FINAL

SITE CHARACTERIZATION WORK PLAN

for

MAKO PROPERTIES LIMITED PARTNERSHIP BUILDING #3
48-50 Enter Lane, Islandia, NY
NYSDEC SITE #152230

March 2011

Prepared for:

Mako Properties Limited Partnership
931B Conklin Street
Farmingdale, NY 11735-2429

Prepared by:

CA RICH CONSULTANTS, INC.
17 Dupont Street
Plainview, NY 11803-1614

March 31, 2011

NYSDEC – Region 1
Division of Environmental Remediation
SUNY @ Stony Brook
50 Circle Road
Stony Brook, NY 11790-3409

Attention: Jamie Ascher

Re: **FINAL SITE CHARACTERIZATION WORK PLAN**
NYSDEC Site # 152230
Mako Properties Limited Partnership Building #3
48-50 Enter Lane
Islandia, New York

Dear Mr. Ascher:

On behalf of the Mako Properties Limited Partnership, CA RICH Consultants, Inc. is pleased to submit the attached Final Site Characterization Work Plan for the above-referenced property. A complete electronic copy of this report is included on a CD in the rear cover of this hard copy.

We look forward to moving ahead with the investigation activities under the oversight of the New York State Department of Environmental Conservation (NYSDEC).

Sincerely,

CA RICH CONSULTANTS, INC.

Jessica Proscia
Environmental Scientist

Steve Sobstyl
Senior Project Manager

Mako Properties Limited Partnership Building #3
48-50 Enter Lane
Islandia, NY

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"MAKO PROPERTIES LIMITED PARTNERSHIP BUILDING #3"

48-50 ENTER LANE

ISLANDIA, NEW YORK

SITE # 152230

1.0 INTRODUCTION

The following Site Characterization Work Plan (SCWP) was prepared by CA RICH Consultants, Inc. (CA RICH) of Plainview, New York, on behalf of the owner Mako Properties Limited Partnership (Mako Properties) for the above-referenced property (hereinafter referred to as "Mako Building #3" or "Site"). This SCWP was prepared in response to the need for further on-site investigation activities at the Site. Mako Properties Limited Partnership executed an Order-on-Consent with the New York State Department of Environmental Conservation (NYSDEC) on August 16, 2010 (Ref. 1). This SCWP is based upon the guidelines set forth in NYSDEC's DER-10 Technical Guidance for Site Investigations and Remediation (Ref. 2). The proposed scope of work presented in this SCWP will be conducted in accordance with the Quality Assurance Project Plan (Appendix A) and Health & Safety Plan prepared for this Site (Appendix B). Based on information already obtained during a previous environmental investigations at the Site, the contaminants of concern are 1,1,1-trichloroethane (TCA) and its degradation products.

This Work Plan addresses the investigation activities to be completed as a further characterization and follow-up investigation with regards the presence of TCA in the groundwater beneath the Site. To summarize, since 1994 CA RICH has conducted an annual environmental tenant inspection and sampling program at the Site to identify potential environmental concerns. The annual program originally included a physical inspection of each tenant space, an assessment and screening of soils contained in all on-site storm drains and the collection of environmental samples from each onsite sanitary waste disposal system. In 2003, the program was expanded to include the installation and annual sampling of a network of three shallow water table groundwater monitoring wells. During the annual groundwater sampling event conducted in October 2009, TCA was detected for the first time the three wells surrounding Mako Building #3. In December 2009, a second round of groundwater sampling was conducted and the detection of TCA was confirmed in the wells and the concentrations appeared to be increasing.

Based on these groundwater test results, CA RICH conducted a Phase II Site Investigation in February 2010 for the purposes of identifying the potential source(s) of TCA on-site and to delineate the lateral extent of TCA in the shallow groundwater. In March 2010, a Phase II Environmental Site Investigation Report (Ref. 3) was prepared and submitted to NYSDEC and a follow-up meeting with NYSDEC was conducted on March 30, 2010. It was agreed during the meeting that the Property Owner would enter into an Order of Consent with NYSDEC and prepare this Site Characterization Work Plan to delineate the vertical and horizontal extent of the on-site groundwater contamination, as well as, identify potential off-site sources the TCA.

More specifically, the purpose of this SCWP is to outline the scope and protocol to be followed during; (a) the further investigation of groundwater impacts identified in the previous investigations, (b) identify any potential on-site or off-site sources of contamination, and (c) to evaluate the potential for soil vapor intrusion conditions at the Site.

This will be accomplished by:

1. Properly characterizing the nature and extent of on-site groundwater contaminants;
2. Identifying any potential on-site sources of the groundwater contaminants;
3. Properly characterizing the nature and extent of soil vapor, if any; and,
4. Producing data of sufficient quantity and quality to determine whether the contamination is originating from the Site or attributable to an off-site source(s).

2.0 PHYSICAL SITE CHARACTERISTICS

2.1 Site Description

The Site is located at 48-50 Enter Lane in Islandia, Suffolk County, New York and is legally designated on SCTM as Section: 006.00; Block: 01.00; Lot: 018.000. It is part of an approximate 2-acre parcel improved with the Site building (Mako Building #3) and a separate, multi-tenant building located on the property at 52-68 Enter Lane (Mako Building #2). The entire property is relatively level and entirely paved with asphalt. Mako Building #3 is a single-story, brick and block structure containing approximately 4,560 square feet of interior floor space. The building is serviced with an on-site sanitary waste disposal system that consists of a primary septic holding tank that connects to single overflow leaching pool. This Site Characterization Work Plan focuses on Mako Building #3 and its immediate surroundings. The Site is presented on a topographic map as illustrated in Figure 1A.

2.2 Site History

Historical records indicate that the Site was originally developed circa 1978 with the free-standing single-story brick/block structure that it is presently. Historically Mako Building #3 has been occupied by Elmont Electric, Westbury Precision, Inc and currently occupied by David Cooke Plaster Company, a pool installation company. A Site Plan is included as Figure 2.

2.3 Surrounding Land Use

This Site is situated within a well-developed, mixed-use industrial and commercial area commonly referred to as the Islandia Industrial Park. Surrounding property environs are comprised mostly of occupied industrial and commercial buildings with some retail space and associated parking lots. Located within the industrial park, approximately ¼-mile south of the Site, is an active public water supply well field owned and operated by the Suffolk County Water Authority. A more general property location map presented on an aerial photograph is attached as Figure 1B.

Specific neighboring property usage is outlined below:

North: Multi-tenant industrial/commercial buildings
South: Multi-tenant industrial/commercial buildings
East: Multi-tenant industrial/commercial buildings
West: Vacant and overgrown, narrow parcel of land that appears to be associated with a masonry supply company with an entrance located Bridge Road.

2.4 Hydrogeologic Setting

Mako Building #3 is situated upon unconsolidated glacial outwash sand deposits at an elevation of approximately 115 feet above mean sea level. Based upon the subsurface geologic conditions encountered during our Phase II investigation, localized subsurface earth materials generally consist of fairly uniform and permeable tan medium-grained sand grading occasionally to a light-brown fine sand. The site specific work conducted to date suggests that the Upper Glacial Aquifer is encountered at a depth of approximately 71-74 feet below land surface and groundwater flows in a southeasterly direction.

