ground surface (bgs) interval and one from the 13- to 22-foot bgs interval;

- Collection of one soil sample for laboratory analysis from each soil boring within the activated carbon injection area from the 10-to 22-foot bgs interval;

- Boreholes will be backfilled with hydrated bentonite and patched at the surface with concrete or asphalt; and

- Laboratory analysis of the soil samples for Target Compound List/Part 375 VOCs by USEPA Method 8260.

In addition and as a minor amendment to the Remediation Pilot Test Work Plan, we plan to advance three additional soil borings concurrent with activated carbon injections to a depth of 20 feet bgs (off-set from the temporary piezometer locations by about 3 feet) to visually screen extracted soil cores for the presence of activated carbon to assess the radius of influence (ROI) of the injections. Completed boreholes will be backfilled with hydrated bentonite and patched at the surface with concrete or asphalt.

The soil sampling analytical results will be validated, tabulated and evaluated and included in the final Remediation Pilot Test Report. Field observations and soil boring logs will also be included in the final report.

If you have any questions, please call us at 212-479-5400.

Sincerely,

Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology, D.P.C.

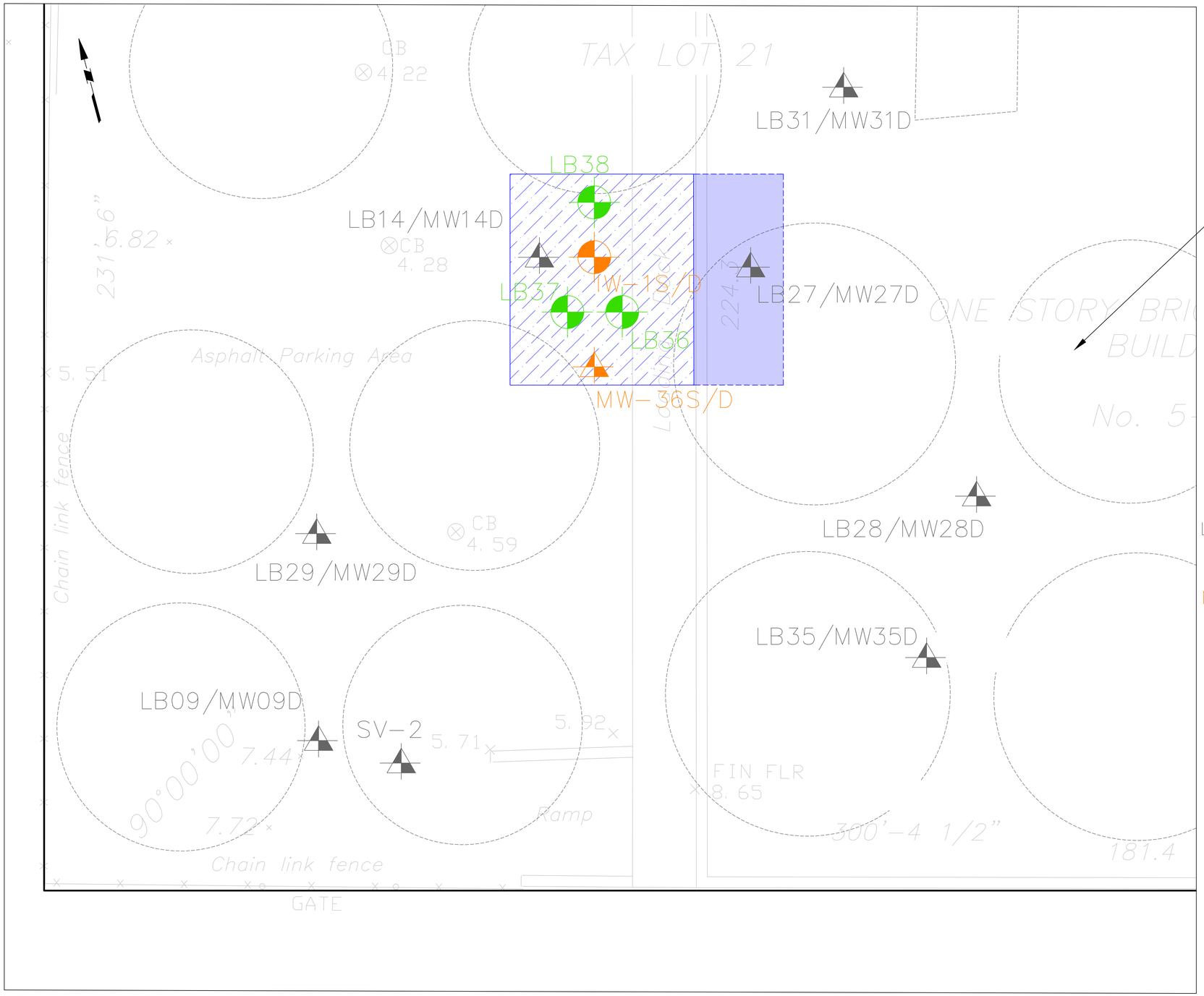
Stewart Abrams, PE
Principal/Vice President

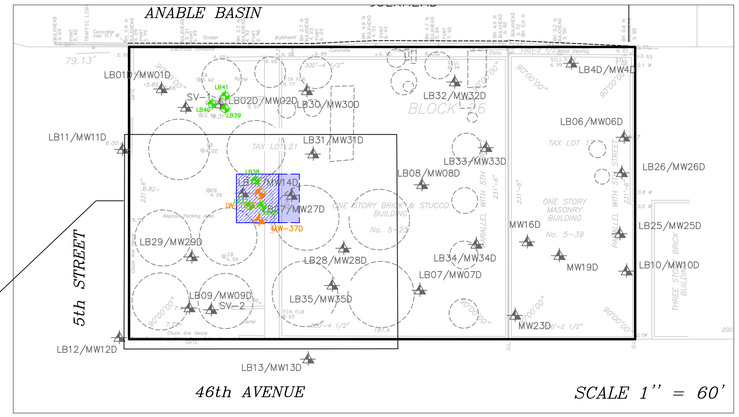
Jason Hayes, PE
Principal/Vice President

cc: T. Pfohl, M. Quigley, P. Kirby, J. Hare, (Plaxall)
M. Chertok, E. Knauer (SPR)
M. Raygorodetsky, G. Wyka, A. Oka, W. Kim, E. Smith (Langan)

Enclosures: Figure 1 Proposed Performance Monitoring Soil Boring Location Map - Sulfate
Figure 2 Proposed Performance Monitoring Soil Boring Location Map - Carbon
Attachment A – Quality Assurance Project Plan

FIGURES





LEGEND:

- APPROXIMATE BCP SITE BOUNDARY
- APPROXIMATE EXTENT OF BIOSPARGING AND SULFATE TREATMENT AREA (OUTSIDE THE BUILDING)
- APPROXIMATE EXTENT OF BIOSPARGING AND SULFATE TREATMENT AREA (INSIDE THE BUILDING)
- LB28/MW28D — EXISTING MONITORING WELL LOCATION AND ID
- MW-37D — PROPOSED MONITORING WELL LOCATION AND ID
- IW-1S/D — PROPOSED INJECTION WELL LOCATION AND ID
- PROPOSED PERFORMANCE MONITORING SOIL BORING LOCATION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY PREPARED BY ALBERT W. TAY, DATED SEPTEMBER 6, 2012.
2. ROI = RADIUS OF INFLUENCE.
3. INJECTIONS WILL ONLY BE CONDUCTED OUTSIDE THE BUILDING, NO INJECTION ACTIVITIES WILL BE CONDUCTED INSIDE THE BUILDING. ONLY MONITORING WELLS SAMPLING WILL BE CONDUCTED INSIDE THE BUILDING.
4. WELL AND SOIL BORING LOCATIONS WILL BE FINALIZED BASED ON GEOPHYSICAL SURVEY RESULTS, FIELD OBSERVATIONS, AND SUBSURFACE OBSTRUCTIONS (IF ANY).
5. A BIOSPARGING TEST WILL BE CONDUCTED AT IW-1D.

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SCALE IN FEET

DATE	Description	No.

REVISIONS

DRAFT

SIGNATURE DATE SIGNED
PROFESSIONAL XXXXXXXXXX
STATE LIC. No. XXXXX

LANGAN
Langan Engineering and Environmental Services, Inc.
21 Penn Plaza, 360 West 31st Street, 8th Floor
New York, NY 10001
T: 212.479.5400 F: 212.479.5444 www.langan.com

Project
ABC - BLOCK 26
BLOCK No. 26, LOT Nos. 17 and 21
LONG ISLAND CITY
QUEENS NEW YORK

Drawing Title
PROPOSED PERFORMANCE MONITORING SOIL BORING LOCATION MAP - SULFATE INJECTIONS

Project No.	Drawing No.
170340203	1
Date: 03/30/2021	
Drawn By: EMS	
Checked By: WK	Sheet 1 of 2

LANGAN
PROJECT NO. 170340203

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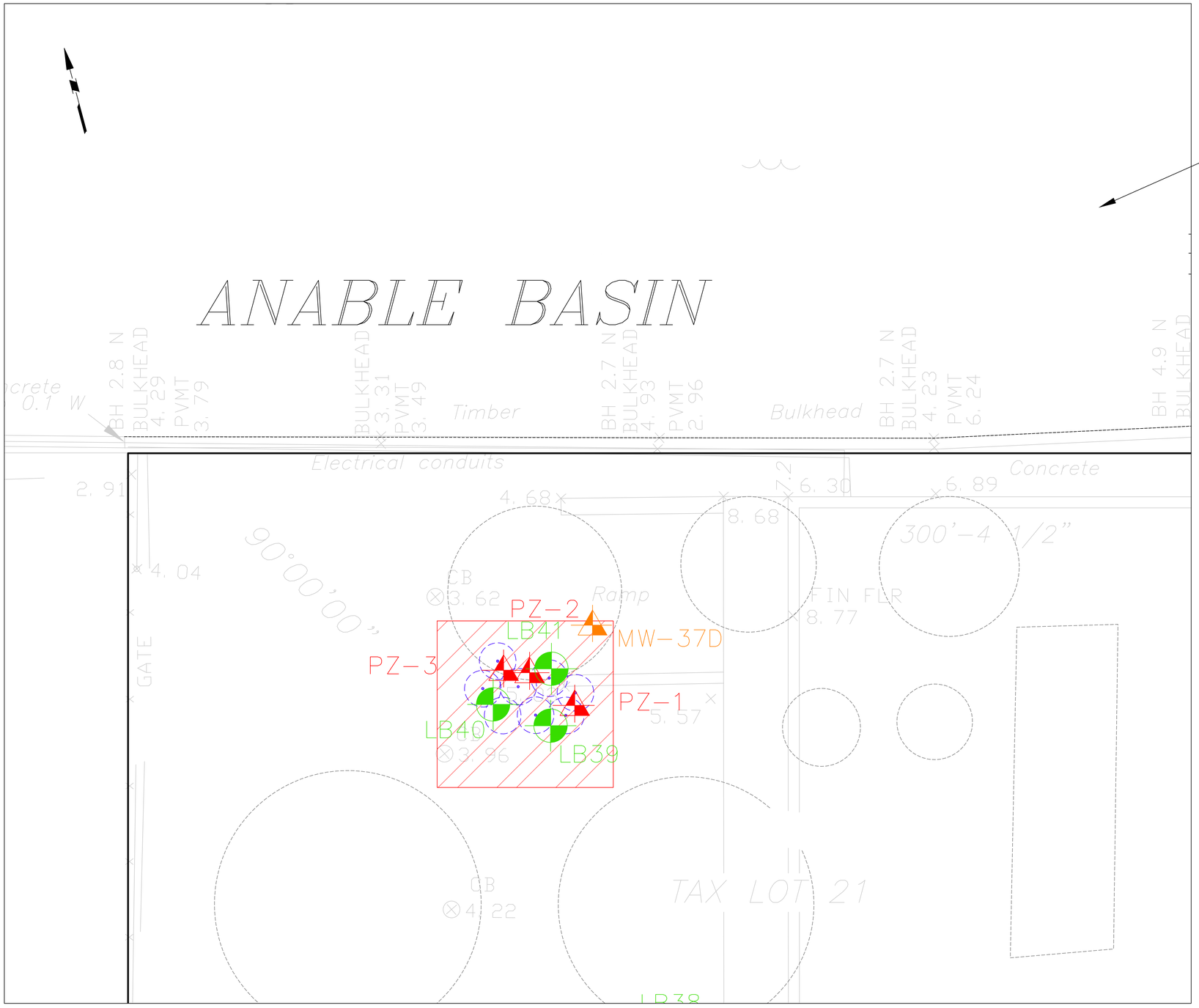

