

**DATA GAP INVESTIGATION WORK PLAN  
REVIEW AVENUE DEVELOPMENT**

**Review Avenue Development Parcel 1  
37-30 Review Avenue  
Long Island City, New York**

**July 12, 2005**

*Prepared for:*

**Cresswood Environmental Consultants, L.L.C.  
DMJ Associates, L.L.C  
Review Railroad, L.L.C**

*Prepared by:*

**Environmental Liability Management, of New York, LLC  
250 West 57<sup>th</sup> St., Suite 2421  
New York, New York  
(212)-581-8023  
(212)-581-8023 (facsimile)**

## 1.0 Introduction and Purpose

Environmental Liability Management, LLC (ELM), on behalf of Cresswood Environmental Consultants (CEC)<sup>1</sup>, has prepared the following Data Gap Investigation Work Plan to identify locations and media where data regarding subsurface conditions is deficient at the Review Avenue Development Parcel 1 (RAD 1) located at 37-30 Review Avenue, Long Island City, New York. Remedial Investigation (RI) and Feasibility Study (FS) reports have been submitted to New York State Department of Environmental Conservation (NYSDEC). These reports address the nature and extent of contamination on the Quanta Resources property and adjacent properties, including Parcel 1. However, a current data gap exists for soil vapor conditions. This work plan addresses that gap consistent with the *Draft Guidance for evaluating Soil Vapor Intrusion in the State of New York*, issued by New York State Department of Health Services (NYSDOH) in February, 2005.

Specifically, the objective of the soil vapor sampling work plan is to assess the baseline soil vapor conditions that exist at the perimeter of Parcel 1 prior to redevelopment. The soil vapor conditions may be further evaluated once the development plans and construction details are finalized, taking into consideration the ultimate site use, associated infrastructure, and institutional / engineering controls that are discussed in the Quanta Resources Site Feasibility Study.

## 2.0 Background

### 2.1 Site Description

Review Avenue Development Parcel 1 ("Parcel 1") is located at 37-30 Review Avenue, Long Island City, New York. The site is bounded on the northeast by Review Avenue and on the southwest by the Southern Line of the Long Island Railroad (LIRR). On the southeast, it is bounded by an alley (Preston Street), which runs southwest from Review Avenue to the LIRR tracks. Farther to the southeast, across the alley, is the Quanta Resources site (Site #2-41-005). Farther to the northeast, across Review Avenue, is Calvary Cemetery. The cemetery covers approximately 175 acres and extends approximately 3,000 feet along Review Avenue. Further to the south, across the LIRR tracks, is the South Capasso site. Newtown Creek lies beyond the South Capasso site to the south. A Brownfield Cleanup Program application for Parcel 1 was submitted to NYSDEC on June 30, 2005.

### 2.2 Site History

The Parcel 1 site exists within a highly industrialized area of Queens, New York. The earliest Sanborn map (1898) shows Parcel 1 as part of Eastern Distilling Company. No further development records are provided on the Sanborn maps until 1950 when the site was shown as being utilized by the Van Iderstine Company poultry feed building. The Sanborn maps indicate that between 1979 and 1993 various operations, including Bekins Trucking and Nanco Contracting, leased the site from the Van Iderstine Company. From about 1993 to the present, it

---

<sup>1</sup> Applicants for the Brownfield Program include the following entities: DMJ Associates, L.L.C., Review Railroad, L.L.C., Cresswood Environmental Consultants, L.L.C. For purposes of this document, the applicants will be referred to collectively as "Cresswood".

is believed that the site was used for other industrial purposes. LNAPL has been detected on the Parcel 1 site. The LNAPL is generally characterized as a viscous, weathered, and heterogeneous petroleum product made up predominantly of high boiling point and low solubility petroleum hydrocarbons with a minor amount of a lighter petroleum product in the range of mineral spirits.

### **2.3 Hydrogeological Characteristics**

The topography and surficial geology at the Parcel 1 and adjacent properties is largely a reflection of man-made land alterations related to land reclamation activities along Newtown Creek that preceded much of the modern history of this part of Long Island.

The Parcel 1 property lies between a local groundwater recharge area associated with a local topographic high to the northeast and Newtown Creek, a regional groundwater discharge area located to the southwest, approximately 450 feet from the Parcel 1 site. Groundwater flow within glacial deposits, in the relatively flat area of the Parcel 1 and adjacent properties, flows horizontally, to the south-southwest. Minor variations in groundwater flow direction have been observed ranging between south-southwest and southwest.

Groundwater elevation data and monitoring results indicate consistent, cyclical, low-amplitude fluctuation of water levels that are generally between approximately 0.05 feet to 0.1 feet. These fluctuations are superimposed on longer-term increasing and decreasing elevation trends. The groundwater elevation fluctuations are not expected to substantially alter groundwater flow direction.

The following geologic interpretation is based on the results obtained during the Remedial Investigation (RI) conducted by Golder Associates, Inc. (Golder, 2005). The stratigraphy at the Parcel 1 property and the immediately adjacent properties consists of the following units from shallow to deep.