Regional USGS and Suffolk County groundwater mapping information indicates that the horizontal rate of shallow groundwater flow is approximately 0.5 to 1 foot per day under natural conditions. The vertical extent of the Upper Glacial Aquifer extends to approximately 166 feet below surface grade. Potable drinking water for the property is supplied by large-capacity public supply wells. These wells, owned by the Suffolk County Water Authority (SCWA), utilize pumped well water withdrawals from the deeper regulated 'sole source' Magothy aquifer. The Magothy aquifer directly underlies the Upper Glacial Aquifer and the groundwater resource within the Magothy is recharged from groundwater migrating vertically downward through the overlying Upper Glacial Aquifer. It was brought to our attention during our March 30, 2010 meeting with NYSDEC that the Suffolk County Water Authority is currently treating the water provided by the nearby supply wells located approximately ¼-mile south of the Site for TCA contamination prior to its distribution to the public.

2.6 Environmental History

In 1994, CA RICH initiated the tenant inspection program that exists today. The program includes the annual inspection of current tenant spaces and an assessment, screening and testing of the soils contained inside on-site drainage structures (i.e. stormwater drains and septic leaching pools). Since 1994 and up until the most recent round of testing of the drainage structures (August 2009), VOCs have never been detected during the screening of the soils in the stormwater drains or reported in the samples collected and laboratory analyzed the Site's sanitary leaching pool.

Since Mako Properties owns several other properties in the Islandia Industrial Park, in 2003, Mako Properties voluntarily established a Ground Water Monitoring Program (GWMP) for the purposes of starting, operating, and documenting site-specific groundwater quality conditions beneath the property. In June 2003, CA RICH designed and installed the three existing groundwater monitoring wells at the Mako Building #2 and Mako Building #3 property on Enter Lane. In addition, CA RICH designed and installed four more monitoring wells at two Mako Properties owned buildings (Mako Building #1 and Mako Building #4) located approximately ¼-mile to the south south-east at the corner of Enter Lane and Bridge Road. The goal of the GWMP was to provide the means to annually test and monitor uppermost groundwater quality occurring at specific locations beneath four properties owned by Mako Properties. These buildings are included in a comprehensive environmental Tenant Inspection Program (TIP) and Storm Drain/Cesspool Sampling Program that has been conducted annually since 1994.

Given the importance of groundwater on Long Island, the GWMP was established to augment the TIP so as to support, track and optimize the environmental integrity of these properties. The groundwater monitoring well network has been sampled in 2004, 2006, 2008 and most recently in 2009. Overall, the uppermost groundwater quality underlying all four Mako Buildings has remained virtually free of contaminants during each and every sampling event with the exception of low level detections of the VOC perchloroethene (PCE), also known as tetrachlorethylene, in the groundwater tested at the monitoring well MW-2 location in front of the Mako Building #3. The concentrations of PCE MW-2 were reported at 16 parts per billion (ppb), 13 ppb, and 6 ppb in 2003, 2004 & 2006, respectively.

In December 2008, two additional groundwater monitoring wells (MW-8 & MW-9) at the Site behind Mako Building #3 to determine the incoming uppermost groundwater quality considered upgradient of the Site. Subsequent testing again found a gradually diminishing and low level detection of PCE in MW-2 at 4.2 ppb, and a low level detection at the newly-installed well MW-8 at 1.8 ppb. PCE was not detected in MW-9. At that time, we continued to resume annual sampling of these wells to discern any further changes in PCE concentrations in wells MW-2, MW-8 and MW-9.

On October 14, 2009, CA RICH conducted the next annual round of groundwater sampling in accordance with the voluntary GWMP at the four buildings owned by Mako Properties. All of the samples were analyzed by a New York State Accredited laboratory for VOCs and the Suffolk County Department of Health Services (SCDHS) regulatory list for metals. Laboratory analytical data from this round indicated that there were no detections of concern in groundwater beneath Mako Buildings #1, 2, and 4, and at Building #3, the PCE levels at both the MW-2 and MW-8 locations were continuing a downward trend to only trace-level detections. However, the groundwater results revealed for the first time, the presence of TCA at a concentration level above the New York State Department of Environmental Conservation (NYSDEC) guidance value of 5 ppb at monitoring well locations MW-2 (400 ppb), MW-8 (1.8 ppb) and MW-9 (17 ppb), which are in close proximity and surround Mako Building #3. This finding occurred shortly after Westbury Precision, Inc. vacated Mako Building #3.

Based upon the groundwater sampling results obtained in October, CA RICH immediately initiated a targeted follow-up study on Mako Building #3 in December 2009. This follow-up investigation was designed to confirm the recent detections of TCA in the underlying shallow groundwater in the vicinity of Building #3. The investigation also evaluated the potential for any immediately apparent on-site existing or historical source(s) of TCA that may have been released onto or into the ground from any existing building or Site facilities.

The investigation included re-sampling monitoring wells MW-2, MW-8, and MW-9; the collection of soil and sediment samples from the on-site stormwater drains, septic tank and sanitary leaching pool. The repeat testing at MW-2, MW-8 and MW-9 confirmed elevated TCA levels above the NYSDEC guidance value of 5 ppb. The TCA concentrations ranged from 120 ppb at MW-9, situated along the property boundary, up to 12,000 ppb at MW-2.

The sediment collected from the on-site leaching pool and the soil from the stormwater drains did not contain levels of VOCs that exceed SCDHS cleanup action values (Ref. 4). Future evaluations of soil quality data will be compared to the soil cleanup objectives contained in 6 NYCRR Part 375-6.8. Sampling of the on-site septic tank identified the presence of 1,1-dichloroethane at 52 ppb and TCA at 22 ppb. Based on these findings, further testing and investigation into any suspected on-site or off-site source(s) and definition of the lateral extent of the TCA in the groundwater at Building #3 was initiated.

2.7 Winter 2010 Investigation Activities and Findings

On February 3, 2010, a geophysical survey utilizing ground-penetrating radar (GPR) was conducted across the entire Site to determine the location of potentially buried USTs or other subsurface features including, but not limited to, the potential presence of buried structures, foundations, utilities, drywells, etc. The findings of the GPR survey did not identify any buried anomalies indicative of suspect USTs or leaching structures beneath the Site.

CA RICH also perform a dye test to confirm the outfall of a small diameter floor drain located inside the building. The dye was immediately observed flowing into the septic tank. A thorough inspection of the septic tank and its overflow leaching pool confirmed a connection to the leaching pool and that there were no other overflow pools connected to this system. The GPR survey also confirmed that there were no additional buried leaching pools in the vicinity of the sanitary system.

On February 3 to 5, 2010, a total of 12 uppermost groundwater samples were collected using the Geoprobe® sample collection methodology. The depth to groundwater at each sample location ranged from 71 to 74 feet below grade and no chemical odors or sheens were observed during the collection of the groundwater samples.

Also during the groundwater sampling activities, CA RICH inspected and screened the subsurface soil with a PID from the top 10 feet of each sample location for any evidence of possible VOC contamination. The screening activities did not identify any evidence of VOCs in the upper ten feet of soil. All specific details pertaining to the above mentioned investigation are included in CA RICH's March 2010 Phase II Environmental Site Investigation (Ref. 3).

In general, the results of the groundwater sampling event indicated the following:

- DCE above NYSDEC TOGS (Ref. 5) levels at GWB-01, GWB-02, GWB-08, GWB-09, GWB-10, GWB-11, GWB-12, and MW-2 with concentrations ranging from undetected at GWB-05 up to 728 ppb (GWB-09); and
- TCA above NYSDEC TOGS levels in GWB-01 through GWB-12, and MW-2 with concentrations ranging from 80.9 ppb at GWB-05 up to 114,000 ppb at GWB-09.

