EnviroGroup Limited
The environmental solutions company

November 17, 2008

Robert McPeak
Energy Solutions
143 West Street
New Milford, CT

Re: Pre-Soil Vapor Intrusion Investigation Work Plan
Leica Area C
Cheektowaga, NY

Dear Mr. McPeak:

This letter provides a work plan for conducting a preliminary investigation in preparation of performing vapor intrusion assessment activities offsite and adjacent to Area C Site of the former Leica facility (the Site) in Cheektowaga, New York (Figure 1) to be conducted by EnviroGroup Limited (EnviroGroup) personnel on behalf of Energy Solutions. We understand that the New York State Department of Environmental Conservation (NYSDEC) in consultation with the New York State Department of Health (NYSDOH) requested that Energy Solutions conduct a soil vapor intrusion evaluation in one or more residential homes located nearest to the above referenced site. The activities described in this work plan are focused on gathering sufficient information to guide the selection process of where to conduct the upcoming vapor intrusion investigation. More specifically, this work plan describes investigation activities to evaluate the presence of certain volatile organic compounds (VOCs) in soil vapor in the vicinity of Area C of the site (Figure 2).

Background Information

The results of groundwater monitoring at the Site to date indicate that VOC concentrations in shallow groundwater are generally low. Groundwater monitoring wells at the Site are mainly located between the facility and Rowan Road. Overburden groundwater flows to the south and southwest in the direction of the residential area. Figure 3 shows the location of the various groundwater monitoring wells in relation to the site and offsite residential properties south of the Site.

A small wet area is present in the adjacent cemetery property near monitoring well MW-14 and a number of residences are located along a portion of Rowan Road to the south of the Site. The nearest occupied buildings are located about 240 feet downgradient (south) of the main building on the Site. The highest concentrations in shallow groundwater are observed in shallow wells MW-10 (cis-1,2-DCE, 190 ug/l and vinyl chloride, 73 ug/l) and MW-14 (cis-1,2-DCE, 220 ug/l and vinyl chloride 25 ug/l). Concentrations were below detection in the shallow wells immediately north of the residences along Rowan Road (MW-3 and MW-

5), and were about 12 ug/l of vinyl chloride at the southernmost monitoring well (MW-22) near the leading edge of the groundwater plume.

The following sections of this letter describe the scope of work, investigation procedures, the investigation team, and the proposed schedule.

Scope of Work

The following scope of work includes the installation and sampling of 8 temporary soil vapor probes approximately 1 to 2 feet above the water table and 8 temporary monitoring wells in Area C and Rowan Road area. The purpose of the sampling program is to evaluate the nature and extent of VOCs in the shallow groundwater and soil vapor phase to the south of MW-22, and to focus any further investigations that may be required to address vapor intrusion potential. The groundwater samples will help delineate the extent of VOCs in the shallow groundwater (the source of potential vapors in this area), while the soil vapor samples will provide a second line of evidence regarding plume location and the potential extent of lateral vapor migration in the vadose zone. These data will also help identify the most appropriate homes for indoor air and sub-slab soil gas testing, if necessary. Proposed sample locations are presented on Figure 3.

Soil Vapor

EnviroGroup will install 8 temporary soil vapor probes using a direct push (Geoprobe™) drill rig to approximately 1 to 2 feet above the water table at the locations shown on Figure 1 to further investigate the nature and extent of residual VOC concentrations observed in groundwater at existing wells. The soil vapor samples will be collected from approximately 1- 2 feet above the water table surface.

The following soil vapor locations are planned: five locations along the southern side of Rowan Road between house number 30 and Preston Road (access permitting); one location along the eastern side of Preston Road; and two locations at the southeast property corner in Area C.

Soil vapor probes will be constructed in accordance with NYSDOH (2006) vapor intrusion guidance. The sampler will ensure that ambient air is not collected in the soil vapor samples by using a helium shroud to minimize the potential for ambient air to be pulled into the samples. In addition, purging and sample collection rates will not exceed 100 ml/minute. Details regarding the helium shroud and sample collection procedures are provided below.