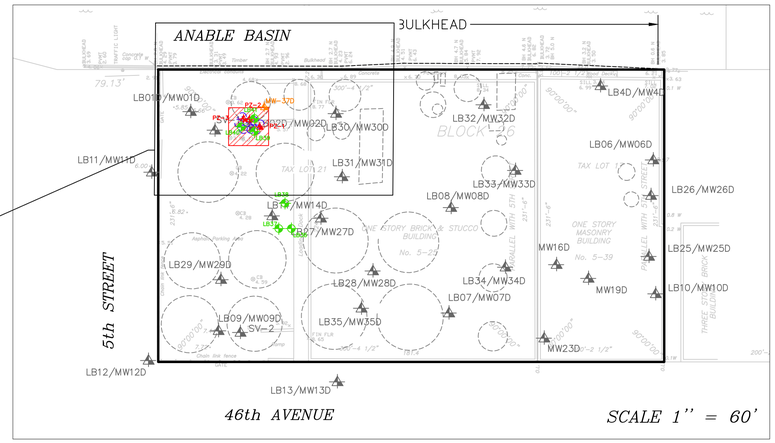

LEGEND:

- APPROXIMATE BCP SITE BOUNDARY
- APPROXIMATE EXTENT OF ACTIVATED CARBON TREATMENT AREA
- MW-37D — PROPOSED MONITORING WELL LOCATION AND ID
- PZ-1 — PROPOSED TEMPORARY PIEZOMETER WELL LOCATION AND ID
- PROPOSED TEMPORARY INJECTION LOCATIONS AND APPROXIMATE ROI
- PROPOSED PERFORMANCE MONITORING SOIL BORING LOCATION

GENERAL NOTES:

1. BASE MAP TAKEN FROM SURVEY PREPARED BY ALBERT W. TAY, DATED SEPTEMBER 6, 2012.
2. ROI = RADIUS OF INFLUENCE.
3. MONITORING WELL, SOIL BORING, AND TEMPORARY PIEZOMETER WELL LOCATIONS WILL BE FINALIZED BASED ON GEOPHYSICAL SURVEY RESULTS, FIELD OBSERVATIONS, AND SUBSURFACE OBSTRUCTIONS (IF ANY).

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SCALE IN FEET

DATE	Description	No.
REVISIONS		

DRAFT

SIGNATURE DATE SIGNED
PROFESSIONAL XXXXXXXXXX
STATE LIC. No. XXXXX

LANGAN
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Project
ABC - BLOCK 26
BLOCK No. 26, LOT Nos. 17 and 21
LONG ISLAND CITY
QUEENS NEW YORK

Drawing Title
PROPOSED PERFORMANCE MONITORING SOIL BORING LOCATION MAP - CARBON INJECTIONS

Project No.	Drawing No.
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Drawn By: EMS	
Checked By: WK	Sheet 2 of 2

LANGAN
PROJECT NO. 170340203

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ATTACHMENT A

QUALITY ASSURANCE PROJECT PLAN

Quality Assurance Project Plan

Remediation Pilot Test Work Plan
ABC Block 26
Long Island City, New York
NYSDEC BCP Site No. C241174

Prepared For:

PLAX B26, LLC
5-46 46th Avenue
Long Island City, New York 11101

Prepared By:

Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology, D.P.C.
21 Penn Plaza
360 West 31st Street, 8th Floor
New York, New York 10001

April 20, 2021
Langan Project No. 170340203

LANGAN

TABLE OF CONTENTS

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ATTACHMENTS

1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was prepared on behalf of PLAX B26, LLC (the Participant) for ABC Block 26, Long Island City, New York (the "site"). The site is enrolled in the New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) as Site No. C241174. Additional site information including site maps and remedial treatment data is provided in the Remediation Pilot Test Work Plan.

This QAPP specifies the sampling procedures to be followed and the analytical methods to be used to ensure that data collected from the remedial investigation are precise, accurate, representative, comparable, and complete.

1.2 PROJECT OBJECTIVES

The objective of the remediation pilot test program is to assess the feasibility of and effectiveness of biosparging and application of sulfate reduction and/or injectable activated carbon in reducing petroleum-related volatile organic compounds (VOC) and semivolatile organic compound (SVOC) impacts to groundwater and VOC impacts to soil at the site and the other two ABC BCP Sites (ABC Block 25 [Site No. C241173] and ABC Block 27 [Site No. C241175]) with similar contamination. The pilot testing results will inform the remedial alternatives analyses for remedy selection across all three sites and will also be used to derive design criteria for full-scale implementation. This QAPP addresses necessary sampling and analytical methods in support of the Remediation Pilot Test Work Plan. These objectives were established in order to meet standards that will protect public health and the environment for the site.

1.3 SCOPE OF WORK

The scope of work includes a combined biosparging, sulfate-reduction, and injectable activated carbon pilot test. Additional details are included in the Remediation Pilot Test Work Plan.

2.0 PROJECT ORGANIZATION

The New York State Department of Environmental Conservation (NYSDEC)-approved Remediation Pilot Test Work Plan will be implemented by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan), on behalf of PLAX B26, LLC. Langan will collect media samples and will subcontract with a qualified driller and accredited analytical laboratories.

For the scope of work described in the Remediation Pilot Test Work Plan, sampling will be conducted by Langan and analytical services will be performed by Microbial Insights of Knoxville, Tennessee (A2LA Certification #AT-2904) and New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory (Alpha Analytical, Inc. [Alpha] of Westborough, MA [ELAP ID #11148]). Data validation services will be performed by Joe Conboy. Resumes for key Langan project personnel are included as Attachment A.

Key contacts for this project are as follows:

PLAX B26, LLC:	Mr. Jordan Hare Telephone: (718) 784-4800
Langan Project Manager:	Mrs. Mimi Raygorodetsky Telephone: (212) 479-5441
Langan Quality Assurance Officer (QAO):	Mr. Greg Wyka Telephone: (212) 479-5476
Program Quality Assurance Monitor:	Ms. Julia Leung, PE Telephone: (212) 479-5452
Data Validator:	Mr. Joe Conboy Telephone: (215) 845-8985
Laboratory Representatives:	Alpha Analytical Ben Rao Telephone: (201) 812-2633
	Microbial Insights Kate Clark Telephone: (865) 573-8188

3.0 QUALITY ASSURANCE OBJECTIVES FOR COLLECTION OF DATA

3.1 INTRODUCTION

The overall quality assurance and quality control (QA/QC) objectives are to develop and implement procedures for sampling, laboratory analysis, field measurements, and reporting that will provide data of sufficient quality for the remedial investigation at the site. The sample set, chemical analysis results, and interpretations must be based on data that meet or exceed quality assurance objectives established for the site. Quality assurance objectives are usually expressed in terms of accuracy or bias, sensitivity, completeness, representativeness, comparability, and sensitivity of analysis. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

3.2 PRECISION

Precision is an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Specifically, it is a quantitative measurement of the variability of a group of measurements compared to their average value. Precision is usually stated in terms of standard deviation, but other estimates such as the coefficient of variation (relative standard deviation), range (maximum value minus minimum value), relative range, and relative percent difference (RPD) are common.

For this project, field sampling precision will be determined by analyzing coded duplicate samples (labeled so that the laboratory does not recognize them as duplicates) for the same parameters, and then, during data validation (Section 5.0), calculating the RPD for duplicate sample results. For field duplicates, results less than 2x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2x the RL. For results greater than 2x the RL, the acceptance criteria is a RPD of $\leq$50% (soil) and <30% (groundwater). RLs and method detection limits (MDL) are provided in Attachment B.

Analytical precision will be determined by the laboratory by calculating the RPD for the results of the analysis of internal laboratory duplicates and matrix spike duplicates. The formula for calculating RPD is as follows:

$$\text{RPD} = \frac{|\text{V1} - \text{V2}|}{(\text{V1} + \text{V2})/2} \times 100$$

where:

RPD	=	Relative Percent Difference.
V1, V2	=	The two values to be compared.
|V1 – V2|	=	The absolute value of the difference between the two values.
(V1 + V2)/2	=	The average of the two values.

3.3 ACCURACY

Accuracy is a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern, or the difference between a measured value and the true or accepted reference value. The accuracy of an analytical procedure is best determined by the analysis of a sample containing a known quantity of material, and is expressed as the percent of the known quantity, which is recovered or measured. The recovery of a given analyte is dependent upon the sample matrix, method of analysis, and the specific compound or element being determined. The concentration of the analyte relative to the detection limit of the analytical method is also a major factor in determining the accuracy of the measurement. Concentrations of analytes, which are close to the detection limits are less accurate because they are more affected by such factors as instrument "noise."

Sampling accuracy may be determined through the assessment of the analytical results of field blanks for each sample delivery group. Field blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field blank was evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias.

Analytical accuracy is typically assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), laboratory control sample and control sample duplicates (LCS/LCSD), internal standard responses, isotope dilution recoveries, the percent recoveries of matrix spike compounds added to selected samples, and the results of laboratory blanks. Additionally, initial and continuing calibrations must be performed and accomplished within the established method control limits to define the instrument accuracy before analytical accuracy can be determined for any sample set. Sample volume permitting, samples displaying outliers

should be reanalyzed. Associated method blanks should be non-detect when analyzed by the laboratory.

Accuracy is normally measured as the percent recovery (%R) of a known amount of analyte, called a spike, added to a sample (matrix spike) or to a blank (blank spike). The %R is calculated as follows:

$$\%R = \frac{SSR - R}{SA} \times 100$$

where:

%R = Percent recovery.

SSR = Spike sample result: concentration of analyte obtained by analyzing the sample with the spike added.

SR = Sample result: the background value, i.e., the concentration of the analyte obtained by analyzing the sample.

SA = Spiked analyte: concentration of the analyte spike added to the sample.

3.4 COMPLETENESS

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for a determination of compliance will also be evaluated.

3.5 REPRESENTATIVENESS

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable standard operating procedures (SOP) and this QAPP. All field technicians will be given copies of appropriate documents prior to sampling events and are required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable United States Environmental Protection Agency (USEPA) methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

3.6 COMPARABILITY

Comparability expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured by:

- Using identified standard methods for both sampling and analysis phases of this project;
- Requiring traceability of all analytical standards and/or source materials to the USEPA or National Institute of Standards and Technology (NIST);
- Requiring that all calibrations be verified with an independently prepared standard from a source other than that used for calibration (if applicable);
- Using standard reporting units and reporting formats including the reporting of QC data;
- Performing a complete data validation on a representative fraction of the analytical results, including the use of data qualifiers in all cases where appropriate; and

- Requiring that all validation qualifiers be used any time an analytical result is used for any purpose.

These steps will ensure all future users of either the data or the conclusions drawn from them will be able to judge the comparability of these data and conclusions.

3.7 SENSITIVITY

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest. The project director will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the project director will select the level of data assessment to ensure that only data meeting the project data quality objectives (DQO) are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

Analytical methods and quality assurance parameters associated with the sampling program are presented in Attachment C. The frequency of associated equipment blanks and duplicate samples will be based on the recommendations listed in the NYSDEC DER-10 Technical Guidance for Site Investigation and Remediation, dated May 2010 (DER-10), and as described in Section 4.3.

Site-specific matrix spike (MS) and matrix spike duplicate (MSD) samples will be prepared and analyzed by the analytical laboratory by spiking an aliquot of submitted sample volume with analytes of interest. Additional sample volume is not required by the laboratory for this purpose. An MS/MSD analysis will be analyzed at a rate of 1 out of every 20 samples, or one per analytical batch.

4.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Groundwater and soil sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10. The following sections describe procedures to be followed for specific tasks.

4.1 FIELD DOCUMENTATION PROCEDURES

Field documentation procedures will include summarizing field observations in field books, soil boring logs, monitoring well construction, completing forms for groundwater sampling, and proper sample labeling. These procedures are described in the following sections.

4.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability, and secure page binding. The pages of the notebook will not be removed.