2.8 NYSDEC meeting and Order of Consent

On March 30, 2010, CA RICH held a meeting with Mr. Jamie Ascher and Mr. Walter Parish (NYSDEC). During the meeting, it was decided that NYSDEC and Mako Properties L.P. would establish an Order of Consent to set the framework for Site Characterization. Included as Appendix C is a copy the executed Order on Consent.

2.9 Historical Environmental Reports

The following list identifies earlier studies performed at the Site. Copies of these reports were submitted to NYSDEC along with CA RICH's March 16, 2010 Phase II Environmental Site Investigation Report.

Document	Date
Groundwater Monitoring Plan – Well Network Installation and Baseline Sampling, CA RICH	November 2003
Annual Environmental Summary Report, CA RICH	December 2004
Groundwater Quality Sampling Plan, CA RICH	May 2005
Annual Environmental Summary Report, CA RICH	March 2006
Subsurface Soil Boring Results, CA RICH	September 2007
Groundwater Well Installation and Sampling Report, CA RICH	January 2009
Annual Environmental Summary Report, CA RICH	December 2009
Phase II Environmental Site Investigation, CA RICH	March 2010

3.0 SITE CHARACTERIZATION INVESTIGATION

3.1 Objectives

The general scope of the investigation will include the installation and sampling of multi-depth monitoring wells, and the collection of soil and soil vapor samples at the Site. The objective of the Site Characterization Investigation activities is to:

1) Gather reasonably attainable public information regarding environmental matters at the Site and the surrounding area that may be attributable to the TCA groundwater contamination.
2) Determine the nature and extent of soil and groundwater contamination at the Site;
3) Determine the potential for soil vapor intrusion at the Site.

3.2 Information Gathering

CA RICH will obtain and review available government environmental database records on Mako Building #3, as well as, the surrounding area to identify any nearby sites known to have used TCA. Freedom of Information Law (FOIL) requests will be submitted to the United States Environmental Protection Agency (USEPA), NYSDEC, New York State Department of Health (NYSDOH) and SCDHS for properties of interest identified during the database review. A freedom of information request will also be submitted to the SCWA to obtain information regarding the nearby well field located approximately ¼-mile south of the Site. The request to SCWA will also specifically request information pertaining to the reported treatment of the well water for TCA. The extent of the area of study is attached as Figure 1C.

3.3 Receptor Survey

CA RICH will conduct a sensitive receptor survey to identify any potential impacts to human health and/or the environment. The survey will include nearby schools, daycare centers, hospitals, medical centers, and nursing homes, as well as, municipal groundwater supply wells used for drinking water, groundwater recharge basins, surface water bodies, wetlands, or other ecologically sensitive resources. The survey will also include the identification of any on-site utility vaults or building foundation basements and storm water drains.

3.4 Utility Clearance

A mark-out of underground utility lines will be performed prior to the start of fieldwork by calling the Long Island One-Call Center at (800) 272-4480. A utility mark-out verification reference number for the Site will be obtained. In addition, CA RICH will review any private surveys or Site Plans that are made available by the Mako Properties.

3.5 Vertical Profiling of Groundwater

Vertical profiling of the groundwater will be accomplished through the collection of groundwater samples from temporarily set sampling points. A total of two locations are proposed and the locations are illustrated on Figure 3. Initially, a boring will be advanced using a hollow stem auger drilling rig to confirm the depth of the bottom of the Upper Glacial formation, which is expected to be encountered at approximately 165 feet below the surface. A plug will be installed on the lead auger to prevent the auger from filling with formation material (i.e. sand heave) during the first 150 feet of drilling.

The bottom of the Upper Glacial Aquifer will be confirmed by knocking out the auger plug and collecting continuous split-barrel soil samples from 150 feet until the top of Magothy Aquifer is reached (approx. 165 feet). After the lead auger plug has been removed and during the collection of spit barrel soil samples, either potable water and/or bentonite slurry (i.e. drilling mud) will used depending on drilling conditions to prevent formation sand from heaving up into the augers. Careful records will be maintained regarding the volume of water and/or bentonite slurry used at each sampling depth interval. The split barrel soil samples will be field screened for the presence of VOCs with a PID.

Once the depth of the top of the Magothy Aquifer has been determined, a gamma geophysical log of the boring will be taken through the open augers to identify clay/silt units and to assist in defining potential groundwater sample intervals. Afterwards, the drilling augers will be retrieved and the boring will be filled with grout to the surface. All downhole drilling equipment will be properly decontaminated. A second drilling location will be selected in close proximity to the initial boring and will be advanced in the same manner down to within five feet of the pre-determined depth of the Magothy Aquifer for the purposes of collecting multi-depth groundwater samples.

3.6 Vertical Profile Groundwater Sampling & Analysis

Based upon the gamma geophysical log information obtained from the initial boring installation, several depths of the Upper Glacial Aquifer will be selected to profile groundwater quality conditions. The boring will be advanced using a hollow stem auger drilling rig with a bottom plug to the deepest pre-determined depth of the bottom of the Upper Glacial formation. The lead auger plug will be removed and a 2-inch diameter steel well pipe will be connected to stainless steel well screen and lowered into the augers. Once the well pipe is in place, the augers will be carefully removed to allow the formation to collapse around the well screen. The well depth will be routinely measured to verify that its depth has not changed.

A Grundfos® submersible pump, or equivalent, will be lowered into the temporary well. The pump will be connected to dedicated polyethylene tubing. The well with then be purged of a minimum of three well casing volumes to obtain a representative sample of groundwater. If necessary, the augers may need to be filled with potable water to maintain a hydrostatic head and to keep sand from heaving up into the augers. The amount of water used to prevent sand heave will be recorded and removed during purging of the temporary well.

All purge water and drill cuttings will be contained pending waste characterization sample results for proper disposal. All drill cuttings will be field screened with a PID and containerized onsite pending proper disposal at a permitted facility.

All vertical groundwater profile samples will be collected directly from the pump discharge tubing into laboratory issued VOA vials and stored in an ice-filled cooler. Once the deepest groundwater sample has been collected, the pump will be retrieved and properly decontaminated in preparation for the next upper level groundwater profile sample to be collected. The temporary well pipe/screen will be lifted upward and set in position for the next sample. Groundwater samples will be collected at approximately 20 foot intervals, to be adjusted based on geologic conditions.

Each groundwater sample will be analyzed for VOCs using USEPA Method 8260 with NYSDEC ASP Category B report deliverables by an ELAP-approved laboratory. The following samples will be collected in accordance with the Quality Assurance Project Plan (QAPP) included in Appendix A. The groundwater laboratory data will be reviewed by a qualified Data Validator and a Data Usability Summary Report (DUSR) will be prepared.

Based upon the vertical profiling groundwater sample results, a determination will be made as to whether the TCA contamination could potentially impact the Magothy Aquifer - Long Island's Sole Source Drinking Water, or if the impact is limited to the Upper Glacial Aquifer. Should the results indicate potential TCA impact to the Magothy Aquifer, a Supplemental Site Characterization or Remedial Investigation Work Plan will be prepared to investigate groundwater quality conditions within the Magothy Aquifer. This Plan may include vertical profiling of groundwater quality conditions within the first 100 feet Magothy formation (approximately 165-265 feet) that would be conducted in accordance with the existing Site Characterization Work Plan.