Soil vapor samples will be collected from each new soil vapor probe in accordance with NYSDOH (2006) guidance and submitted to an Environmental Laboratory Approval Program (ELAP)-certified laboratory for analysis. The soil vapor samples will be analyzed for VOCs by EPA Method TO-15.

Ambient Air Sampling

Due to the potential for ambient air to be drawn into shallow soil vapor, one ambient air sample will be collected at the same time as soil vapor in the area, from a representative/upwind location, and submitted to and analyzed by an ELAP-certified laboratory for VOCs by EPA Method TO-15. Ambient air typically contains numerous VOCs. As such, ambient air sample results are typically useful for comparison to soil vapor sample results and aid in characterizing possible background contribution.

Temporary Well Installation, Sampling, and Analysis

Eight different boreholes will be advanced from ground surface to approximately 12 feet below ground surface in unconsolidated deposits using a direct push (Geoprobe™) drill rig at locations adjacent to the above noted soil vapor probe locations, shown on Figure 1.

Soil lithologies will be logged from ground surface to the total depth of each borehole based on evaluation of soil cores. A 1-inch PVC temporary monitoring well will be installed within the saturated section of each borehole. These wells will be screened at or near the water table, with screened intervals of 5 feet or less, to best represent vapor intrusion potential and constructed pursuant to industry standard practices.

Groundwater Sampling and Analysis

One groundwater sample will be collected from each temporary monitoring well using disposable polyethylene bailers with disposable low-flow-tips. A duplicate sample will be collected from one of the temporary wells and one trip blank sample will be submitted for quality control purposes. Field water quality parameters including temperature, pH, and specific conductivity will be measured ex-situ during sampling activities. Groundwater samples will be placed into laboratory-supplied containers, labeled, logged onto chain of custody documents and stored on ice for submittal to and ELAP certified laboratory analysis of VOCs by EPA Method 8260B.

Investigation Procedures

Activities described in this work plan will be conducted in accordance with NYSDOH guidance documents (NYSDOH, 2006) and NYSDEC Draft DER-10 guidance (NYSDEC, 2002).

Soil Vapor Probe Installation, Sampling, and Analysis

Semi-permanent (temporary) soil vapor probes will be installed during investigation activities in accordance with NYSDOH guidance, although it should be noted that the soil vapor probes may be installed shallower than preferred in the guidance due to the high water table. Soil vapor probe installation, sampling, and analysis procedures are described below.

Soil Vapor Probe Installation

Soil vapor probes will be constructed utilizing acrylic screens connected to 1/4 inch inside diameter (ID) inert tubing (i.e., Teflon® or nylon) consistent with NYSDOH guidance (NYSDOH, 2006). The screens will be placed at the desired sampling depth (typically in the middle of the sampling zone, described below) and the tubing extended up the center of the borehole to approximately 24 inches above ground surface and fitted with an air-tight valve.

Each soil vapor sampling zone is expected to be limited to only six inches to one foot in length. The screens will be centered within each sampling zone and the annulus surrounding each screen will be backfilled with clean glass beads (60 – 120 sieve size). The soil vapor probe sampling zones then will be sealed with a granular bentonite seal. Granular bentonite will be installed in nominal 8 inch lifts (with distilled water hydration following each lift) to a height of at least three feet above the glass beads. Due to the shallow water table, the recommended 3 foot minimum thickness of bentonite seal above the sampling zone may not be possible at this site. Soil cuttings generated during soil vapor probe installation activities will be placed adjacent to each soil vapor probe location for backfill at the sampling location. The remaining soil cuttings will be placed into 55 gallon drums and staged on-site at a location designated by Energy Solutions.

Soil Vapor Sampling and Analysis Procedures

All soil vapor samples will be collected in accordance with NYSDOH guidance (NYSDOH, 2006), as described below.