#### **2.3.1 *Urban Fill***

The unconsolidated unit directly underlying the Quanta Resources property and adjacent properties, is miscellaneous urban fill, generally consisting of a heterogeneous mixture of angular to sub-angular, loose to compact, silty fine sand and gravel, intermixed with various debris, including, but not limited to, brick fragments, asphalt, wire, and plastic. The urban fill ranges in thickness from 3 to 16 feet on the Quanta Resources property.

#### **2.3.2 *Glacial Deposits***

Unconsolidated sedimentary deposits, consisting predominately of interbedded horizons of fine to coarse sand and fine to coarse gravel, comprise the youngest natural material underlying the urban fill at Quanta Resources property. These unconsolidated geologic deposits are of glacial origin and can be further subdivided into an "upper" and a "lower" unit. This distinction is based largely on the lateral extent and natural color of the units. The upper unit is predominately gray to dark gray. The lower unit is predominately yellowish brown to brown. The upper surface of the lower unit is located at approximately -30 feet mean sea level (MSL). Some discrete and laterally discontinuous horizons of silt, silty clay and clay are also present within the upper unit of the glacial deposits. The localized fine-grained deposits are observed no shallower than approximately seven (7) feet below ground surface (bgs). Hydraulically, the upper and lower units of the glacially deposited sediments are in direct hydraulic connection and therefore are predicted to respond similarly to hydrologic stresses (i.e. precipitation).

### **2.3.3 Lower Clay Unit**

The deepest natural geologic unit observed during the remedial investigation at the Quanta Resources property is a laterally continuous, finely laminated to thinly bedded, silty clay, silt, or clay. The clay unit is herein referred to as the lower clay of the Raritan Formation of Late Cretaceous age, based on a review of available published literature. The lower clay has been described as ranging between dark gray silty clay and white to light gray clay. Based on the RI work, the lower clay is continuous across the Quanta Resources property and adjacent properties.

## **3.0 Data Gap Investigation Work Plan**

### **3.1 Objective**

The objective of the Data Gap Investigation Work Plan is to identify areas where relevant data regarding subsurface conditions at the Parcel 1 site is deficient. A Remedial Investigation (RI) related to the adjacent Quanta Resources site has characterized the nature and extent of groundwater and soil contamination at Parcel 1. The results of this subsurface characterization are summarized and contained in a Draft Remedial Investigation (RI) Report submitted to NYSDEC in June 2005.

Soil vapor sampling has not been conducted at Parcel 1 and represents a data gap to be addressed at the Parcel 1 site. The objective for conducting a soil vapor-sampling program at the site is to establish a baseline for soil vapor compound concentrations on the perimeter of the site. Sampling will be conducted in accordance with NYSDOH *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York State*.

### **3.2 Factors Affecting Soil Vapor Migration and Intrusion**

#### **3.2.1 Subsurface Contamination**

Based on the results of previous subsurface remedial investigations, it is expected that the compounds that pose the greatest threat for soil vapor intrusion include volatile organic compounds (VOCs) present in groundwater, soil, and LNAPL at the Parcel 1 site. Detected VOCs include acetone, benzene, toluene, ethylbenzene, xylenes, MTBE, 1,2 dichlorobenzene, trichloroethane (TCE), tetrachloroethene (PERC), vinyl chloride, 1,1 dichloroethene, 1,2 dichloroethene, methylene chloride, and chloroform.

#### **3.2.2 Soil Moisture Content**

Soil moisture content has a significant impact on soil vapor sampling results. Elevated soil moisture content effectively reduces the mobility of compounds contained in soil vapor by limiting the off gassing from groundwater sources. ELM has incorporated the potential impacts due to soil moisture content into this soil vapor-sampling proposal by quantifying the potential impacts of precipitation, water level, and barometric pressure at the proposed sampling locations..

### **3.3 Soil Vapor Sampling Procedures**

The available information does not indicate that any previous studies of soil vapor have been conducted. Therefore, the soil vapor sampling plan described below will establish a baseline for soil vapor compound concentrations along the perimeter of the Site. Sampling will be conducted in a manner consistent with NYSDOH *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York*. Approximately ten soil vapor samples will be collected along the perimeter of the Quanta Resources Site (see attached figure). The soil vapor sampling locations have been selected to provide adequate coverage along the perimeter of the Parcel 1 Site. The distance between soil vapor sampling locations is approximately 125 to 150 feet.

Soil vapor sampling will be conducted with semi-permanent subsurface soil vapor sampling implants installed utilizing direct push technology. This methodology involves advancing steel rods that are approximately 1.25 inches in diameter, with a steel point attached at the end, using a hydraulic hammer, to create an open small-diameter hole that extends to the desired depth. A sampling probe, consisting of approximately ½-inch-diameter polyethylene tubing fitted with a one-foot-long stainless steel screen, will be installed within the borehole.