3.7 Installation, Sampling and Analysis of Permanent Groundwater Monitoring Wells

In the event that the concentration of TCA is limited to the groundwater within the Upper Glacial Aquifer, a series of multi-depth permanent groundwater monitoring wells will be installed on-site. A total of five monitoring wells will be installed using a hollow stem auger drill rig. The monitoring well depths will include one shallow (water table well), two intermediate depth wells, and two deep (bottom of the Upper Glacial Aquifer) wells. As a baseline, groundwater sampling of all permanent shallow (water table) wells will include analysis for the full Target Compound List (TCL) utilizing USEPA Method 8260 with NYSDEC ASP Category B deliverables.

After the baseline sampling, the analyte list for future sampling rounds can be pared down based upon the initial findings. The final depth and screen zone of each well will be established based upon the chemical results of the vertical profiling and approval from NYSDEC. The purpose of these wells is to set up a groundwater monitoring well network to facilitate data collection that will be utilized to determine groundwater quality beneath the Property. The proposed monitoring well locations are illustrated in Figure 4.

All wells will be constructed of schedule 40 PVC riser casing and associated 0.020-inch slotted screen. The diameter of each well, either 2-inch or 4-inch, will be determined based upon the results of the vertical profiling. Each well will be gravel packed two feet above the screen with No. 2 sand. A two foot thick bentonite seal will be set above the gravel pack. The remaining annular space above the gravel pack will be backfilled with a cement/bentonite slurry tremied from the bottom of the borehole upward to avoid bridging. Each well will be finished with a watertight cap and a bolt-down steel cover curb box cemented flush to grade.

3.7.1 Well Development

Immediately following installation of each monitoring well, the well will be developed using a small-diameter submersible pump to reduce the amount of fine material in the well screen to minimize turbidity and to obtain fresh formation groundwater. A portable nephelometer will be used to take periodic turbidity measurements during well development with a goal of achieving a turbidity not to exceed 50 NTUs upon well development. The wells will be pumped until the discharge water is relatively turbid-free. Well development information will be recorded on the well construction log. All well development water will be contained in DOT-approved 55-gallon drums pending waste characterization sample results for proper disposal.

3.7.2 Well Elevation Survey

After the installation of all the wells is completed, the elevations of the top of the well casings will be surveyed by a NYS-Licensed Surveyor to the nearest 0.01 of a foot. The depth to water will be measured at all new and existing water table wells and a water table elevation contour map indicating the direction of groundwater flow will be prepared.

3.7.3 Groundwater Monitoring Well Sampling

Approximately one to two weeks after well development, a groundwater sample will be collected from each newly installed well and the five existing on-site water table monitoring wells. Groundwater samples collected from these wells will be analyzed and used to evaluate the horizontal and vertical extent of TCA dissolved in the Upper Glacial Aquifer beneath the Site.

A Grundfos® submersible pump, or equivalent, will be lowered into the well. The pump will be connected to dedicated polyethylene tubing. The well with then be purged of a minimum of three well casing volumes to obtain a representative sample of groundwater. All purge water will be contained in DOT-approved 55-gallon drums pending waste characterization sample results for proper disposal. Measurements of turbidity, pH and specific conductivity will be taken and recorded after the removal of each well casing volume during well purging and prior to sample collection. All samples will be collected directly from the pump discharge tubing into laboratory issued VOA vials and stored in an ice-filled cooler until delivery to an ELAP-approved laboratory. Laboratory analysis will include VOCs using USEPA Method 8260 with NYSDEC ASP Category B deliverables.

3.8 Sub-Slab Soil Vapor Point Installation and Sampling

A total of four temporary sub-slab soil vapor points will be installed through the concrete floor of the Mako Building #3. In addition, two temporary sub-slab soil vapor points will be installed in the adjacent building “Mako Building #2”, located to the southeast of Mako Building #3. All sub-slab vapor points will be installed in accordance with the New York State Department of Health (NYSDOH) “Guidance for Evaluating Soil Vapor Intrusion in the State of New York” dated October 2006 (Ref. 6). A total of two exterior soil vapor points will be installed along the Site boundary along the south side of the property and will be installed per Section 2.1.7 of NYSDOH “Guidance for Evaluating Soil Vapor Intrusion in the State of New York” (Ref. 6). Indoor ambient air samples will be also be collected in the interior of Mako Buildings #2 and #3, with one exterior ambient air sample collected behind Mako Building #3. The locations of the sub-slab soil vapor points are illustrated in Figure 5. The actual location of all of the sampling points will be determined in the field with consultation with NYSDEC staff.

The soil vapor points will be installed by drilling a 1/2-inch diameter hole through the concrete surface using a manually operated hammer-drill equipped with a carbide bit. The hole will be advanced down through the concrete to approximately 2-3 inches below the floor slab. The points will be constructed of 1/4-inch stainless steel pipe connected to 1/4-inch polyethylene tubing. The sampling probe will be placed two inches directly beneath the slab.
A three-way "T" connector valve assembly will be connected to a vacuum pump and a pre-cleaned six-liter SUMMA® air sampling canister. The vapor probe assembly will be sealed at the slab surface with liquid beeswax.

Before collecting the soil vapor sample, the sample tubing is purged using a vacuum pump set at a rate of approximately 0.2 liters per minute. A helium tracer gas will be used to enrich the atmosphere around the sampling location. The tracer gas verifies that interior ambient air is not inadvertently drawn down into the sub-slab soil vapor sample. Both the purge volume from the sampling tube and the helium-enriched air within the container will be screened for the tracer gas using a Gowmac® Model 21-250, or equivalent, gas leak detector.

Following the purging and tracer gas verification steps, the sub-slab soil vapor samples will be collected using the SUMMA® canister set to fill at a rate of not more than 0.2 liters per minute with an approximate fill time of 2-hours. The samples will be analyzed for VOCs using USEPA Method T0-15 by a NYS-certified laboratory.

Soil vapor point installation logs will be generated and will be included as an appendix in the Site Characterization Report. The logs will contain any local condition(s) that occurred during the sampling that may influence interpretation of the results (i.e. weather).

Concurrent with the interior soil vapor sampling, the collection of ambient air samples from inside and outside of the Mako Building #3 is also planned. The exterior ambient air sample will be obtained using a SUMMA® canister equipped with a regulator to collect a sample over the same 2-hour time period as the soil vapor samples. The indoor ambient air samples will be collected in the same manner but will be collected over an 8-hour period. The samples will be collected from the breathing zone and submitted to a NYSDOH certified laboratory for analysis of VOCs using EPA Method TO-15 under chain of custody documentation.

3.9 Equipment Decontamination

An equipment decontamination area will be set up in a location close to but segregated from the work area. This area will be set up on top of a minimum 6-mil polyethylene liner (or equivalent quality plastic sheeting), and will include the following equipment: decontaminating cleaners and solutions, deionized water, sprayers, washing tubs, brushes and clean disposable latex and neoprene gloves. Gloves worn for sample handling will be discarded between sample collections.

All down-hole drilling equipment will be decontaminated upon arrival at the Site and between each use, e.g., augers, samplers, rods and plugs, etc. All re-usable sampling equipment, including bowls, trowels, and split-spoon samplers, etc. will be decontaminated with a three-step washing process that consists of a tap water rinse, an Alconox® and tap water wash, followed by a distilled water rinse. After each rinsing process the equipment will be allowed to air dry.

The submersible pump used for groundwater sample collection will be decontaminated between sample collection by passing the detergent and water mixture through the pump, followed by two fresh water rinses.