- soil vapor probes will not be disturbed for at least 24 hours after installation and before sampling;
- one implant volume(i.e., bead pack, probe screen and tubing), plus two probe volumes (i.e., the volume of probe screen and tubing) will be calculated based on the diameter of the tubing (i.e. soil vapor probes will be constructed utilizing 0.25 inch ID inert tubing) and purged prior to sample collection.
- the flow rate for purging will not exceed 0.1 liters per minute using calibrated clean gas-tight syringes;
- the flow rate for sampling will not exceed 0.1 liters per minute and will be controlled by laboratory-set regulators installed on the sample canisters;
- soil vapor samples will be collected in 1 liter stainless steel canisters certified clean by the laboratory (Centek Laboratories, LLC, [Centek]), an ELAP-certified laboratory;
- sample canisters will be connected to the probe tubing by an air-tight valve, which allow purging and tracer gas testing using a calibrated gas-tight syringe;
- duplicate samples will be collected from soil vapor probes using a "T" configuration;
- the volume of each soil vapor sample collected will exceed the minimum volume required to achieve the minimum reporting limit; and

- if necessary due to weather conditions, tube warmers will be used to reduce condensation within sample tubing.

A helium tracer shroud will be used when collecting soil vapor samples to verify that appropriate sampling techniques are being implemented. The shroud will consist of a clean, small plastic bucket shroud with two small ports. The shroud will be placed over each soil vapor probe, using hydrated bentonite to create an air-tight seal with the ground.

Each connection will be located inside the shroud and the tubing extended through the air-tight seal of hydrated bentonite to the exterior side of the shroud. All tubing will be purged in the field with ultra high purity (UHP) nitrogen gas. Each soil vapor tube then will be connected to an air-tight 3-way valve with a syringe attached to one side of the valve and the sampling tube on the other side of the valve (both outside of the shroud).

Prior to purging or sampling activities, helium tracer gas will be released via a small diameter tube through a port located on the top of the shroud into the enclosure beneath the shroud. A sample of the air inside the shroud will be measured through the second port using a portable helium detector to determine the concentration of helium within the enclosure beneath the shroud.

Three purge volumes (calculated based on the volume of probe tubing and screen) will be purged via syringe from the soil vapor tube through the shroud and into a tedlar bag. The tedlar bag then will be connected to a portable helium detector to measure for the presence of helium gas in the purged vapors. Immediately after soil vapor purging and prior to sampling, a soil vapor sample will be collected by syringe through the air-tight valve in the sample tubing and analyzed in the field for the presence of helium gas using a portable monitoring device. If high concentrations (>10% of the shroud concentration) of helium are observed in the soil vapor sample, the soil vapor probe seal and shroud seal will be checked and/or enhanced to reduce the infiltration of ambient air into the enclosure and another sample collected. If helium concentrations are less than 10%, a soil vapor sample will be collected in a 1 liter sample canister and submitted for laboratory analysis.

Soil vapor samples will be collected in 1000 mL Summa® (or equivalent) canisters supplied and certified clean (i.e. batch certification) to reporting limit levels by an ELAP-certified laboratory. Soil vapor samples will be shipped under chain-of-custody documentation to an ELAP-certified laboratory and analyzed for VOCs by EPA Method TO-15 with minimum reporting limits of 1 $\mu g/m^3$ or less.

Soil Vapor Probe Equipment Quality Assurance and Control

Prior to deployment to the Site, all soil vapor sample Summa® canisters (or equivalent) and flow regulators will be cleaned by the laboratory according to Method TO-15 standards. To avoid cross contamination, each soil vapor probe location will have its own dedicated, laboratory-set flow regulator that will not be reused at any other location during this sampling event.

Prior to the installation of each new soil vapor probe, the tubing and screens will be assembled and connected to a cylinder of UHP nitrogen. UHP nitrogen will be passed through each soil vapor probe assembly at approximately 30 psi for 1 minute to purge the probe assembly of potential contaminants. Upon completion of purging activities, and using freshly-gloved hands, each probe assembly will be immediately placed into the borehole by personnel and completed consistent with NYSDOH guidance (NYSDOH, 2006).

Groundwater Sampling

Temporary groundwater monitoring wells will be installed during investigation activities in accordance with NYSDEC generally accepted procedures. Groundwater well installation, sampling, and analysis procedures are described below.