Entries will be made in waterproof, permanent blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number
- Reasons for being on-site or taking the sample
- Date and time of activity
- Sample identification numbers

- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate
- Physical location of sampling locations such as depth below ground surface
- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures
- Description of the sample including physical characteristics, odor, etc.
- Readings obtained from health and safety equipment
- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample
- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera
- Other pertinent observations such as the presence of other persons on the site, actions by others that may affect performance of site tasks, etc.
- Names of sampling personnel and signature of persons making entries

Field records will also be collected on field data sheets including monitoring well construction logs and soil boring logs, which will be used for geologic and drilling data during injection activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

4.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number in accordance with the sample nomenclature guidance included in Attachment D, and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

4.2 EQUIPMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

A photoionization detector (PID) will be used during the sampling activities to evaluate work zone action levels, screen soil samples, and collect monitoring well headspace readings. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the Site Health and Safety Officer (HSO), and will be accomplished by following the procedures outlined in the operating manual for the instrument. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration
- Type of equipment serviced and identification number (such as serial number)
- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

Water quality meters (Horiba U-52, or similar) will be used during purging of groundwater during baseline and post-injection sampling to measure pH, specific conductance, temperature, dissolved oxygen, turbidity and oxidation-reduction-potential (ORP), every five minutes. During injection events, water quality meters (Horiba U-52, YSI 600, or similar) and sulfide detection meters (Hach EZ4000, or similar) will be used to measure pH, specific conductance, temperature, dissolved oxygen, turbidity, ORP, and sulfide at the beginning and end of each day. Water-quality meters should be calibrated and the results documented before use each day using standardized field calibration procedures and calibration checks.

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation,

sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled and unscheduled maintenance.

4.3 SAMPLE COLLECTION

Soil Samples

Samples will be visually classified and field screened using a PID to assess potential impacts from volatile VOCs and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using either EnCore® or Terra Core® sampling equipment. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 4.4. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected soil sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

Groundwater Samples

Groundwater sampling will be conducted using low-flow sampling procedures following USEPA guidance ("Low Stress [low flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", EQASOP-GW 001, Revised September 19, 2017).

During purging, field parameters including water level drawdown, purge rate, pH, specific conductance, temperature, dissolved oxygen, turbidity and ORP will be measured, every five minutes using a water quality meter (Horiba U-52 or similar) in accordance with the Remediation Pilot Test work Plan. The water quality meter and depth-to-water interface probe shall be decontaminated between monitoring wells. Samples should generally not be collected until the field parameters have stabilized. Field parameters will be considered stable once three sets of measurements are within ±0.1 standard units for pH, ±3% for conductivity and temperature, ±10 millivolts for ORP, and ±10% for turbidity and dissolved oxygen. Purge rates should be adjusted to keep the drawdown in the well to less than 0.3 feet, as practical. Additionally, an

attempt should be made to achieve a stable turbidity reading of less than 10 Nephelometric Turbidity Units (NTU) prior to sampling. If the turbidity reading does not stabilize at reading of less than 10 NTU for a given well, then both filtered and unfiltered samples should be collected from that well. If necessary, field filtration should be performed using a 0.45 micron disposable in-line filter. Groundwater samples should be collected after parameters have stabilized as noted above or the readings are within the precision of the meter. Deviations from the stabilization and drawdown criteria, if any, should be noted on the sampling logs.

Samples should be collected directly into laboratory-supplied jars. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 4.4. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected groundwater sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

Sample Equipment Blanks and Duplicates

Equipment blanks will be collected for quality assurance purposes at a rate of one per 20 investigative samples per matrix. Equipment blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Equipment blank samples will be analyzed for the complete list of analytes on the day of sampling. Trip blanks will be collected at a rate of one per day if samples are analyzed for VOCs during that day.

Duplicate samples will be collected and analyzed for quality assurance purposes. Duplicate samples will be collected at a frequency of 1 per 20 investigative samples per matrix and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one duplicate sample will be collected.

4.4 SAMPLE CONTAINERS AND HANDLING

Certified, commercially clean sample containers will be obtained from the analytical laboratory. The laboratory will also prepare and supply the required trip blanks and equipment blank sample containers and reagent preservatives. Sample bottle

containers, including the equipment blank containers, will be placed into plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, Langan field personnel will fill the plastic coolers with ice in Ziploc® bags (or equivalent) to maintain a temperature of 4° ±2° C.

Samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on-ice in laboratory provided coolers until shipment to the laboratory. The temperature in the coolers containing samples and associated equipment blanks will be maintained at a temperature of 4°±2°C while on-site and during sample shipment to the analytical laboratory.

Food and beverages will be prohibited near the sampling equipment.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 4.9, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 4.6.

4.5 SAMPLE PRESERVATION

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field. Samples will be preserved according to the requirements of the specific analytical method selected, as shown in Attachment C.

4.6 SAMPLE SHIPMENT

4.6.1 Packaging

Groundwater sample containers will be placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will

be placed in a Ziploc® bag (or equivalent) and placed inside the cooler. The cooler will be taped closed and custody seals will be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (e.g. FedEx) then laboratory address labels will be placed on top of the cooler.

4.6.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All environmental samples will be transported to the laboratory by a laboratory-provided courier under the chain-of-custody protocols described in Section 4.9.

- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

4.7 DECONTAMINATION PROCEDURES

Sampling equipment will be thoroughly decontaminated before mobilization and between sample locations. Field sampling equipment, including water level indicators and other non-dedicated equipment, requires cleaning between uses. Equipment will be rinsed using a three bucket rinse procedure. An about three-gallon solution of decontamination fluid consisting of Alconox® or Citranox® and deionized (DI) water will be prepared in a five-gallon bucket for the first equipment rinse. A second five-gallon bucket will be filled with about three gallons of DI water for the second rinse. A third five-gallon bucket will be filled with about three gallons of DI water for the final rinse. Powderless nitrile (non-latex) gloves will be donned during the handling of sampling equipment and sample containers.

4.8 RESIDUALS MANAGEMENT

Debris (e.g., paper, plastic and disposable personal protective equipment [PPE]) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal. If applicable, residual solids (e.g., leftover soil cuttings) will be placed back in the borehole from which it was sampled. If gross contamination is observed, soil will be collected and stored in Department of Transportation (DOT)-approved 55-gallon drums in a

designated storage area at the site. The residual materials stored in a designated storage area at the site for further characterization, treatment or disposal.

Residual fluids (such as purge water) will be collected and stored in DOT-approved (or equivalent) 55-gallon drums in a designated storage area at the site. The residual fluids will be analyzed, characterized and disposed off-site in accordance with applicable federal and state regulations. Residual fluids such as decontamination water may be discharged to the ground surface, however, if gross contamination is observed, the residual fluids will be collected, stored, and transported similar purge water or other residual fluids.

4.9 CHAIN OF CUSTODY PROCEDURES

A chain-of-custody protocol has been established for collected samples that will be followed during sample handling activities in both field and laboratory operations. The primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safe keeping. Chain-of-custody procedures are provided below:

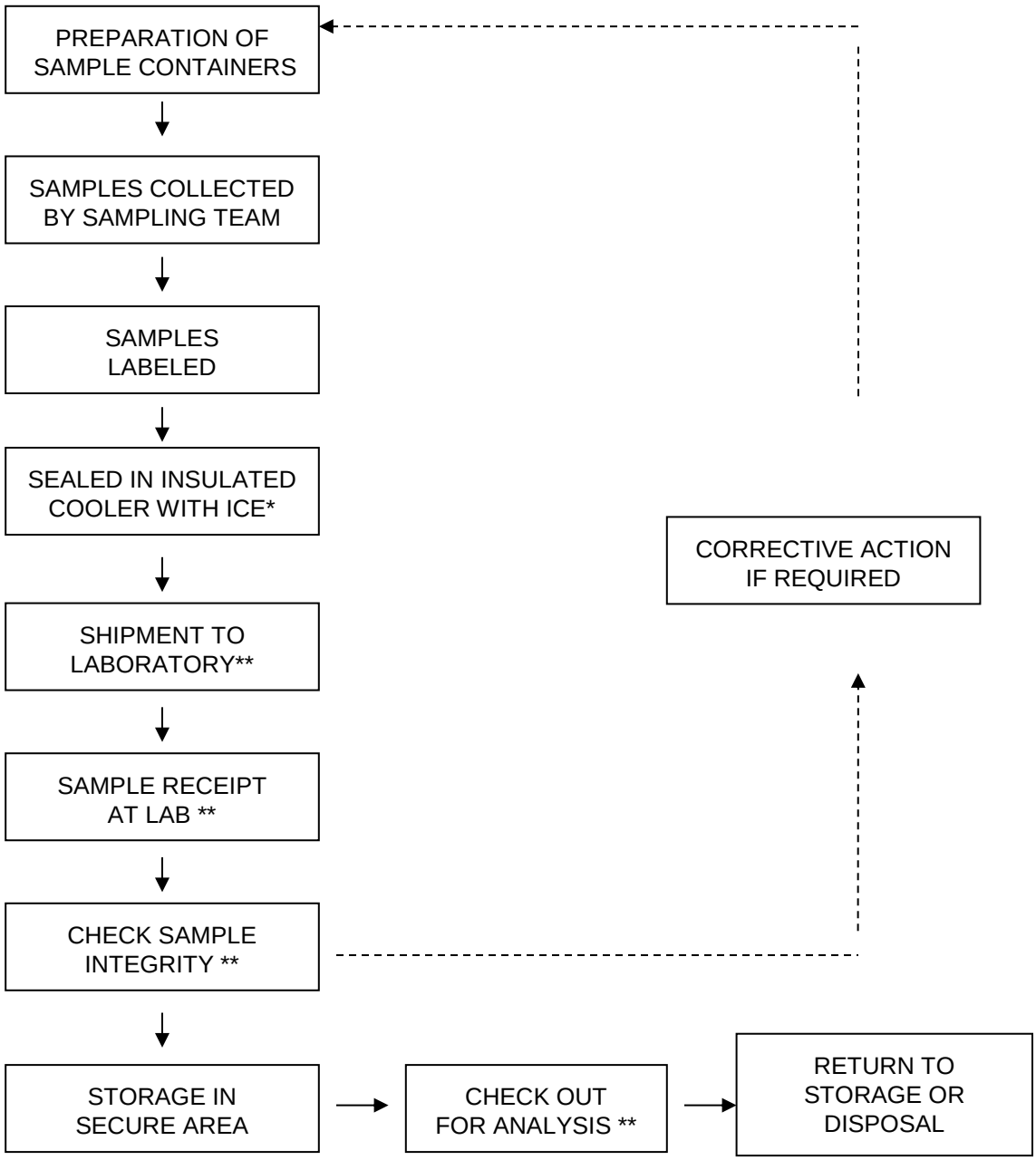
- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, permanent blue or black ink.
- Langan field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain-of-custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors

and sign the chain-of-custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

Sample coolers will be accompanied by the chain-of-custody form, sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid. If applicable, a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form.

Samples will be packaged for shipment to the laboratory with the appropriate chain-of-custody form. A copy of the form will be retained by the sampling team for the project file and the original will be sent to the laboratory with the samples. Bills of lading will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory. A flow chart showing a sample custody process is included as Figure 1.1. Blank chain-of-custody forms from Alpha and Microbial Insights are included as Figure 1.2 and 1.3, respectively.

Figure 1.1 Sample Custody



*SUMMA CANISTERS SHOULD NOT BE ICED
** REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

Figure 1.2 Sample Chain-of-Custody Form - Alpha

ALPHA
Westborough, MA 01581
8 Walkup Dr.
TEL: 508-898-9220
FAX: 508-898-9193

Mansfield, MA 02048
320 Forbes Blvd
TEL: 508-822-9300
FAX: 508-822-3288

NEW YORK CHAIN OF CUSTODY

Service Centers
Mahwah, NJ 07430: 35 Whitney Rd, Suite 5
Albany, NY 12205: 14 Walker Way
Tonawanda, NY 14150: 275 Cooper Ave, Suite 105

Page
of

Date Rec'd in Lab

ALPHA Job #

Client Information
Client:
Address:
Phone:
Fax:
Email:

Project Information
Project Name:
Project Location:
Project #
(Use Project name as Project #)
Project Manager:
ALPHAQuote #:

Turn-Around Time
Standard
Rush (only if pre approved)
Due Date:
# of Days:

These samples have been previously analyzed by Alpha

Other project specific requirements/comments:

Please specify Metals or TAL.