3.10 Sampling QA/QC Protocol

Field notes including observations of soil conditions, pertinent observations, diagrams (if appropriate) will be maintained. Appropriate photographs will be taken. A record of each sample, including any pertinent observations about the sample, will be kept in a field notebook and/or appropriate logs and copies will be included within the Site Characterization Report.

Dedicated, new polyethylene tubing will be used at each well location for purging and sampling. Samples will be packaged in laboratory-issued sample containers by CA RICH personnel and stored on-ice pending same day or overnight shipment to CA RICH's subcontracted State-Certified laboratory. Groundwater samples will be collected directly from the decontaminated sampling pump into laboratory-issued 40-milliliter VOC vials. The vials will be filled completely and checked to ensure no air bubbles are present. Additional field and laboratory QA/QC protocol is included in the attached QAPP (Appendix A).

3.11 Health & Safety

A site-specific Health and Safety Plan (HASP) has been prepared for the field portion of the Site Investigation. The HASP will cover all activities in the 'investigation area', as well as emergency procedures and available emergency services in proximity to the Site. All proposed work discussed in this SCWP will be conducted in accordance with the HASP. The HASP is included as Appendix B.

3.12 Site Characterization Report

Once the laboratory results are obtained, a Site Characterization Report will be prepared for NYSDEC. At a minimum, the Site Characterization Report will include the following items:

- A description of the work performed;
- Well and soil vapor point construction details;
- Laboratory summary tables and maps;
- Qualitative Exposure Assessment;
- A Data Usability Summary Report including the laboratory data;
- A water table elevation and contour map;
- Conclusions and Recommendations.

4.0 SCHEDULE

The following Schedule is provided for this Site Characterization Investigation.

Event	Schedule
Site Characterization Work Plan and HASP Submission	November, 2010
NYSDEC Review Period	January, 2011
Environmental Database Area Study	December, 2010
Freedom of Information Requests and Review	December, 2010
Submission of Revised Site Characterization Work Plan & HASP	March, 2011
NYSDEC Review Period (Estimated)	March, 2011
On-Site soil, soil vapor and groundwater testing	April - May, 2011
Chemical Analysis	June, 2011
Site Characterization Report	July – August, 2011

5.0 REFERENCES

1. NYSDEC, August 2010, Order on Consent and Administrative Settlement.

2. NYSDEC. DER-10 Technical Guidance for Site Investigation and Remediation. New York, Author, May 2010.

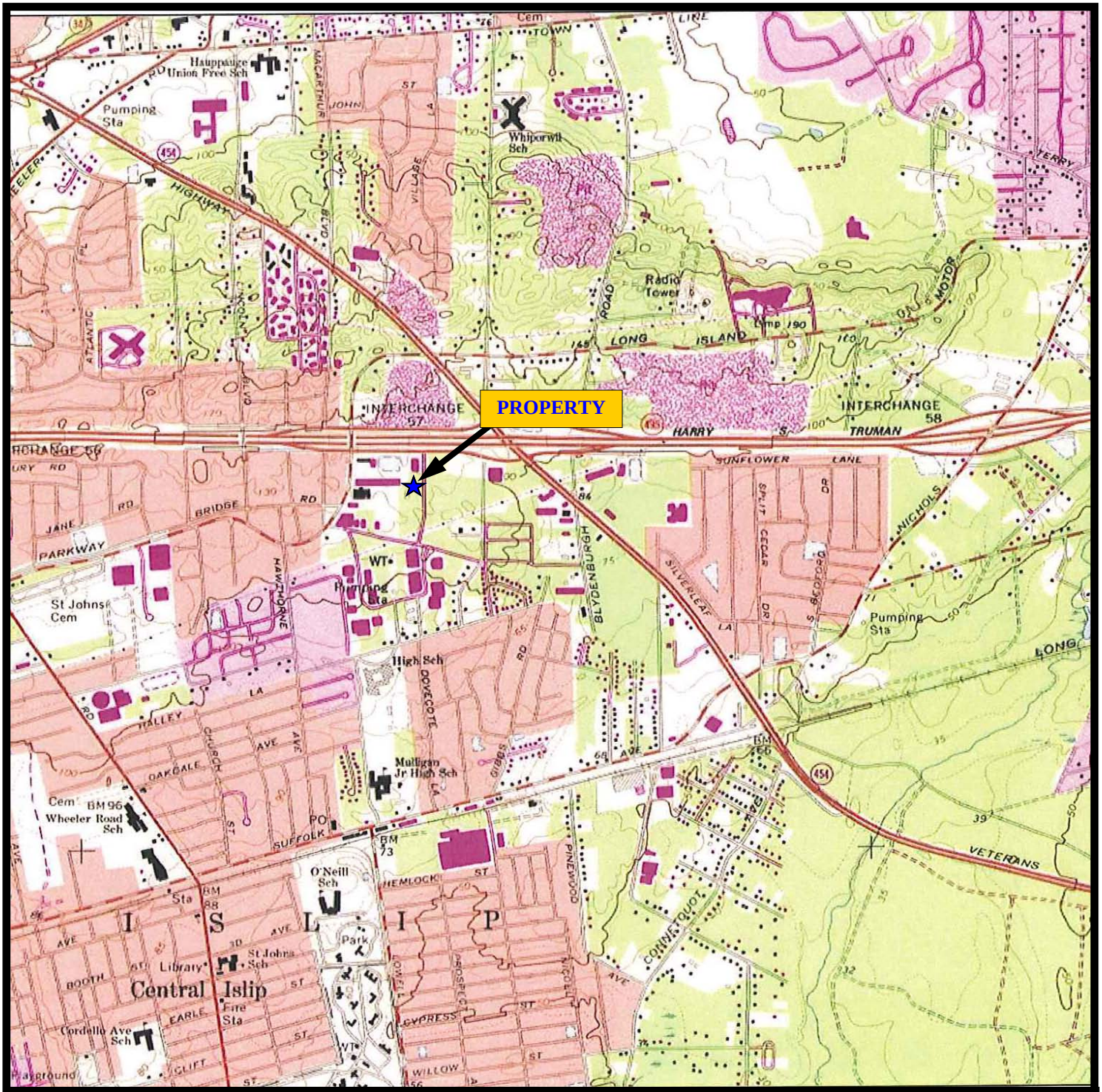
3. CA RICH Consultants, Inc., March 2010, Phase II Environmental Site Investigation.

4. SCDHS, January 7, 1999; Standard Operation Procedure for the Administration of Article 12 of the Suffolk County Sanitary Code: Pump-out and Soil Cleanup Criteria.

5. NYSDEC. Technical and Operational Guidance Series (1.1.1) Ambient Water Quality Standards and Guidance Values. New York, Author, October 22, 1993.

6. NYSDOH "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" dated October 2006.

Figures



APPROX. SCALE (ft.)