Consistent with NYSDOH draft guidance,, each hole depth will be approximately five to six feet bgs. The sampling depth will be selected based on subsurface conditions, including local geological conditions and soil moisture content, and generally will be located near the bottom of the hole. Each of the ten sample locations will be constructed to prevent the intrusion of ambient air into the sample. Consistent with Figure 2.2, Section 2.7.1 of the NYSDOH *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York State*. Morie #2 gravel will be used to backfill the hole to approximately 12 inches above the screen. A bentonite seal will be installed to create a seal extending upward from the top of the gravel to approximately 2 feet below the surface. Clean material will be used to backfill from the top of the gravel to approximately 12 inches below surface grade. A quick-setting bentonite or concrete surface seal will be installed and the soil vapor sampling implant will be labeled. The soil vapor sampling implant surface seal is designed to prevent ambient outdoor air from infiltrating and diluting the sample.

Soil vapor samples will be collected within forty-eight (48) hours of the installation of the soil vapor sampling implant. Prior to sampling, a tracer gas test will be conducted in a manner consistent with the NYSDOH draft guidance to verify the integrity of the soil vapor sampling implant seal. Sulfur hexafluoride (SF<sub>6</sub>)<sup>2</sup> will be used as the tracer gas and a hand-held monitoring device will be used to detect the tracer gas in samples collected from the soil vapor implants in tedlar bags. Real-time tracer gas sampling will confirm the integrity of the probe seals prior to formal sample collection. The tracer gas test will be conducted at the first two to three sampling locations until it is confirmed that the methodology being used to seal the probes will prevent ambient outdoor air from entering the sample. After confirming that no ambient air leakage is occurring additional samples will be collected in tedlar bags using a portable air compressor and screened via a hand-held monitoring device for the presence of explosive gases. If explosive gases are present, samples will be delivered to an Environmental Laboratory Approval Program (ELAP) certified laboratory for Total Petroleum Hydrocarbon Volatiles

---

<sup>2</sup> SF<sub>6</sub> is the most commonly used tracer gas and its use for such purposes is endorsed by NYSDOH in *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York State*. SF<sub>6</sub> is readily available, relatively low in toxicity, virtually odorless, can be monitored with portable instruments, and is normally not found in the environment.

(TPHV) analysis by a Gas Chromatograph using a Flame Ionization detector (GC-FID) according to modified USEPA Method No. 8015, which separates methane from other alkanes.

One to three volumes of standing air within the sampling probe and tube will be purged immediately prior to sampling. Purging will be conducted at a regulated intake rate of approximately 25 ml/min. Soil vapor sampling will be conducted using 6-liter Summa canisters set at a regulated intake rate of approximately 25 ml/min. The objective of using this intake rate is to collect samples that: (1) reflect real-time soil vapor conditions, (2) limit the likelihood of ambient air intrusion, and (3) are comprised of an adequate volume of sample to achieve minimum reporting limit requirements. The flow rate is well below the NYSDEC maximum permitted flow rate of 2 L/min.

In order to account for variations in soil moisture content, precipitation, water level and barometric pressure will be monitored for three days prior to the day of sampling using data collected from the National Oceanic Atmospheric Administration (NOAA) Central Park Station. If precipitation occurs during sampling, or if the cumulative precipitation observed in the three days prior to sampling is greater than 0.5 inch, soil vapor sampling will be postponed. In addition, the proposed sampling depth may be altered slightly, based on predicted soil moisture content. Soil moisture samples will be collected at a corresponding depth adjacent to one to two soil vapor-sampling locations and analyzed according to USEPA Method No. 160.3 to determine soil moisture content.

An ELAP certified laboratory would be used to analyze soil vapor samples according to USEPA Method (Total Organic) TO-15 VOCs and NYSDOH Method 311-9 for tetrachloroethene (PERC). All samples collected for laboratory analysis will be handled consistent with the Quality Assurance / Quality Control Plan (QA/QC) requirements of the NYSDOH *Draft Guidance for Evaluating Soil Vapor Intrusion in the State of New York State*. Sample blanks and duplicates will be collected for approximately ten percent (10%) of the soil vapor samples. In order to characterize site-specific background outdoor air conditions, and provide a comparative baseline of ambient air quality with respect to the soil vapor sampling results, outdoor air samples will be collected concurrently with soil vapor sampling, at one to two soil vapor-sampling locations at approximately five feet above surface grade. These samples will be collected using six-liter Summa canisters set at a regulated intake rate of approximately 25 ml/min. A sketch of sampling locations and outdoor site conditions and activities will be prepared during the soil vapor-sampling event. Local weather conditions will be documented and a sample log sheet and standard chains of custody will be maintained.

#### **4.0 Data Evaluation**

The purpose of the soil vapor sampling plan and data evaluation is to assess the baseline soil vapor conditions that exist at the perimeter of the Quanta Resources Site prior to redevelopment. The soil vapor conditions may be further evaluated once the eventual redevelopment plans and construction details are finalized. Therefore, the secondary purpose of the current data evaluation will be to determine if additional soil vapor sampling is warranted to further assess soil vapor conditions in light of the ultimate Site use, associated infrastructure, and engineering/ institutional controls. The vapor samples obtained will be analyzed for TO-15 constituents, with appropriate ELAP-consistent data validation.

## **5.0 Report Preparation**

Upon completion of this Data Gap Investigation and receipt of the analytical results, a report will be prepared and submitted to NYSDEC and NYSDOH.