Deliverables
ASP-A
EQuIS (1 File)
Other

Regulatory Requirement
NY TOGS
AWQ Standards
NY Restricted Use
NY Unrestricted Use
NYC Sewer Discharge

Billing Information
Same as Client Info
PO #

Disposal Site Information
Please identify below location of applicable disposal facilities.
Disposal Facility:
NJ
NY
Other:

ANALYSIS

Sample Filtration
Done
Lab to do
Preservation
Lab to do
(Please Specify below)

Sample Specific Comments

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Time	Collection Date	Sample Matrix	Sampler's Initials							Total # Bottles

Container Type
Preservative

Relinquished By:	Date/Time	Received By:	Date/Time

Preservative Code:
A = None
B = HCl
C = HNO_3
D = H_2SO_4
E = NaOH
F = MeOH
G = $NaHSO_4$
H = $Na_2S_2O_3$
K/E = Zn Ac/NaOH
O = Other

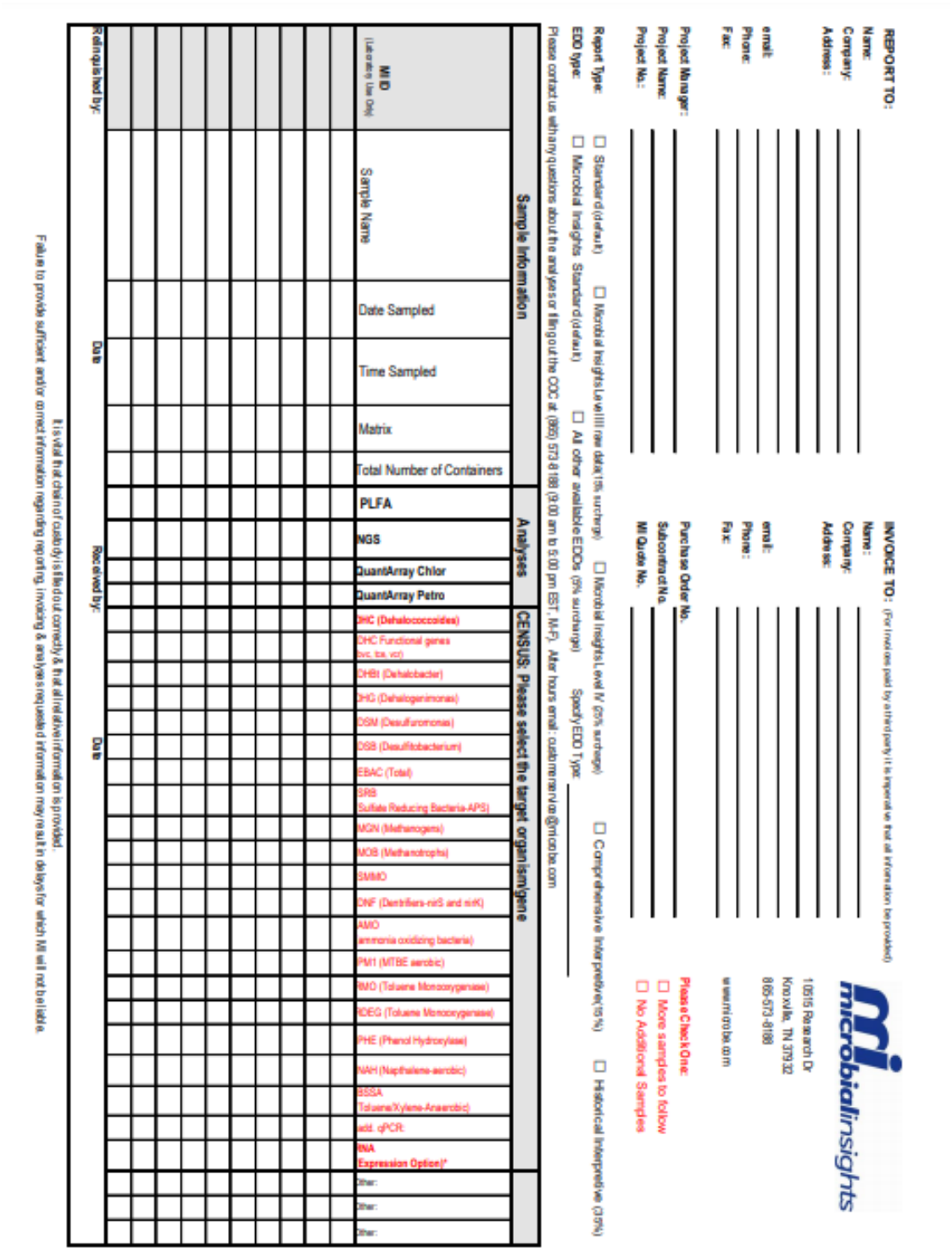
Container Code
P = Plastic
A = Amber Glass
V = Vial
G = Glass
B = Bacteria Cup
C = Cube
O = Other
E = Encore
D = BOD Bottle

Westboro: Certification No: MA935
Mansfield: Certification No: MA015

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. BY EXECUTING THIS COC, THE CLIENT HAS READ AND AGREES TO BE BOUND BY ALPHA'S TERMS & CONDITIONS. (See reverse side.)

Form No: 01-25 HC (rev. 30-Sept-2013)

Figure 1.3 Sample Chain-of-Custody Form – Microbial Insights



microbialinsights

10515 Research Dr
Knoxville, TN 37932
865-573-8188
www.microbe.com

REPORT TO:
Name:
Company:
Address:
email:
Phone:
Fax:

INVOICE TO: (For invoices paid by a third party it is important that all information be provided)
Name:
Company:
Address:
email:
Phone:
Fax:

Project Manager:
Project Name:
Project No.:

Purchase Order No.
Subcontract No.
MI Quote No.

Please Check One:
☐ More samples to follow
☐ No Additional Samples

Report Type: ☐ Standard (default) ☐ Microbial Insights Level III raw data (5% surcharge) ☐ Microbial Insights Level IV (20% surcharge) ☐ Comprehensive Interpretive (10%) ☐ Historical Interpretive (35%)
EDD type: ☐ Microbial Insights Standard (default) ☐ All other available EDDs (5% surcharge) Specify EDD Type:

Please contact us with any questions about the analyses or filling out the COC at (865) 573 8188 (9:00 am to 5:00 pm EST, M-F). After hours email: custmeranalysis@microbe.com

Sample Information					Analyses				CENSUS: Please select the target organism/gene
MI ID (Laboratory Use Only)	Sample Name	Date Sampled	Time Sampled	Matrix	Total Number of Containers	PLFA	NGS	QuantArray Chlor	QuantArray Petro	DHC (Dehalococcoides)
										DHC Functional genes (bvc, tca, vcr)
										DHBt (Dehalobacter)
										DHG (Dehalogenimonas)
										DSM (Desulfuromonas)
										DSB (Desulfitobacterium)
										EBAC (Total)
										SRB Sulfate Reducing Bacteria-APS)
										MGN (Methanogens)
										MOB (Methanotrophs)
										SMMO
										DNF (Denitrifiers-nirS and nirK)
										AMO ammonia oxidizing bacteria)
										PM1 (MTBE aerobic)
										BMO (Toluene Monooxygenase)
										BDEG (Toluene Monooxygenase)
										PHE (Phenol Hydroxylase)
										NAH (Naphthalene-aerobic)
										BSSA Toluene/Xylene-Anaerobic)
										add. qPCR:
										RNA Expression Option)*
										Other:
										Other:
										Other:

Relinquished by: Date Received by: Date

It is vital that chain of custody is filled out correctly & that all relative information is provided.
Failure to provide sufficient and/or correct information regarding reporting, invoicing & analysis requested information may result in delays for which MI will not be liable.

Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

4.10 LABORATORY SAMPLE STORAGE PROCEDURES

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the DQOs of the project. When irregularities do exist, the environmental consultant must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Samples for VOCs will be maintained in satellite storage areas within the VOC laboratory. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

5.0 DATA REDUCTION, VALIDATION, AND REPORTING

5.1 INTRODUCTION

Data collected during the remediation test pilot program will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The methods for the laboratory analysis of soil and water samples and the quantitation limits are presented in Attachment B. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 appropriate for the analyses to be performed, and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

5.2 DATA REDUCTION

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of the site contamination condition.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for EQuIS. To avoid transcription errors, data will be loaded directly into the ASCII format from the LIMS. If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

5.3 DATA VALIDATION

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:

- Verification of the QC sample results,
- Verification of the identification of sample results (both positive hits and non-detects),
- Recalculation of 10% of all investigative sample results, and
- Preparation of Data Usability Summary Reports (DUSR).

A DUSR will be prepared and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain of custody (COC) procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each sample delivery group (SDG) will follow. For each of the organic analytical methods, the following will be assessed:

- Holding times;
- Instrument tuning;
- Instrument calibrations;
- Blank results;
- System monitoring compounds or surrogate recovery compounds (as applicable);
- Internal standard recovery results;
- MS and MSD results;
- Target compound identification;
- Chromatogram quality;
- Pesticide cleanup (if applicable);
- Compound quantitation and reported detection limits;
- System performance; and
- Results verification.

For each of the inorganic compounds, the following will be assessed:

- Holding times;
- Calibrations;
- Blank results;
- Interference check sample;
- Laboratory check samples;
- Duplicates;
- Matrix Spike;
- Furnace atomic absorption analysis QC;
- ICP serial dilutions; and
- Results verification and reported detection limits.

Based on the results of data validation, the validated analytical results reported by the laboratory will be assigned one of the following usability flags:

- "U" - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" - Not detected. Quantitation limit may be inaccurate or imprecise;
- "J" - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method
- "N" – Tentative identification. Analyte is considered present in the sample;
- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and
- No Flag - Result accepted without qualification.

6.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

6.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

6.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may be performed.

6.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

6.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings, which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

7.0 CORRECTIVE ACTION

7.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

7.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management and staff, such as field investigation teams, remedial response planning personnel, and laboratory groups, monitor on-going work performance in the

normal course of daily responsibilities. Work may be audited at the sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (see next page). The CAR identifies the out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____ _____ _____ _____ _____ _____

Originator Date Approval Date Approval Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

8.0 REFERENCES

NYSDEC. Division of Environmental Remediation. DER-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7- U.S. Environmental Protection Agency, Washington, D.C.

USEPA, 1992a. CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Revision #8, dated January 1992. USEPA Region II.

USEPA, 1992b. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Revision XI, dated January 1992. USEPA Region II.

ATTACHMENT A

RESUMES

MIMI RAYGORODETSKY

PRINCIPAL/VICE PRESIDENT

ENVIRONMENTAL ENGINEERING

Ms. Raygorodetsky sources and directs large, complex environmental remediation and redevelopment projects from the earliest stages of pre-development diligence, through the remediation/construction phase, to long-term operation and monitoring of remedial systems and engineering controls. She has a comprehensive understanding of federal, state and local regulatory programs and she uses this expertise to guide her clients through a preliminary cost benefit analysis to select the right program(s) given the clients' legal obligations, development desires and risk tolerance. She is particularly strong at integrating the requirements of selected programs and client development needs to develop and design targeted and streamlined diligence programs and remediation strategies. Ms. Raygorodetsky is also highly skilled in integrating remediation with construction on large urban waterfront projects, which tend to more complex than landside projects.