Temporary Well Installation

Temporary monitoring wells will be constructed with 1 inch I.D., schedule 40 flush joint threaded PVC materials. Well screens are anticipated to be 5 feet in length with a slot size of 0.010 inch. The filter material (washed sand) will be placed in the annulus of each borehole to a level of approximately 2 feet above the top of the screen interval. Following installation of the filter material, a bentonite seal (bentonite chips) will be placed on top of the filter material to a minimum thickness of two feet. Due to the shallow water table, the thickness of bentonite seal above the filter pack may vary at this site. Distilled water will be added to ensure proper hydration of the bentonite.

Groundwater Sampling and Analysis and Quality Control

Upon completion of temporary monitoring well installation, the static water level will be measured using an electronic water-sensing probe to allow calculation of the wetted casing volume. A minimum of three wetted casing volumes will be purged prior to sampling.

During each purge volume, field water quality parameters; pH, temperature, and specific conductance will be measured ex-situ using a calibrated field meter. Field water quality data collected during groundwater sampling activities will be recorded on field water quality sampling and analysis forms. Groundwater samples will be collected utilizing .75 inch dedicated, disposable polyethylene bailers and nylon rope. Low–flow tips will be used during the collection of samples for VOC analysis. Groundwater in the bailer will be quickly transferred into clean, laboratory-supplied containers using a low-flow sampling tip. The sample containers will be labeled, logged onto chain of custody documents, and stored on ice for submittal to the laboratory for analysis.

Information collected during groundwater sampling activities will be recorded onto Well Development and Field Water Quality Sampling and Analysis forms.

The procedures described below will be followed to minimize cross contamination of groundwater samples:

- dedicated groundwater sampling equipment (e.g., polyethylene bailers, low-flow sampling tips, nylon rope) do not require decontamination.
- Clean, unopened sample containers provided by the analytical laboratory will be used for all groundwater samples;
- field meters will be cleaned (decontaminated) between sample locations by washing the meters with a solution of alconox/deionized water then rinsing with deionized water;
- personal protective equipment (PPE) (e.g., disposable nitrile gloves) and purge water generated from purging and decontamination procedures during groundwater sampling activities will be containerized for management by Energy Solutions; and,
- upon completion of the field program, all materials related to the field program will be cleaned (decontaminated), returned, or removed from the Site and work areas will be left clean and secure.

Reporting

The laboratory will provide complete data packages as defined under the requirements of the NYSDEC Analytical Services Protocol Category B or EPA Contract Laboratory Program deliverables. Groundwater, soil vapor and ambient air data will be reviewed, validated, and verified in terms of their ability to satisfy quality assurance requirements. Quality control procedures will be reviewed to verify consistency with NYSDOH guidance (as presented in the NYSDEC guidance for development of a Data Usability Summary Report).

The results of the investigation will be summarized in a letter report. The letter report will include such items as data summary tables, figures, laboratory analytical data, and field sampling forms.

Soil Cuttings and Rinse Waters

Soil cuttings and decon water generated from cleaning of drilling and sampling equipment will be placed in 55 gallon drums and staged on-site in a secure location designated by Energy Solutions. Groundwater sampling supplies (e.g. bailers, rope) generated from sampling activities will be bagged and placed in a trash dumpster at the property upon completion of investigation activities. We understand that Energy Solutions or its client will remain the sole owner of any investigation derived waste generated by investigation activities and be responsible for its proper disposal according to appropriate state and federal regulations.

Investigation Team Key Personnel

A summary of relevant experience for each team member of the investigation team is provided below.

Project Management

The project Principal responsible for overall implementation of this work plan will be David Folkes of EnviroGroup Limited, a recognized expert in the field of vapor intrusion. Mr. Folkes has worked on over 30 vapor intrusion projects across the country and has helped train numerous federal and state regulatory officials on vapor intrusion evaluation procedures. He has substantial experience with vapor intrusion investigations in New York and has worked closely with NYSDEC and NYSDOH staff on various vapor intrusion issues.