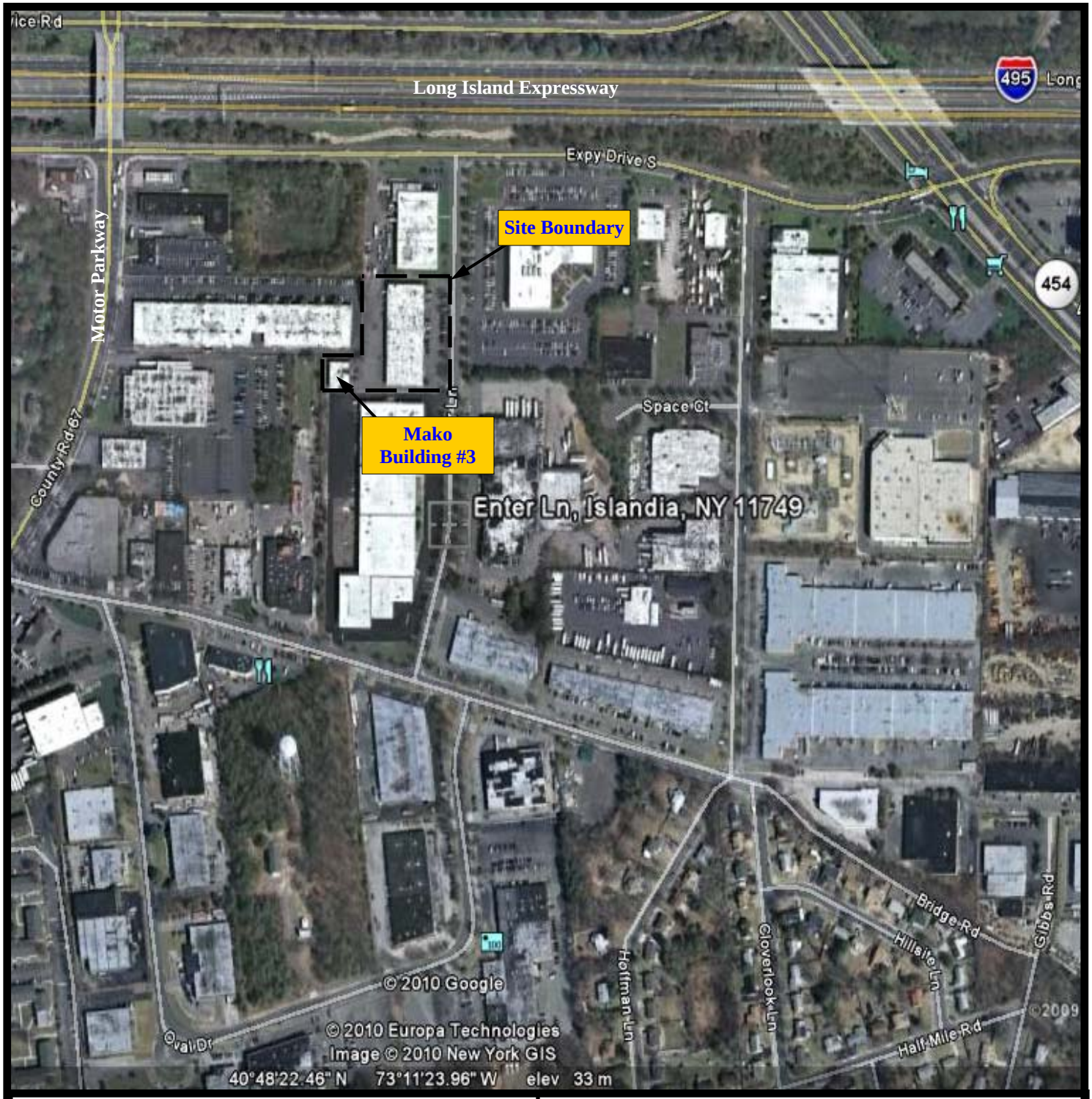
0 24,000 48,000

N

Adapted from 1979 USGS Central Islip Quadrangle

CA RICH CONSULTANTS, INC.
17 Dupont Street,
Plainview, NY 11803

TITLE: **SITE LOCATION MAP**		*DATE:* **4/29/2010**
		SCALE: **AS SHOWN**
FIGURE: **1a**	**Mako Building # 3** **48-50 Enter Lane** **Hauppauge, New York**	*DRAWN BY:* **JP**
DRAWING:		*APPR. BY:* **STM**

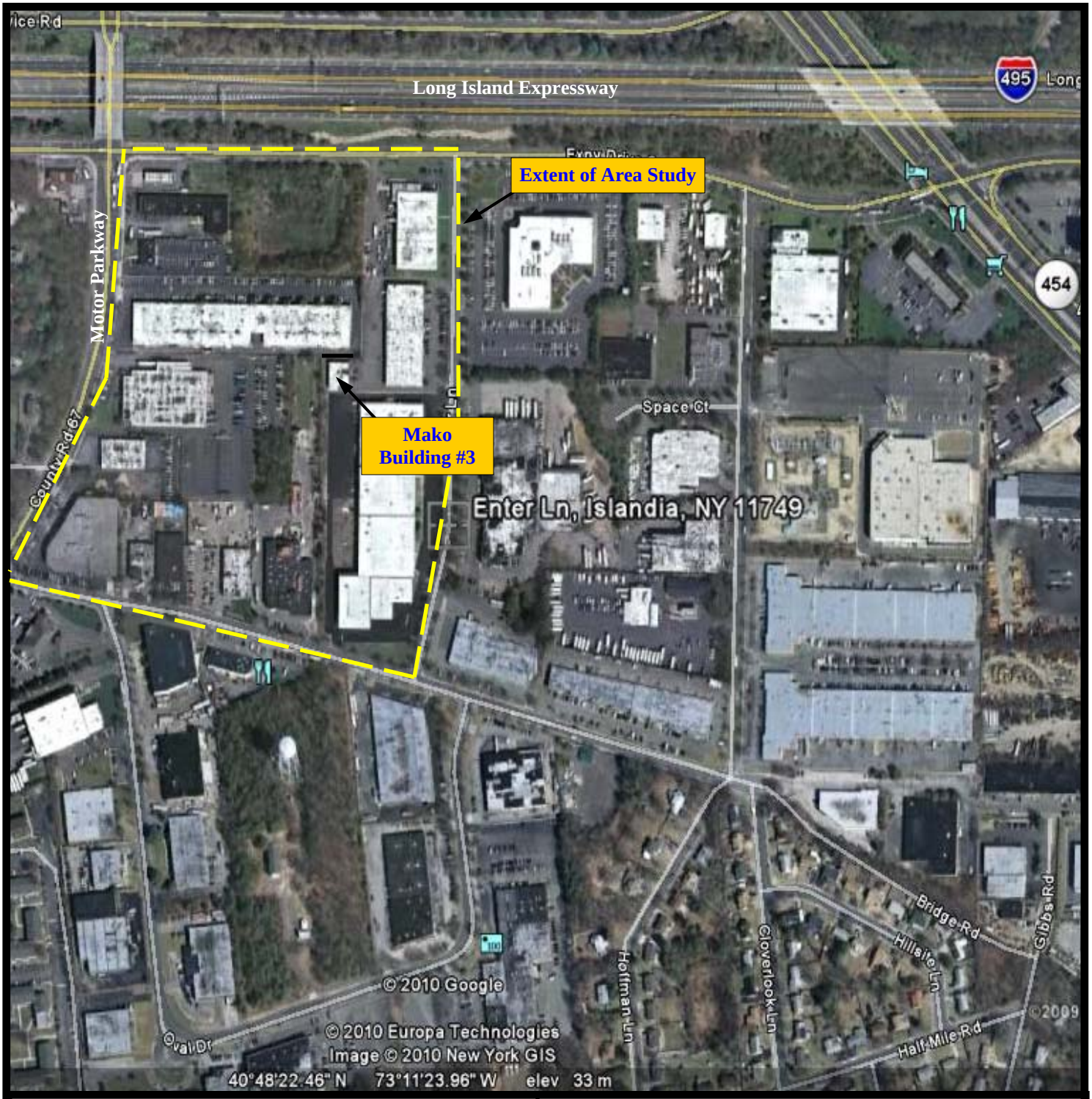


N

Adapted from Google Earth Aerial Image.