EDUCATION

B.A., Biology and Spanish Literature
Colby College

AFFILIATIONS

New York Women Executives in Real Estate (WX) - Board Member; Networking and Special Events Committee Co-Chair

New York Building Congress, Council of Industry Women - Committee Member

New York City Brownfield Partnership - Founding Member and President

NYC Office of Environmental Remediation Technical Task Force - Committee Member

SELECTED PROJECTS

- 25 Kent Avenue, Due Diligence for Purchase of a Brownfields Location, Brooklyn, NY
- Ferry Point Waterfront Park, Redevelopment of a Former Landfill into a Park, Bronx, NY
- Battery Maritime Building (10 South Street), Phase I ESA, New York, NY
- Residential Development at 351-357 Broadway, Phase 1 ESA, New York, NY
- 450 Union Street, Phase I and Phase II Remediation (NYS DEC Brownfield Cleanup Program), New York, NY
- Echo Bay Center, NYS DEC Brownfield Cleanup Program, New York, NY
- 420 Kent Avenue, NYS DEC Brownfield Cleanup Program, Brooklyn, NY
- 416 Kent Avenue, NYS DEC Brownfield Cleanup Program, Brooklyn, NY
- 264 Fifth Avenue, Phase I ESA, New York, NY
- 262 Fifth Avenue, Phase I ESA, New York, NY
- ABC Blocks 25-27 (Mixed-Use Properties), Brownfield Cleanup Program, Long Island City, NY
- Residences at 100 Barrow Street, Phase I ESA, New York, NY
- Residences at 22-12 Jackson Avenue, Due Diligence for Building Sale, Long Island City, NY
- Residences at 2253-2255 Broadway, Phase I and Phase II Services, New York, NY
- Prince Point, Phase I ESA, Staten Island, NY
- 787 Eleventh Avenue (Office Building Renovation), Phase I UST Closure, New York, NY
- 218 Front Street/98 Gold Street, Planning and Brownfield Consulting, Brooklyn, NY
- Mark JCH of Bensonhurst, Phase I and HazMat Renovation, Brooklyn, NY
- 39 West 23rd Street, E-Designation Brownfield, New York, NY

- 250 Water Street, Phase I and Phase II Property Transaction, New York, NY
- 27-19 44th Drive, Residential Redevelopment, Long Island City, NY
- 515 West 42nd Street, E-Designation, New York, NY
- 310 Meserole Street, Due Diligence Property Purchase, Brooklyn, NY
- Former Georgetown Heating Plant, HazMat and Phase I ESA, Washington D.C.
- 80-110 Flatbush Avenue, Brooklyn, NY
- 132 East 23rd Street, New York, NY
- 846 Sixth Avenue, New York, NY
- Greenpoint Landing, Remediation/Redevelopment, Brooklyn, NY
- 711 Eleventh Avenue, Due Diligence/Owner's Representative, New York, NY
- Brooklyn Bridge Park, Pier 1, Waste Characterization and Remediation, Brooklyn, NY
- Post-Hurricane Sandy Mold Remediation, Various Private Homes, Far Rockaway, NY
- Brooklyn Bridge Park, One John Street Development, Pre-Construction Due Diligence and Construction Administration, Brooklyn, NY
- 7 West 21st Street, Brownfields Remediation, New York, NY
- 546 West 44th Street, Brownfields Remediation, New York, NY
- Post-Hurricane Sandy Mold Remediation, Various Private Homes, Nassau and Suffolk Counties, Long Island, NY
- 55 West 17th Street, Brownfield Site Support, New York, NY
- Pratt Institute, 550 Myrtle Avenue Renovations, Environmental Remediation, Brooklyn, NY
- 42-02 Crescent Street Redevelopment, Phase I and II Environmental, Long Island City, NY
- IAC Building (555 West 18th Street), New York, NY
- Retirement Communities on100-acre Parcels in ME, NJ, MA, CT, and NJ
- 363-365 Bond Street/400 Carroll Street, Brooklyn, NY
- 160 East 22nd Street, New York, NY
- 110 Third Avenue, New York, NY
- Lycee Francais (East 76th Street & York Avenue), New York, NY
- Winchester Arms Munitions Factory, New Haven, CT

GREGORY C. WYKA, PG, LEED AP

SENIOR PROJECT GEOLOGIST

ENVIRONMENTAL ENGINEERING

Mr. Wyka is a geologist with experience in regulatory government, brownfield development, and environmental liability consulting. His expertise includes site characterization, remedial investigation, waste characterization, conceptual site modeling, remedial design and implementation, construction management, GIS, and sustainability. Mr. Wyka's abilities integrate remediation with property redevelopment and he provides technical, regulatory, logistical, and risk management guidance to clients, including developers, owners, and environmental attorneys. He provides direct assistance for clients on construction and remediation projects in the New York State Inactive Hazardous Waste Disposal Site Program, New York State Spill Response Program, New York State Brownfield Cleanup Program (BCP), New York City E-Designation Program and New York City Voluntary Cleanup Program (VCP).

EDUCATION

B.A., Geology, Chemistry and Environmental Studies
Bowdoin College

PROFESSIONAL REGISTRATION

LEED Accredited Professional (LEED AP) Neighborhood Development

Professional Geologist (PG) in NY

10-Hour OSHA

CPR and First Aid Certified

AFFILIATIONS

New York State Council of Professional Geologists (NYSCPG)

NYSCPG Board of Directors

Urban Green Council

New York City Brownfield Partnership

SELECTED PROJECTS

- Greenpoint Landing Waterfront Development, Brooklyn, NY: Brownfield Redevelopment, E-Designation, NYC VCP
- Anable Basin, Long Island City, NY; Brownfield Redevelopment, BCP.
- 82 King Street, New York, NY: Brownfield Redevelopment, BCP
- 300 West 122nd Street, New York, NY: Brownfield Redevelopment, BCP
- 2409 Jerome Avenue, Bronx, NY: Brownfield Redevelopment, BCP.
- City DPW Yard, New Rochelle, NY: Brownfield Redevelopment, BCP
- 160 Leroy Street, New York, NY: Brownfield Redevelopment; E-Designation, NYC VCP 685 First Avenue. New York, NY: Brownfield Redevelopment: NYSDEC Voluntary Cleanup Program
- 60 West Street, Brooklyn, NY: Brownfield Redevelopment, E-Designation
- 27-19 44th Drive, Long Island City, NY: Brownfield Redevelopment
- 515 West 42nd Street, New York, NY: E-Designation
- Brooklyn Bridge Park, Pierhouse: Brownfield Redevelopment 550 Myrtle Avenue, Brooklyn, NY: E-Designation
- 50 Jay Street, Phase I ESA, Brooklyn, NY
- 205 Water Street, Brooklyn, NY: Brownfield Redevelopment, E-Designation
- 29-01 Borden Avenue, Long Island City, NY; Brownfield Redevelopment, NYSDEC Spills
- 29-10 Hunters Point Avenue, Long Island City, NY: Brownfield Redevelopment
- 30-27 Greenpoint Avenue, Long Island City, NY: NYSDEC Spills
- 55 Water Street, New York, NY: Emergency petroleum spill closure (Tropical Storm Sandy)
- 144 East 201st Street, New York, NY: Brownfield Redevelopment, E-Designation
- 310 Meserole Street, Phase I ESA, Brooklyn, NY

- 13-17 Laight Street, Phase I ESA, New York, NY
- 460 Mother Gaston Boulevard, Phase I ESA, Brooklyn, NY
- 25 Kent Avenue, Phase I ESA, Brooklyn, NY
- 1110 Oak Point Avenue, Phase I ESA, Bronx, NY
- 859-863 Lexington Avenue, Phase I ESA, New York, NY
- 49 East 21st Street, Phase I ESA, New York, NY
- 1552-1560 Broadway, Phase I ESA, New York, NY
- 287-291 East Houston Street, Phase I ESA, New York, NY
- Big River Study Area (Superfund), Old Lead Belt, Park Hills and Desloge, MO: Remedial Investigation
  Berry's Creek Study Area (Superfund Site), Bergen County, NJ: Remedial Investigation
- Everglades Restoration Project, Clewiston, FL: Remedial Investigation
- Marble River Wind Farm, Ellenburg, NY: Wetland Delineation

JULIA LEUNG, PE

PROJECT ENGINEER

ENVIRONMENTAL ENGINEERING & WATER RESOURCES

Ms. Leung is an environmental engineer working in the New York Metro area. Her projects involve the investigation and assessment of environmental systems including physical/chemical processes, water chemistry, environmental system analysis, solid waste and water resources engineering, stormwater design and hydrology.

SELECTED PROJECTS

- Phase I ESA, Various Locations, NYC and Westchester County, NY
- Phase II ESI, 412 East 90th Street, New York, NY
- 420 Kent Avenue, Brooklyn, NY
- West and Watts Development, New York, NY
- 203 East 92nd Street, Mixed-Use Building, New York, NY
- BAM North Tower, Brooklyn, NY
- Phase II ESI, FedEx Distribution Facility (830 Fountain Avenue), Brooklyn, NY
- Waste Classification and Lead Delineation Investigation (261 Hudson Street), New York, NY
- Waste Classification Investigation (41-43 East 22nd Street), New York, NY
- Columbia University, Manhattanville Campus, New York, NY
- Riverside Building 5, New York, NY
- Condominium at 200 East 79th Street, New York, NY
- Mercedes Benz of Manhattan (536 West 41st Street), New York, NY
- Phase II ESI (627 Smith Street), Brooklyn, NY
- 340 Court Street, Brooklyn, NY
- 460 Washington Street, New York, NY
- 208 East 79th Street, New York, NY
- 320 Fordham Landing, Bronx, NY
- Greenpoint Landing, Brooklyn, NY
- ABC Block 25, ABC Block 26, ABC Block 27, Long Island City, NY
- 80 Flatbush Avenue, Brooklyn, NY
- 2409 Jerome Avenue, Bronx, NY
- Bronx Point, Bronx, NY
- 4650 Broadway, New York, NY
- 445 Gerard Avenue and 414 Gerard Avenue, Bronx, NY

EDUCATION

M.E., Environmental Engineering
Cornell University

B.S., Biological Engineering (Environmental Studies Concentration)
Cornell University

PROFESSIONAL REGISTRATION

Professional Engineer (PE) in NY

10-Hour OSHA

AFFILIATIONS

American Society of Civil Engineers (ASCE)

JOSEPH CONBOY

STAFF CHEMIST

ENVIRONMNETAL

Mr. Conboy has seven years of environmental chemistry, quality assurance, and environmental database management experience, with a current emphasis on validation of laboratory data for submittal to NJDEP via the New Jersey Data of Known Quality Protocols and to NYSDEC. Previous work experience includes performing validation of data for projects in USEPA Regions 2 and 3 while employing appropriate validation guidelines for each region, managing large data sets, updating appropriate regulatory limits, performing statistical evaluations, and preparing electronic data deliverables and report deliverables using the Earthsoft EQuIS database program, and acted as an intermediary between project managers, field staff, and laboratories. Mr. Conboy also has experience in field sampling techniques and maintains current OSHA HAZWOPER certification.

EDUCATION

B.Sc., Chemistry with a minor in Mathematics
Rowan University

CERTIFICATIONS & TRAINING

OSHA 40-Hour HAZWOPER 29 CFR 1910.120(e)(4) Certification

NJ Analytical Guidance and Data Usability Training

USEPA Data Validation Training

Earthsoft EQuIS Environmental Database Training

SELECTED PROJECTS

- 1400 Ferris, Bronx, NY – Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs and SVOCs including 1,4-dioxane, and tangentially used based on professional judgment to perform validation of PFAS data.
- Broome Street Parking Lot, NY - Completed validation of waste characterization data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOCs, SVOCs, herbicides, PCBs, pesticides, metals including mercury, ignitability temperature, pH, reactive cyanide, reactive sulfide, cyanide, and hexavalent chromium. Toxicity characteristic leachate procedure extraction data for VOCs, SVOCs, herbicides, pesticides, metals, and mercury were also validated.
- 215 North 10th Street, Brooklyn, NY - Completed validation of soil and groundwater data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data.
- 35 Commercial Street, Brooklyn, NY - Completed validation of soil data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.
- Suffolk Street, Lower East Side, NY- Completed validation of soil, groundwater, and soil vapor data and prepared the Data Usability Summary Report for submittal to NYSDEC. USEPA Region II

guidelines, with aide from National Functional Guidelines, were employed to perform validation of VOC, VOCs by USEPA TO-15, SVOC, SVOC SIM, herbicide, PCB, pesticide, metals, mercury, cyanide, hexavalent chromium, trivalent chromium data, and tangentially used based on professional judgment to perform validation of PFAS data.