Eric Lovenduski of EnviroGroup will manage the investigation program, including field arrangements, coordination with subcontractors, data validation and evaluation, and reporting. In addition, Mr. Lovenduski will supervise the installation of the soil vapor probes. Mr. Lovenduski has over nine years of experience in environmental consulting, including the installation of numerous soil vapor probes. He is skilled in planning and completing complex environmental investigations, reports, and evaluating corrective actions as well as developing cost and time effective solutions to contaminated site redevelopment projects. Mr. Lovenduski has worked for a number of years as a consultant in New York and is experienced with vapor intrusion evaluations under NYSDEC and NYSDOH protocols. Jeff Kurtz will assist with data validation and evaluation tasks. Dr. Kurtz is an acknowledged expert in the field of soil vapor and indoor air testing and analysis, and has worked on several vapor intrusion projects in the state of New York.

Laboratories

Centek, an ELAP-certified laboratory, will be utilized as the laboratory and perform the EPA Method TO-15 analyses on all soil vapor and ambient air samples. TestAmerica, an ELAP-certified laboratory will analyze groundwater samples for VOCs by EPA Method 8260B.

Schedule

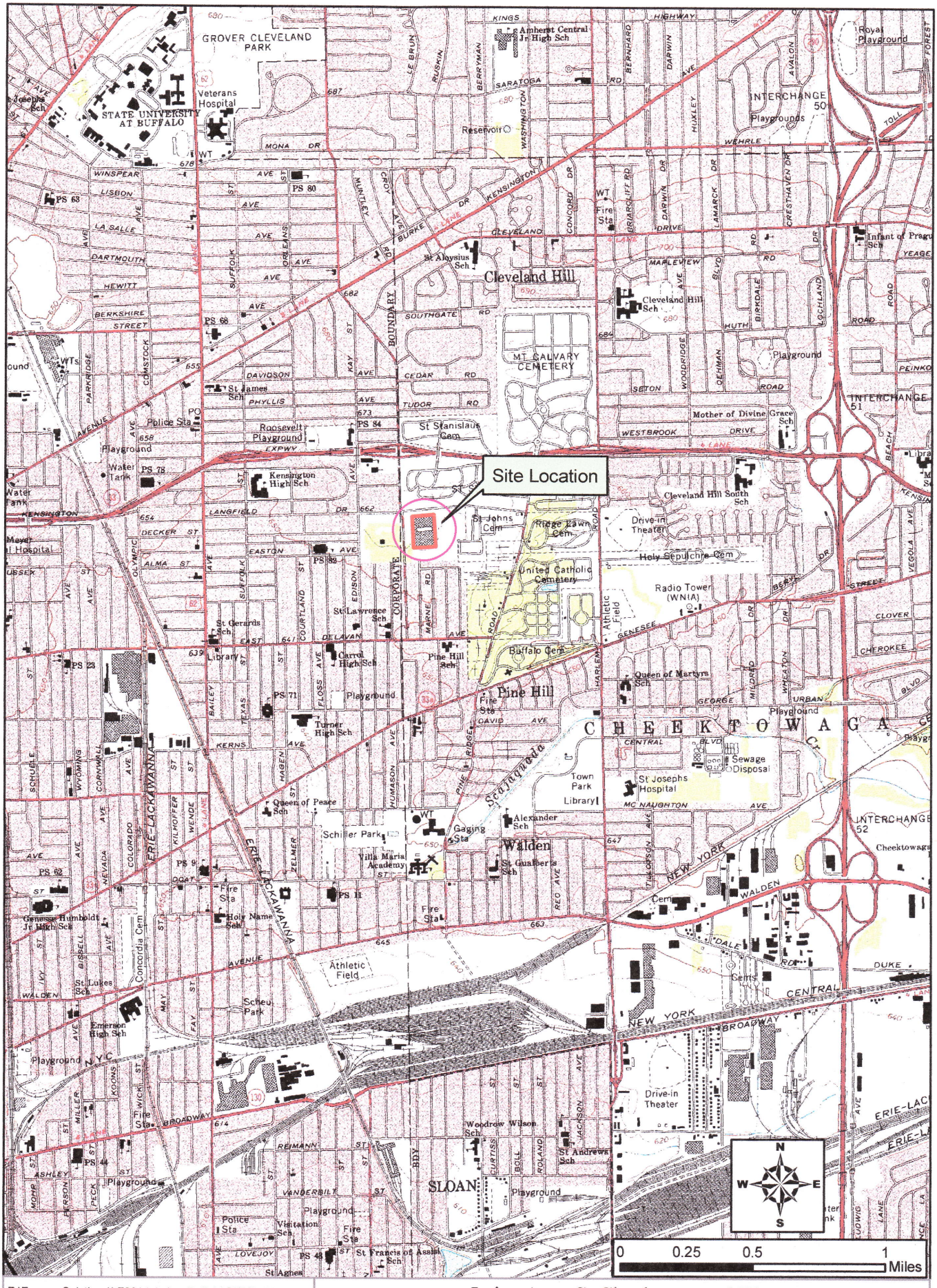
We are prepared to begin the implementation steps of this work plan as soon as approved by the agencies, off-site access and availability of drilling equipment permitting. Groundwater, soil vapor and ambient air analytical results are expected to be received within two weeks of sample delivery to the laboratory with the associated Category B package expected within 21 days of sample delivery. Analytical results will be submitted to the agencies in a data report within four weeks of receipt of the Category B package in anticipation of follow-up meeting(s) with the agencies to review analytical results and discuss the potential need for any additional data collection and/or investigation activities.