CA RICH CONSULTANTS, INC.
17 Dupont Street,
Plainview, NY 11803

TITLE: **PROPERTY LOCATION MAP**	DATE: **4/22/10**
	SCALE: **AS SHOWN**
FIGURE: **1B**	**Mako Properties LP**
DRAWING:	**Mako Building # 3**
	48-50 Enter Lane
	Islandia, New York
	DRAWN BY: **S.T.M.**
	APPR. BY: **C.A.R.**



Extent of Study Area

N

Adapted from Google Earth Aerial Image.

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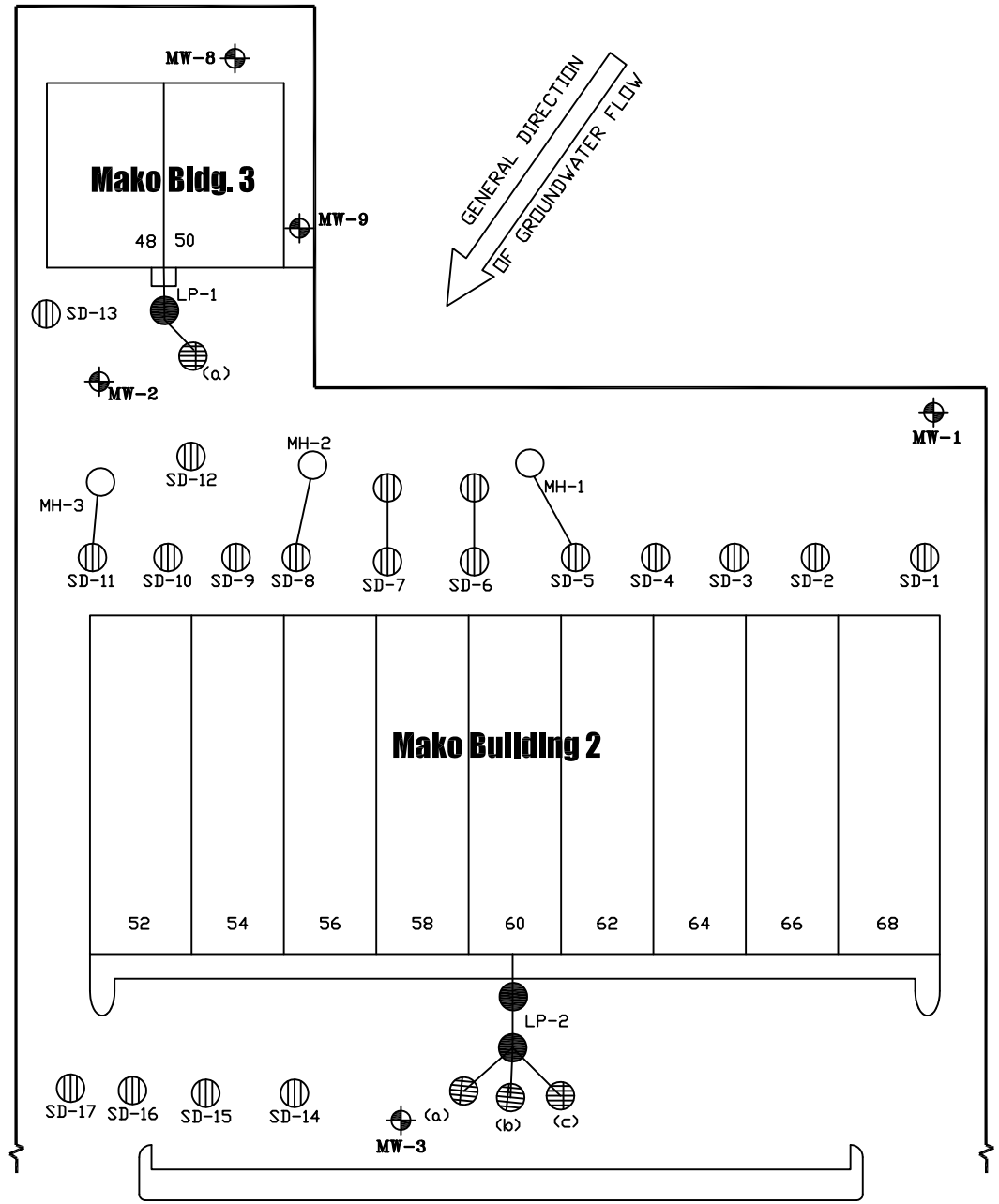
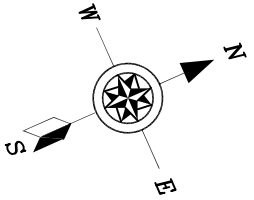
Plainview, NY 11803

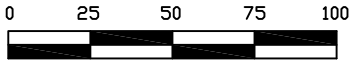
TITLE: **Extent of Study Area**		DATE: **5/12/10**
		SCALE: **AS SHOWN**
FIGURE: **1C**	**Mako Properties LP** **Mako Building # 3** **48-50 Enter Lane** **Islandia, New York**	DRAWN BY: **J.E.P**
DRAWING:		APPR. BY: **S.T.M**





LEGEND

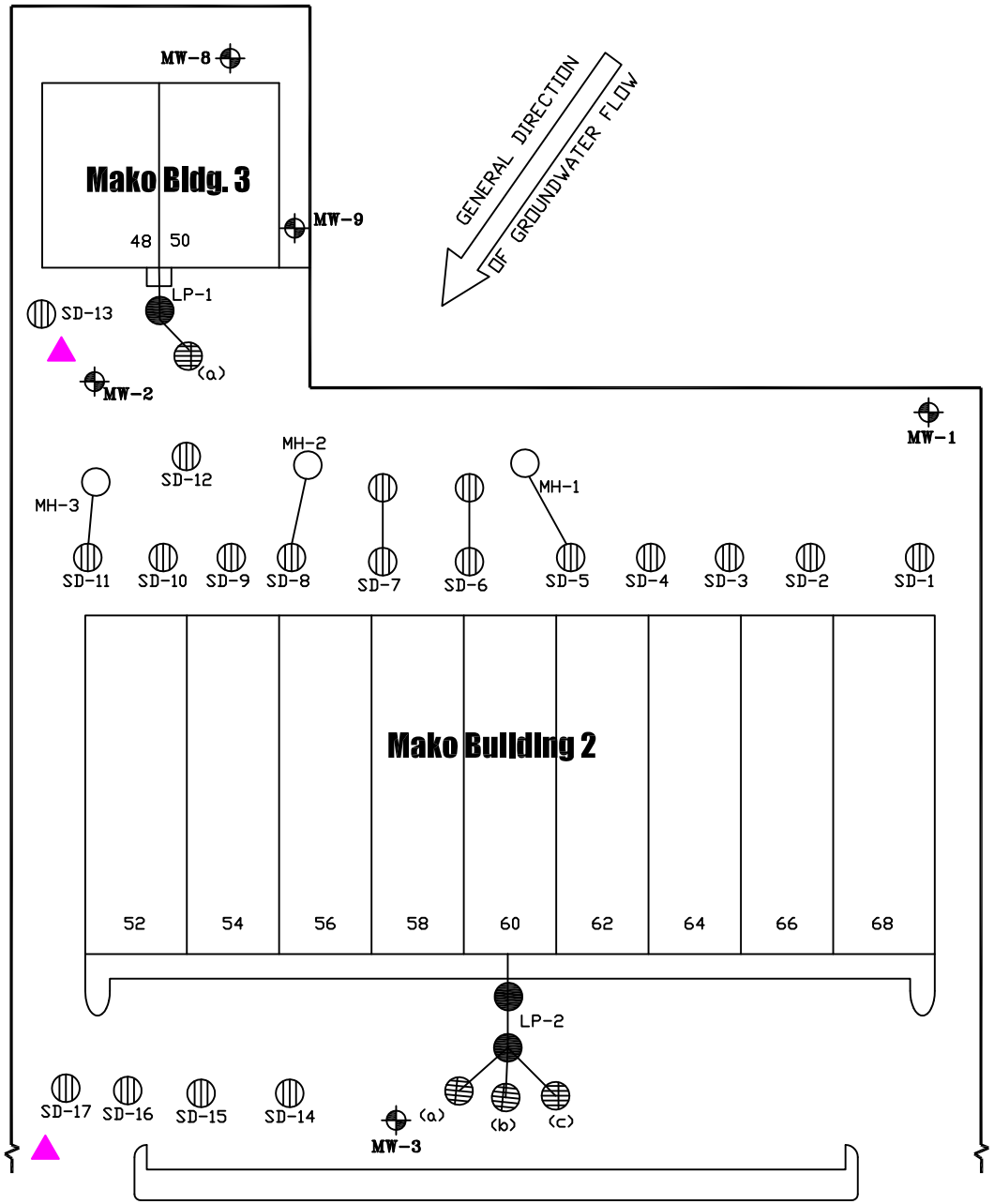
- Existing Groundwater Monitoring Well
- Stormwater Drain
- LP-1 Septic Tank
- (a) Leaching Pool
- MH-3 Solid Cover Overflow Stormwater Drain