- Managed a database for a confidential client containing 10+ years of environmental chemical data from multiple laboratories, requiring select data validation in accordance with New Jersey Data of Known Quality Protocols and identifying areas of delineation from historic field information. Once identified, NJDEP designated groundwater, surface water, soil, sediment, soil vapor, and custom screening criteria were researched and applied to each area, requiring individualized flagging for reporting.*
- Prepared the New Jersey Data of Known Quality Protocol Data Usability Evaluation and managed the database for a confidential client for a data set greater than 20 years old. A DUE or any validation effort was not prepared in the 20 years prior to current. This included data from variations of methods for volatile organic compounds, semivolatile organic compounds, total and dissolved metals, pesticides, herbicides, natural attenuation parameters, and per- and polyfluoroalkyl substances in multiple media.*
- Performed 200+ Stage 2a validations for a combined 87-acre USEPA designated Corrective Action site under the Resource Conservation and Recovery Act, including a quick-turn USEPA required PCB by soxhlet extraction investigation across multiple plants. Once a former train car painting facility, USEPA required a quick-turn PCB by soxhlet extraction soil investigation.
- Preparation of a quality assurance program for a confidential client in West Virginia. A quick turn QAPP was prepared in a service location new to the consultant, resulting in research into state requirements for data usability and auditing newly employed laboratories. The QAPP was understood to be prepared for groundwater only, but the client did not reveal the need for sediment and soil. Two QAPPs were submitted for review to governing agencies.*
- Used statistical software to determine a localized background upper confidence limit of chromium for a confidential client's sand and gravel site. Validation was used to confirm laboratory procedures, and data was used in ProUCL calculations to compare to researched background chromium levels for Pennsylvania soils. *
- Prepared daily perimeter dust and air monitoring summaries and validation of low level mirex data for a confidential client's superfund site. Low level mirex data was generated by university laboratories and subject to validation following national functional guidelines to aide in river clean-up, including sediment, surface water, and treatment system water matrices.*

**Project completed prior to employment at LANGAN.*

ATTACHMENT B

LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

ATTACHMENT B

GROUNDWATER SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Method	Matrix	Analyte	RL	MDL	Units
Volatile Organic Compounds					
EPA 8260C	Groundwater	1,1,1,2-Tetrachloroethane	0.5	0.164	ug/L
EPA 8260C	Groundwater	1,1,1-Trichloroethane	0.5	0.158	ug/L
EPA 8260C	Groundwater	1,1,2,2-Tetrachloroethane	0.5	0.144	ug/L
EPA 8260C	Groundwater	1,1,2-Trichloro-1,2,2-Trifluoroethane	10	0.148	ug/L
EPA 8260C	Groundwater	1,1,2-Trichloroethane	0.75	0.144	ug/L
EPA 8260C	Groundwater	1,1-Dichloroethane	0.75	0.21	ug/L
EPA 8260C	Groundwater	1,1-Dichloroethene	0.5	0.142	ug/L
EPA 8260C	Groundwater	1,1-Dichloropropene	2.5	0.173	ug/L
EPA 8260C	Groundwater	1,2,3-Trichlorobenzene	2.5	0.234	ug/L
EPA 8260C	Groundwater	1,2,3-Trichloropropane	5	0.176	ug/L
EPA 8260C	Groundwater	1,2,4,5-Tetramethylbenzene	2	0.542	ug/L
EPA 8260C	Groundwater	1,2,4-Trichlorobenzene	2.5	0.22	ug/L
EPA 8260C	Groundwater	1,2,4-Trimethylbenzene	2.5	0.191	ug/L
EPA 8260C	Groundwater	1,2-Dibromo-3-chloropropane	2.5	0.327	ug/L
EPA 8260C	Groundwater	1,2-Dibromoethane	2	0.193	ug/L
EPA 8260C	Groundwater	1,2-Dichlorobenzene	2.5	0.184	ug/L
EPA 8260C	Groundwater	1,2-Dichloroethane	0.5	0.132	ug/L
EPA 8260C	Groundwater	1,2-Dichloropropane	1.75	0.133	ug/L
EPA 8260C	Groundwater	1,3,5-Trimethylbenzene	2.5	0.174	ug/L
EPA 8260C	Groundwater	1,3-Dichlorobenzene	2.5	0.186	ug/L
EPA 8260C	Groundwater	1,3-Dichloropropane	2.5	0.212	ug/L
EPA 8260C	Groundwater	1,4-Dichlorobenzene	2.5	0.187	ug/L
EPA 8260C	Groundwater	1,4-Diethylbenzene	2	0.392	ug/L
EPA 8260C	Groundwater	2,2-Dichloropropane	2.5	0.204	ug/L
EPA 8260C	Groundwater	2-Butanone	5	1.94	ug/L
EPA 8260C	Groundwater	2-Hexanone	5	0.515	ug/L
EPA 8260C	Groundwater	4-Ethyltoluene	2	0.34	ug/L
EPA 8260C	Groundwater	4-Methyl-2-pentanone	5	0.416	ug/L
EPA 8260C	Groundwater	Acetone	5	1.46	ug/L
EPA 8260C	Groundwater	Acrolein	5	0.633	ug/L
EPA 8260C	Groundwater	Acrylonitrile	5	0.43	ug/L
EPA 8260C	Groundwater	Benzene	0.5	0.159	ug/L
EPA 8260C	Groundwater	Bromobenzene	2.5	0.152	ug/L
EPA 8260C	Groundwater	Bromochloromethane	2.5	0.138	ug/L
EPA 8260C	Groundwater	Bromodichloromethane	0.5	0.192	ug/L
EPA 8260C	Groundwater	Bromoform	2	0.248	ug/L
EPA 8260C	Groundwater	Bromomethane	1	0.256	ug/L
EPA 8260C	Groundwater	Carbon disulfide	5	0.299	ug/L
EPA 8260C	Groundwater	Carbon tetrachloride	0.5	0.134	ug/L
EPA 8260C	Groundwater	Chlorobenzene	0.5	0.178	ug/L
EPA 8260C	Groundwater	Chloroethane	1	0.134	ug/L
EPA 8260C	Groundwater	Chloroform	0.75	0.162	ug/L
EPA 8260C	Groundwater	Chloromethane	2.5	0.176	ug/L
EPA 8260C	Groundwater	cis-1,2-Dichloroethene	0.5	0.187	ug/L
EPA 8260C	Groundwater	cis-1,3-Dichloropropene	0.5	0.144	ug/L
EPA 8260C	Groundwater	Cyclohexane	10	0.271	ug/L
EPA 8260C	Groundwater	Dibromochloromethane	0.5	0.149	ug/L
EPA 8260C	Groundwater	Dibromomethane	5	0.363	ug/L
EPA 8260C	Groundwater	Dichlorodifluoromethane	5	0.245	ug/L
EPA 8260C	Groundwater	Ethyl ether	2.5	0.15	ug/L
EPA 8260C	Groundwater	Ethylbenzene	0.5	0.168	ug/L
EPA 8260C	Groundwater	Hexachlorobutadiene	0.5	0.217	ug/L
EPA 8260C	Groundwater	Isopropylbenzene	0.5	0.187	ug/L
EPA 8260C	Groundwater	Methyl Acetate	10	0.234	ug/L
EPA 8260C	Groundwater	Methyl cyclohexane	10	0.396	ug/L
EPA 8260C	Groundwater	Methyl tert butyl ether	1	0.16	ug/L
EPA 8260C	Groundwater	Methylene chloride	3	0.289	ug/L
EPA 8260C	Groundwater	Naphthalene	2.5	0.216	ug/L
EPA 8260C	Groundwater	n-Butylbenzene	0.5	0.192	ug/L
EPA 8260C	Groundwater	n-Propylbenzene	0.5	0.173	ug/L
EPA 8260C	Groundwater	o-Chlorotoluene	2.5	0.17	ug/L
EPA 8260C	Groundwater	o-Xylene	1	0.33	ug/L
EPA 8260C	Groundwater	p/m-Xylene	1	0.332	ug/L
EPA 8260C	Groundwater	p-Chlorotoluene	2.5	0.185	ug/L
EPA 8260C	Groundwater	p-Isopropyltoluene	0.5	0.188	ug/L
EPA 8260C	Groundwater	sec-Butylbenzene	0.5	0.181	ug/L
EPA 8260C	Groundwater	Styrene	1	0.359	ug/L
EPA 8260C	Groundwater	tert-Butyl Alcohol	10	0.899	ug/L
EPA 8260C	Groundwater	tert-Butylbenzene	2.5	0.185	ug/L
EPA 8260C	Groundwater	Tetrachloroethene	0.5	0.181	ug/L
EPA 8260C	Groundwater	Toluene	0.75	0.161	ug/L
EPA 8260C	Groundwater	trans-1,2-Dichloroethene	0.75	0.163	ug/L
EPA 8260C	Groundwater	trans-1,3-Dichloropropene	0.5	0.164	ug/L
EPA 8260C	Groundwater	trans-1,4-Dichloro-2-butene	2.5	0.173	ug/L
EPA 8260C	Groundwater	Trichloroethene	0.5	0.175	ug/L
EPA 8260C	Groundwater	Trichlorofluoromethane	2.5	0.161	ug/L
EPA 8260C	Groundwater	Vinyl acetate	5	0.311	ug/L
EPA 8260C	Groundwater	Vinyl chloride	1	0.0699	ug/L
EPA 8260C	Groundwater	Xylenes, Total	1	0.33	ug/L