Please do not hesitate to contact me if you any questions regarding this proposed work plan.

Sincerely,
EnviroGroup Limited

David J. Folkes, P.E.
Principal

Cc: Project File LE-0614



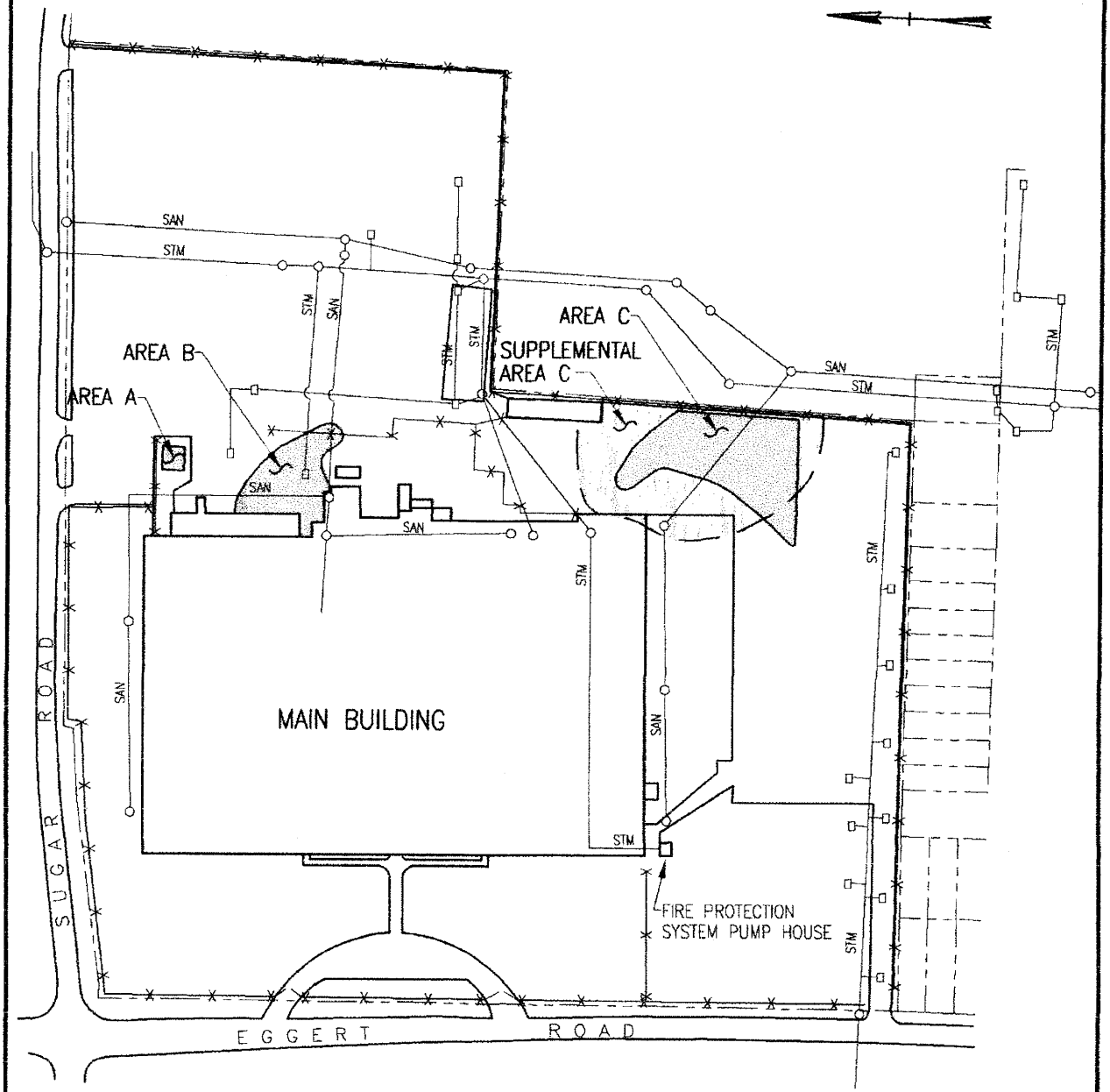
R:\Energy_Solutions\LE0614_Leica_Buffalo\GIS\SiteMap.mxd