ATTACHMENT B

GROUNDWATER SAMPLES
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Method	Matrix	Analyte	RL	MDL	Units
Semivolatile Organic Compounds					
EPA 8270D	Groundwater	1,2,4,5-Tetrachlorobenzene	10	0.357	ug/L
EPA 8270D	Groundwater	1,2,4-Trichlorobenzene	5	0.21	ug/L
EPA 8270D	Groundwater	1,2-Dichlorobenzene	2	0.302	ug/L
EPA 8270D	Groundwater	1,3-Dichlorobenzene	2	0.35	ug/L
EPA 8270D	Groundwater	1,4-Dichlorobenzene	2	0.323	ug/L
EPA 8270D	Groundwater	2,3,4,6-Tetrachlorophenol	5	0.59	ug/L
EPA 8270D	Groundwater	2,4,5-Trichlorophenol	5	0.748	ug/L
EPA 8270D	Groundwater	2,4,6-Trichlorophenol	5	0.775	ug/L
EPA 8270D	Groundwater	2,4-Dichlorophenol	5	0.564	ug/L
EPA 8270D	Groundwater	2,4-Dimethylphenol	5	0.578	ug/L
EPA 8270D	Groundwater	2,4-Dinitrophenol	20	1.4081	ug/L
EPA 8270D	Groundwater	2,4-Dinitrotoluene	5	1.05	ug/L
EPA 8270D	Groundwater	2,6-Dinitrotoluene	5	0.89	ug/L
EPA 8270D	Groundwater	2-Chloronaphthalene	2	0.455	ug/L
EPA 8270D	Groundwater	2-Chlorophenol	2	0.58	ug/L
EPA 8270D	Groundwater	2-Methylnaphthalene	2	0.355	ug/L
EPA 8270D	Groundwater	2-Methylphenol	5	0.703	ug/L
EPA 8270D	Groundwater	2-Nitroaniline	5	0.956	ug/L
EPA 8270D	Groundwater	2-Nitrophenol	10	1.05	ug/L
EPA 8270D	Groundwater	3,3'-Dichlorobenzidine	5	0.478	ug/L
EPA 8270D	Groundwater	3-Methylphenol/4-Methylphenol	5	0.72	ug/L
EPA 8270D	Groundwater	3-Nitroaniline	5	0.668	ug/L
EPA 8270D	Groundwater	4,6-Dinitro-o-cresol	10	1.36	ug/L
EPA 8270D	Groundwater	4-Bromophenyl phenyl ether	2	0.428	ug/L
EPA 8270D	Groundwater	4-Chloroaniline	5	0.835	ug/L
EPA 8270D	Groundwater	4-Chlorophenyl phenyl ether	2	0.355	ug/L
EPA 8270D	Groundwater	4-Nitroaniline	5	0.83	ug/L
EPA 8270D	Groundwater	4-Nitrophenol	10	1.09	ug/L
EPA 8270D	Groundwater	Acenaphthene	2	0.284	ug/L
EPA 8270D	Groundwater	Acenaphthylene	2	0.372	ug/L
EPA 8270D	Groundwater	Acetophenone	5	0.428	ug/L
EPA 8270D	Groundwater	Anthracene	2	0.2	ug/L
EPA 8270D	Groundwater	Atrazine	10	0.794	ug/L
EPA 8270D	Groundwater	Azobenzene	2	0.537	ug/L
EPA 8270D	Groundwater	Benzaldehyde	5	0.986	ug/L
EPA 8270D	Groundwater	Benzidine	20	5.24	ug/L
EPA 8270D	Groundwater	Benzo(a)anthracene	2	0.323	ug/L
EPA 8270D	Groundwater	Benzo(a)pyrene	2	0.658	ug/L
EPA 8270D	Groundwater	Benzo(b)fluoranthene	2	0.371	ug/L
EPA 8270D	Groundwater	Benzo(ghi)perylene	2	0.574	ug/L
EPA 8270D	Groundwater	Benzo(k)fluoranthene	2	0.3	ug/L
EPA 8270D	Groundwater	Benzoic Acid	50	1.0104	ug/L
EPA 8270D	Groundwater	Benzyl Alcohol	2	0.677	ug/L
EPA 8270D	Groundwater	Biphenyl	2	0.237	ug/L
EPA 8270D	Groundwater	Bis(2-chloroethoxy)methane	5	0.596	ug/L
EPA 8270D	Groundwater	Bis(2-chloroethyl)ether	2	0.409	ug/L
EPA 8270D	Groundwater	Bis(2-chloroisopropyl)ether	2	0.597	ug/L
EPA 8270D	Groundwater	Bis(2-Ethylhexyl)phthalate	3	0.928	ug/L
EPA 8270D	Groundwater	Butyl benzyl phthalate	5	1.13	ug/L
EPA 8270D	Groundwater	Caprolactam	10	0.3895	ug/L
EPA 8270D	Groundwater	Carbazole	2	0.374	ug/L
EPA 8270D	Groundwater	Chrysene	2	0.304	ug/L
EPA 8270D	Groundwater	Dibenzo(a,h)anthracene	2	0.438	ug/L
EPA 8270D	Groundwater	Dibenzofuran	2	0.218	ug/L
EPA 8270D	Groundwater	Diethyl phthalate	5	0.393	ug/L
EPA 8270D	Groundwater	Dimethyl phthalate	5	0.333	ug/L
EPA 8270D	Groundwater	Di-n-butylphthalate	5	0.768	ug/L
EPA 8270D	Groundwater	Di-n-octylphthalate	5	1.2	ug/L
EPA 8270D	Groundwater	Fluoranthene	2	0.401	ug/L
EPA 8270D	Groundwater	Fluorene	2	0.32	ug/L
EPA 8270D	Groundwater	Hexachlorobenzene	2	0.396	ug/L
EPA 8270D	Groundwater	Hexachlorobutadiene	2	0.417	ug/L
EPA 8270D	Groundwater	Hexachlorocyclopentadiene	20	0.585	ug/L
EPA 8270D	Groundwater	Hexachloroethane	2	0.298	ug/L
EPA 8270D	Groundwater	Indeno(1,2,3-cd)Pyrene	2	0.433	ug/L
EPA 8270D	Groundwater	Isophorone	5	0.787	ug/L
EPA 8270D	Groundwater	Naphthalene	2	0.332	ug/L
EPA 8270D	Groundwater	Nitrobenzene	2	0.401	ug/L
EPA 8270D	Groundwater	NitrosoDiPhenylAmine(NDPA)/DPA	2	0.34	ug/L
EPA 8270D	Groundwater	n-Nitrosodimethylamine	2	0.498	ug/L
EPA 8270D	Groundwater	n-Nitrosodi-n-propylamine	5	0.645	ug/L
EPA 8270D	Groundwater	P-Chloro-M-Cresol	2	0.543	ug/L
EPA 8270D	Groundwater	Pentachlorophenol	10	3.22	ug/L
EPA 8270D	Groundwater	Phenanthrene	2	0.23	ug/L
EPA 8270D	Groundwater	Phenol	5	0.27	ug/L
EPA 8270D	Groundwater	Pyrene	2	0.524	ug/L
EPA 8270D-SIM	Groundwater	2-Chloronaphthalene	0.2	0.035	ug/L
EPA 8270D-SIM	Groundwater	2-Methylnaphthalene	0.2	0.045	ug/L
EPA 8270D-SIM	Groundwater	Acenaphthene	0.2	0.035	ug/L
EPA 8270D-SIM	Groundwater	Acenaphthylene	0.2	0.035	ug/L
EPA 8270D-SIM	Groundwater	Anthracene	0.2	0.035	ug/L
EPA 8270D-SIM	Groundwater	Benzo(a)anthracene	0.2	0.016	ug/L
EPA 8270D-SIM	Groundwater	Benzo(a)pyrene	0.2	0.039	ug/L
EPA 8270D-SIM	Groundwater	Benzo(b)fluoranthene	0.2	0.016	ug/L
EPA 8270D-SIM	Groundwater	Benzo(ghi)perylene	0.2	0.042	ug/L
EPA 8270D-SIM	Groundwater	Benzo(k)fluoranthene	0.2	0.042	ug/L
EPA 8270D-SIM	Groundwater	Chrysene	0.2	0.038	ug/L
EPA 8270D-SIM	Groundwater	Dibenzo(a,h)anthracene	0.2	0.039	ug/L
EPA 8270D-SIM	Groundwater	Fluoranthene	0.2	0.038	ug/L
EPA 8270D-SIM	Groundwater	Fluorene	0.2	0.037	ug/L
EPA 8270D-SIM	Groundwater	Hexachlorobenzene	0.8	0.032	ug/L
EPA 8270D-SIM	Groundwater	Hexachlorobutadiene	0.5	0.036	ug/L
EPA 8270D-SIM	Groundwater	Hexachloroethane	0.8	0.03	ug/L
EPA 8270D-SIM	Groundwater	Indeno(1,2,3-cd)Pyrene	0.2	0.04	ug/L
EPA 8270D-SIM	Groundwater	Naphthalene	0.2	0.043	ug/L
EPA 8270D-SIM	Groundwater	Pentachlorophenol	0.8	0.22	ug/L
EPA 8270D-SIM	Groundwater	Phenanthrene	0.2	0.015	ug/L
EPA 8270D-SIM	Groundwater	Pyrene	0.2	0.04	ug/L
METALS					
EPA 6020B	Groundwater	Iron, Dissolved	0.05	0.0191	mg/L
EPA 6020B	Groundwater	Iron, Total	0.05	0.0191	mg/L
EPA 6020B	Groundwater	Manganese, Dissolved	0.001	0.00044	mg/L
EPA 6020B	Groundwater	Manganese, Total	0.001	0.00044	ug/L
Wet Chemistry					
4500NH3-BH	Groundwater	Nitrogen, Ammonia	0.075	0.023	mg/L
4500NO3-F	Groundwater	Nitrate	0.1	0.0228	mg/L
4500P-E	Groundwater	Phosphorus, Orthophosphate	0.005	0.001	mg/L
4500SO4-E	Groundwater	Sulfate	10	1.37	mg/L
4500S2-D	Groundwater	Sulfide	0.1	0.1	mg/L
Heterotrophic Plate Count and Gene Analysis					
Heterotrophic Plate Count	Groundwater	Anaerobic Heterotrophic Plate Count, Total	N/A	N/A	cfu/mL
Quantitative Polymerase Reactions	Groundwater	Bacteria, Total	5,000 cells	100 cells	cells/g
Quantitative Polymerase Reactions	Groundwater	Sulfate Reducing Bacteria, Total	5,000 cells	100 cells	cells/g

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Langan Engineering & Environmental

TCL Volatiles - EPA 8260C/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
Methylene chloride	75-09-2	10	0.816	ug/kg	70-130	30	70-130	30	30			
1,1-Dichloroethane	75-34-3	1.5	0.2952	ug/kg	70-130	30	70-130	30	30			
Chloroform	67-66-3	1.5	0.3246	ug/kg	70-130	30	70-130	30	30			
Carbon tetrachloride	56-23-5	1	0.2112	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloropropane	78-87-5	3.5	0.255	ug/kg	70-130	30	70-130	30	30			
Dibromochloromethane	124-48-1	1	0.3078	ug/kg	70-130	30	70-130	30	30			
1,1,2-Trichloroethane	79-00-5	1.5	0.393	ug/kg	70-130	30	70-130	30	30			
Tetrachloroethene	127-18-4	1	0.3062	ug/kg	70-130	30	70-130	30	30			
Chlorobenzene	108-90-7	1	0.1862	ug/kg	70-130	30	70-130	30	30			
Trichlorofluoromethane	75-69-4	5	0.3914	ug/kg	70-139	30	70-139	30	30			
1,2-Dichloroethane	107-06-2	1	0.2274	ug/kg	70-130	30	70-130	30	30			
1,1,1-Trichloroethane	71-55-6	1	0.2698	ug/kg	70-130	30	70-130	30	30			
Bromodichloromethane	75-27-4	1	0.3848	ug/kg	70-130	30	70-130	30	30			
trans-1,3-Dichloropropene	10061-02-6	1	0.3006	ug/kg	70-130	30	70-130	30	30			
cis-1,3-Dichloropropene	10061-01-5	1	0.2672	ug/kg	70-130	30	70-130	30	30			
1,1-Dichloropropene	563-58-6	5	0.4556	ug/kg	70-130	30	70-130	30	30			
Bromoform	75-25-2	4	0.4954	ug/kg	70-130	30	70-130	30	30			
1,1,2,2-Tetrachloroethane	79-34-5	1	0.2402	ug/kg	70-130	30	70-130	30	30			
Benzene	71-43-2	1	0.2972	ug/kg	70-130	30	70-130	30	30			
Toluene	108-88-3	1.5	0.2416	ug/kg	70-130	30	70-130	30	30			
Ethylbenzene	100-41-4	1	0.2214	ug/kg	70-130	30	70-130	30	30			
Chloromethane	74-87-3	5	0.7832	ug/kg	52-130	30	52-130	30	30			
Bromomethane	74-83-9	2	0.6478	ug/kg	57-147	30	57-147	30	30			
Vinyl chloride	75-01-4	2	0.7534	ug/kg	67-130	30	67-130	30	30			
Chloroethane	75-00-3	2	0.4384	ug/kg	50-151	30	50-151	30	30			
1,1-Dichloroethene	75-35-4	1	0.2598	ug/kg	65-135	30	65-135	30	30			
trans-1,2-Dichloroethene	156-60-5	1.5	0.3916	ug/kg	70-130	30	70-130	30	30			
Trichloroethene	79-01-6	1	0.224	ug/kg	70-130	30	70-130	30	30			
1,2-Dichlorobenzene	95-50-1	5	0.3642	ug/kg	70-130	30	70-130	30	30			
1,3-Dichlorobenzene	541-73-1	5	0.3996	ug/kg	70-130	30	70-130	30	30			
1,4-Dichlorobenzene	106-46-7	5	0.4198	ug/kg	70-130	30	70-130	30	30			
Methyl tert butyl ether	1634-04-4	2	0.487	ug/kg	66-130	30	66-130	30	30			
p/m-Xylene	179601-23-1	2	0.43	ug/kg	70-130	30	70-130	30	30			
o-Xylene	95-47-6	2	0.4174	ug/kg	70-130	30	70-130	30	30			
cis-1,2-Dichloroethene	156-59-2	1	0.3014	ug/kg	70-130	30	70-130	30	30			
Dibromomethane	74-95-3	10	0.4348	ug/kg	70-130	30	70-130	30	30			
Styrene	100-42-5	2	0.726	ug/kg	70-130	30	70-130	30	30			
Dichlorodifluoromethane	75-71-8	10	0.3888	ug/kg	30-146	30	30-146	30	30			
Acetone	67-64-1	10	3.235	ug/kg	54-140	30	54-140	30	30			
Carbon disulfide	75-15-0	10	0.3754	ug/kg	59-130	30	59-130	30	30			
2-Butanone	78-93-3	10	3.8772	ug/kg	70-130	30	70-130	30	30			
Vinyl acetate	108-05-4	10	0.751	ug/kg	70-130	30	70-130	30	30			

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. (Soil/Solids only)
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

Langan Engineering & Environmental

TCL Volatiles - EPA 8260C/5035 High&Low (SOIL)

Holding Time: 14 days
Container/Sample Preservation: 1 - 1 Vial MeOH/2 Vial Water

Analyte	CAS #	RL	MDL	Units	LCS Criteria	LCS RPD	MS Criteria	MS RPD	Duplicate RPD	Surrogate Criteria		
4-Methyl-2-pentanone	108-10-1	10	0.8164	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichloropropane	96-18-4	10	0.387	ug/kg	68-130	30	68-130	30	30			
2-Hexanone	591-78-6	10	0.3964	ug/kg	70-130	30	70-130	30	30			
Bromochloromethane	74-97-5	5	0.3022	ug/kg	70-130	30	70-130	30	30			
2,2-Dichloropropane	594-20-7	5	0.795	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromoethane	106-93-4	4	0.4088	ug/kg	70-130	30	70-130	30	30			
1,3-Dichloropropane	142-28-9	5	0.5656	ug/kg	69-130	30	69-130	30	30			
1,1,1,2-Tetrachloroethane	630-20-6	1	0.3284	ug/kg	70-130	30	70-130	30	30			
Bromobenzene	108-86-1	5	0.2202	ug/kg	70-130	30	70-130	30	30			
n-Butylbenzene	104-51-8	1	0.3144	ug/kg	70-130	30	70-130	30	30			
sec-Butylbenzene	135-98-8	1	0.2756	ug/kg	70-130	30	70-130	30	30			
tert-Butylbenzene	98-06-6	5	0.6032	ug/kg	70-130	30	70-130	30	30			
o-Chlorotoluene	95-49-8	5	0.313	ug/kg	70-130	30	70-130	30	30			
p-Chlorotoluene	106-43-4	5	0.3608	ug/kg	70-130	30	70-130	30	30			
1,2-Dibromo-3-chloropropane	96-12-8	5	0.8366	ug/kg	68-130	30	68-130	30	30			
Hexachlorobutadiene	87-68-3	5	0.4582	ug/kg	67-130	30	67-130	30	30			
Isopropylbenzene	98-82-8	1	0.177	ug/kg	70-130	30	70-130	30	30			
p-Isopropyltoluene	99-87-6	1	0.2732	ug/kg	70-130	30	70-130	30	30			
Naphthalene	91-20-3	5	0.7696	ug/kg	70-130	30	70-130	30	30			
Acrylonitrile	107-13-1	10	0.3756	ug/kg	70-130	30	70-130	30	30			
n-Propylbenzene	103-65-1	1	0.284	ug/kg	70-130	30	70-130	30	30			
1,2,3-Trichlorobenzene	87-61-6	5	0.4034	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trichlorobenzene	120-82-1	5	0.7898	ug/kg	70-130	30	70-130	30	30			
1,3,5-Trimethylbenzene	108-67-8	5	0.6016	ug/kg	70-130	30	70-130	30	30			
1,2,4-Trimethylbenzene	95-63-6	5	0.573	ug/kg	70-130	30	70-130	30	30			
1,4-Dioxane	123-91-1	100	17.4	ug/kg	65-136	30	65-136	30	30			
1,4-Diethylbenzene	105-05-5	4	0.2	ug/kg	70-130	30	70-130	30	30			
4-Ethyltoluene	622-96-8	4	0.097	ug/kg	70-130	30	70-130	30	30			
1,2,4,5-Tetramethylbenzene	95-93-2	4	0.181	ug/kg	70-130	30	70-130	30	30			
Ethyl ether	60-29-7	5	0.3798	ug/kg	67-130	30	67-130	30	30			
trans-1,4-Dichloro-2-butene	110-57-6	5	1.478	ug/kg	70-130	30	70-130	30	30			
1,2-Dichloroethane-d4	*17060-07-0*									*70-130*		
2-Chloroethoxyethane												
Toluene-d8	*2037-26-5*									*70-130*		
4-Bromofluorobenzene	*460-00-4*									*70-130*		
Dibromofluoromethane	*1868-53-7*									*70-130*		

Please Note that the RL information provided in this table is calculated using a 100% Solids factor. ***(Soil/Solids only)***
Please Note that the information provided in this table is subject to change at anytime at the discretion of Alpha Analytical, Inc.

ATTACHMENT C

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

ATTACHMENT C

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	MS/MSD Samples
Groundwater	Temperature, Turbidity, pH, ORP, Conductivity	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2;no headspace	Three 40-mL VOC vials with Teflon®-lined cap	Analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	1 per 20 samples
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis				
		Part 375 + TAL Metals	EPA 6020B, EPA 7470A	Cool to 4°C; HNO_3	250 ml plastic	6 months, except Mercury 28 days				
		Sulfate (SO_4^{3})	EPA 300.0, SM 4500SO4-E, EPA 9038	None	250mL plastic	28 days	N/A	N/A	N/A	N/A
		Sulfide (S^{2-})	SM 4500S2-AD, EPA 9030B	NaOH, Zinc Acetate	Two 250mL	7 days	N/A	N/A	N/A	N/A
		Nitrate (NO_3^{1-})	EPA 300.0, SM4500NO_3-F, EPA 353.2	H2SO4	Two 250mL plastic	48 hours	N/A	N/A	N/A	N/A
		Nitrite (NO_{2-})	EPA 353.2, SM 4500NO2-B	H2SO4	Two 250mL plastic	48 hours	N/A	N/A	N/A	N/A
		Orthophosphate	SM 4500P-E	H2SO4	250 mL plastic	28 days	N/A	N/A	N/A	N/A
		Ammonia	SM 4500NH3-BH, EPA 350.1	H2SO4	250 mL plastic	28 days	N/A	N/A	N/A	N/A
		Anaerobic Heterotrophic Plate Count, Total	HPC	Cool to 4°C	Two 40mL VOAVials	48 hours	N/A	N/A	N/A	N/A
		Bacteria, Total	qPCR	Cool to 4°C	One 1-Liter Plastic	48 hours	N/A	N/A	N/A	N/A
		Sulfate Reducing Bacteria	qPCR	Cool to 4°C	One 1-Liter Plastic	48 hours	N/A	N/A	N/A	N/A
Soil	Total VOCs via PID	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C	Two 40-ml VOC vials with 5ml H2O, one with MeOH or 3 Encore Samplers (separate container for % solids)	14 days	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	1 per 20 samples

Notes:
1. PID - Photoionization Detector
2. VOC - Volatile organic compound
3. EPA - Environmental Protection Agency
4. TCL - Target compound list
5. TAL - Target analyte list
6. qPCR - Quantitative Polymerase Reactions
7. HPC - Heterotrophic Plate Count

ATTACHMENT D

SAMPLE NOMENCLATURE

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SAMPLE NOMENCLATURE

The sample nomenclature outlined below provides consistency between sample events and projects but, most importantly, establish unique sample IDs that will avoid confusion months or years after the sample has been collected. Furthermore, unique sample IDs are required for any data submitted to the NYSDEC in EDD format or being uploaded to an EQuIS database.

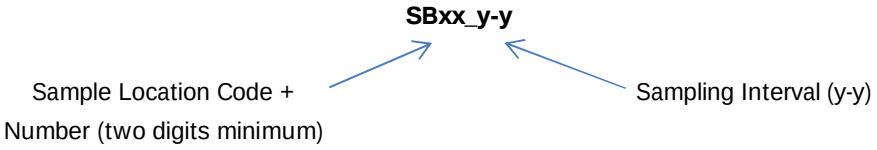
1.0 INVESTIGATION LOCATION CODES

SB	Soil Boring	SV	Soil Vapor Point
WC	Waste Characterization Boring	IA	Indoor Air
TP	Test Pit	AA	Ambient Air
EPSW	Endpoint Location (Sidewall)	SVE	Vapor Extraction Well
EPB	Endpoint Location (Bottom)	DS	Drum
MW	Monitoring Well	IDW	Investigation Derived Waste
TMW	Temporary Monitoring Well	SL	Sludge
SW	Surface Water	FP	Free Product

2.0 SAMPLE NOMENCLATURE

Each sample at a site must have a unique value.

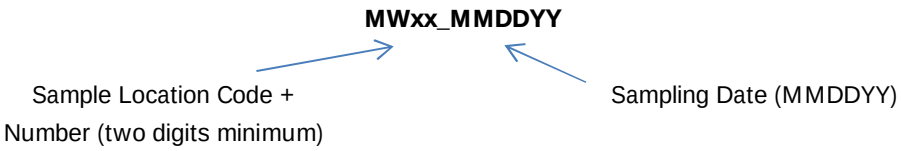
- **Soil/Sediment Samples:**



Sample Type	Sample Location Code	Sampling Depth or Interval (feet bgs or approx. elevation)	Sample Name
Phase II/Remedial Investigation			
Grab Soil Sample	SB01	2 to 4	SB01_2-4
	SB02	4	SB02_4
Waste Characterization			
Grab Soil Sample	WC01	2 to 4	WC01_2-4
	WC02	4	WC02_4
Composite Soil Sample from one or more locations	COMP01 or COMP02 + COMP03	0 to 10 (Fill)	COMP01_0-10

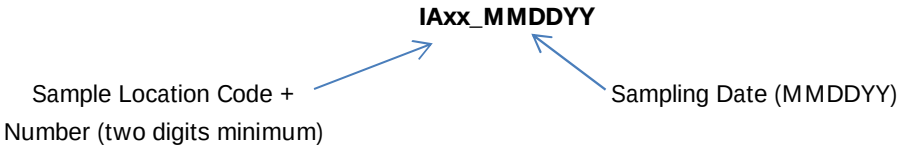
Sample Type	Sample Location Code	Sampling Depth or Interval (feet bgs or approx. elevation)	Sample Name
Endpoint Sampling			
Grab Soil Sample	EPSW01_N	5	EPSW01_N_5
	EPSW01_S	5	EPSW01_S_5
	EPSW01_E	5	EPSW01_E_5
	EPSW01_W	5	EPSW01_W_5
	EPB01	6	EPB01_6

- **Groundwater/Surface Water Samples:**



Sample Type	Sample Location Code	Sampling Date	Sample Name
Groundwater Sample	MW01	02/21/2013	MW01_022113

- **Air/Soil Vapor Samples:**



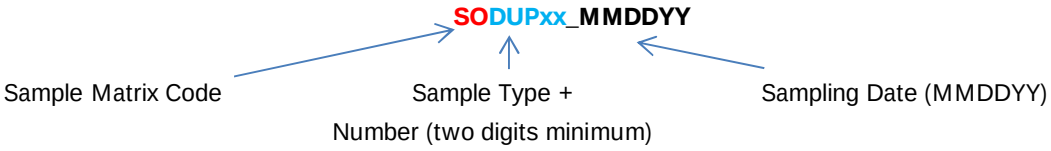
Sample Type	Sample Location Code	Date	Sample Name
Air Sample	IA01	02/21/2013	IA01_022113
Soil Vapor Sample	SV01	02/21/2013	SV01_022113
Vapor Extraction Well Sample	SVE01 (INLET/MIDPOINT/OUTLET)	02/21/2013	SVE01_IN_022113 SVE01_ MID_022113 SVE01_ OUT_022113

- **QA/QC Samples:**

Sample Matrix Codes

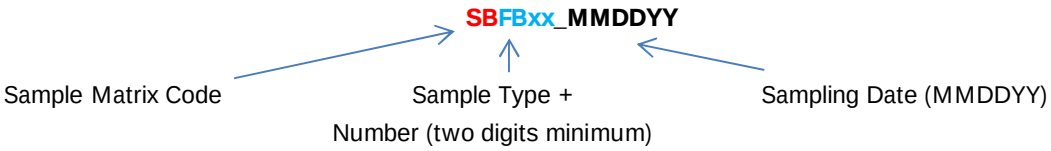
SO	Soil	AS	Air
SE	Sediment	SV	Soil Vapor
GW	Groundwater	SL	Sludge
SW	Surface Water	FP	Free Product

- Duplicates Samples



Sample Type	Parent Sample Code	Date	Sample Name
Groundwater Duplicate Sample (DUP)	MW01_022113	02/21/2013	GWDUP01_022113
Soil boring Duplicate Sample (DUP)	SBP01_022113	02/21/2013	SODUP01_022113
Grab Waste Characterization	WC01	02/21/2013	WCDUP01_022113
Composite Waste Characterization	COMP01	02/21/2013	COMPDUP01_022113

- Field Blanks and Trip Blanks



Sample Type	Date	Sample Name
Groundwater Field Blank (FB)	02/21/2013	GWFB01_022113
Groundwater Trip Blank (TB)	02/21/2013	GWTB01_022113
Soil Field Blank	02/21/2013	SOFB01_022113
Soil Trip Blank	02/21/2013	SOTB01_022113

- Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Parent Sample Name_MS or MSD

Sample Type	Sample Location	Parent Sample Name	Sample Name
Matrix Spike Soil (MS)	SB01	SB01_2-4	SB01_2-4_MS
Matrix Spike Soil Duplicate (MSD)	SB01	SB01_2-4	SB01_2-4_MSD
Matrix Spike GW (MS)	MW01	MW01	MW01_MS
Matrix Spike GW Duplicate (MSD)	MW01	MW01	MW01_MSD

3.0 NOTES

1. The sample location code should not exceed 20 characters and the sample name should not exceed 40 characters.
2. Sample location code (**SB01, MW01, etc.)** is a sequential number (starting with 01) and should be a minimum of two digits.
3. Sample Interval (SB01_**0-5**) is separated from the sample location code with an underscore, and the top and bottom interval with a dash. Soil and sediment sample intervals should always be in

feet. Soil and sediment sample intervals should contain no "/" or "()" or unit.

4. Sample date (MW01_**022113**) is separated from the sample location code with an underscore and should be provided in MMDDYY format [the date should contain no "/" or "-"].
5. If groundwater samples are collected from multiple intervals within one well, you may assign a letter designation (in lower case) to the well ID to differentiate between intervals (i.e., MW01a_022113, MW01b_022113, and MW01c_022113). The letter "a" would indicate the shallowest interval and "c" the deepest. The actual depth intervals should be documented in the project field book or field sheets and the letter designations should be used consistently between sampling events.
6. According to USEPA's Contract Laboratory Program (CLP) Guidance for Field Samplers (January 2011), field duplicate samples should remain "blind" to the laboratory (i.e., they should have separate CLP Sample numbers). Assign two separate (unique) CLP sample numbers (i.e., one number to the field sample and one to the duplicate). Submit blind to the laboratory. (http://www.epa.gov/superfund/programs/clp/download/sampler/CLPSamp-01-2011.pdf)