EnviroGroup Limited
Centennial, Colorado

Figure 1
LE-0614

Leica Area C, Cheektowaga, NY

Site Map



DOCUMENT CONTROL NO.	PROJECT	LEICA, INC. EGGERT & SUGAR ROADS CHEEKTOWAGA, NEW YORK	NES, Inc. 44 Shelter Rock Road Danbury, CT 06810 (203) 798-5000	PROJECT # 3948-100 FILENAME: 3948100A SCALE: 1" =200' DATE: 4/9/98 BY: AD CK: MC FIGURE # 2
REVISION NO.	DRAWING	SITE PLAN		

EGGERT ROAD

SUGAR ROAD

IVANHOE ROAD

ROWAN ROAD

RESIDENTIAL HOMES

PRESTON ROAD

MAIN BUILDING

ASPHALT

SITE REMEDIATION TRAILERS

CEMETERY MAINTENANCE SHOP

MW-2A

MW-2 (649.72)

MW-3 (649.95)

MW-5A

MW-5 (649.82)

MW-9 (649.18)

MW-9B

MW-10 (651.12)

MW-11A (NM)

MW-12 (NM)

MW-4 (649.43)

MW-7 (651.59)

MW-6A (NM)

MW-6 (651.88)

MW-20 (654.57)

MW-21 (NM)

MW-14A

MW-14 (651.57)

MW-22 (650.41)

MW-13 (651.56)

MW-13A

MW-23 (NM)

MW-19 (653.23)

MW-18 (653.02)

MW-16A

MW-16R (651.59)

MW-15 (NM)

MW-1A

MW-1 (656.55)

MW-17A

649

650

651

652

653

654

655

656

PROPOSED SOIL VAPOR/GROUNDWATER SAMPLE LOCATION

FEET: 0 30 60 120

LEGEND:

- BEDROCK WELL
- OVERBURDEN WELL
- PROPERTY LINE
- FENCE
- 645 OVERBURDEN GROUNDWATER CONTOUR
- 645 INFERRED O.B. GROUNDWATER CONTOUR
- DIRECTION OF GROUNDWATER FLOW

DOCUMENT CONTROL NO.

REVISION NO.

LEICA, INC.
EGGERT & SUGAR ROADS
CHEEKTOWAGA, NEW YORK

GROUNDWATER CONTOURS
MAY 2007 – OVERBURDEN WELLS

PROJECT

DRAWING

PROJECT NO.: 137015

FILE NAME: 137015-ANNUAL-07

SCALE: 1" =120'

DATE: 2/5/08

BY: MR

CK: RM

FIGURE #

3