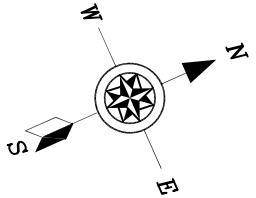


Graphic Scale in Feet

CA RICH CONSULTANTS, INC.
Certified Groundwater and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: SITE PLAN		DATE: 4/22/2010
		SCALE: As Shown
FIGURE: 2	MAKO PROPERTIES BLDG. #3 48-50 ENTER LANE ISLANDIA, NEW YORK	DRAWN BY: S.T.M.
DRAWING NO: 2010-12A		APPR. BY: C.A.R.





LEGEND

- Existing Groundwater Monitoring Well
- Proposed Hydropunch Location
- Stormwater Drain
- LP-1 Septic Tank
- (a) Leaching Pool
- MH-3 Soild Cover Overflow Stormwater Drain

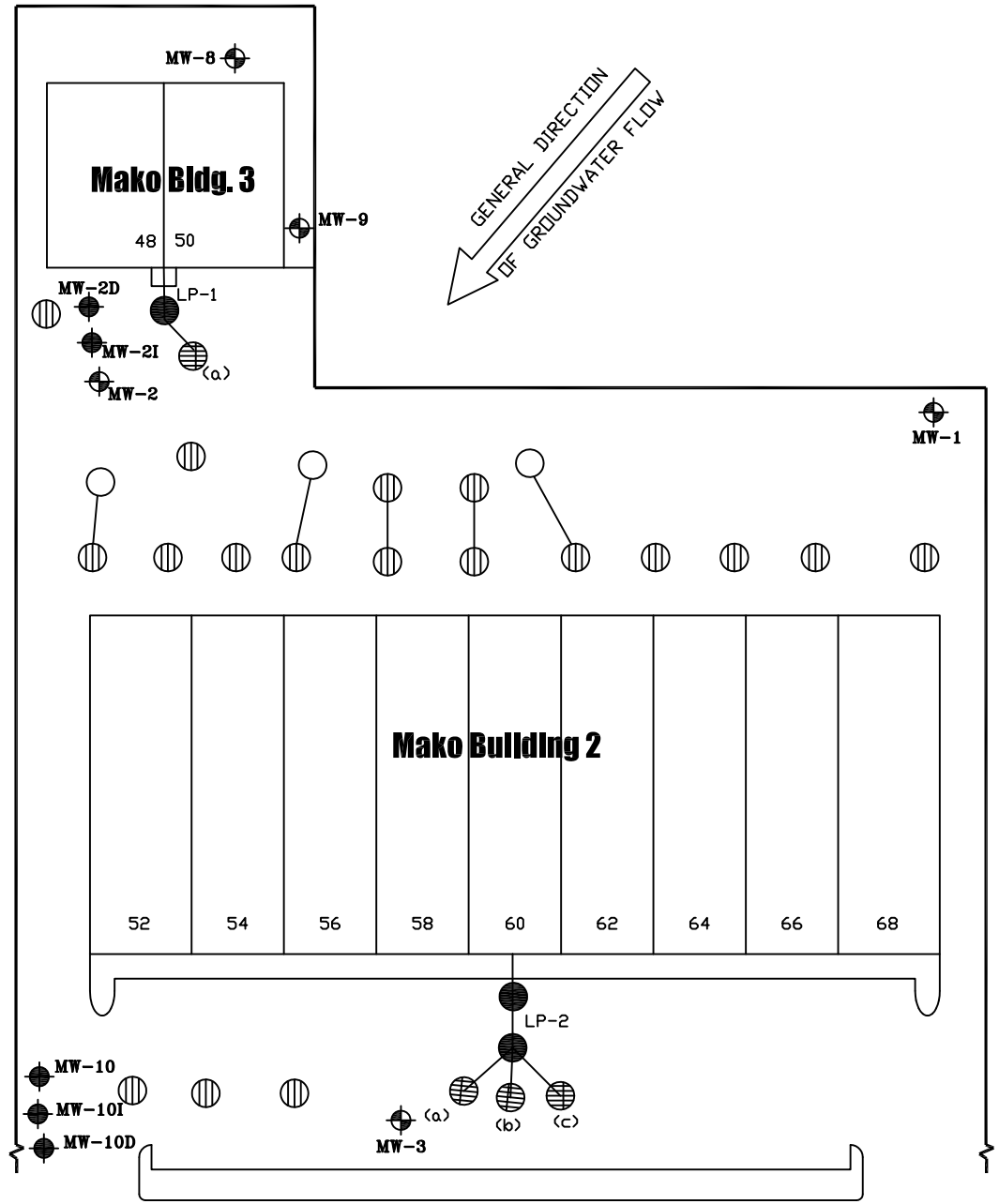
0 25 50 75 100

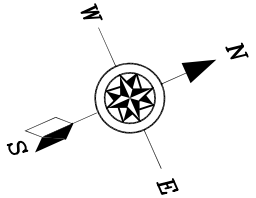
Graphic Scale in Feet

CA RICH CONSULTANTS, INC.

Certified Groundwater and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

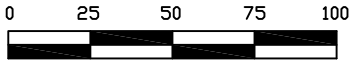
TITLE: PROPOSED HYDROPUNCH LOCATIONS		DATE: 10/24/2010
		SCALE: As Shown
FIGURE: 3	MAKO PROPERTIES BLDG. #3 48-50 ENTER LANE ISLANDIA, NEW YORK	DRAWN BY: S.T.M./J.T.C.
DRAWING NO: 2010-13A		APPR. BY: C.A.R.





LEGEND

- Existing Groundwater Monitoring Well
- Proposed Groundwater Monitoring Well
- Stormwater Drain
- LP-1 Septic Tank
- (a) Leaching Pool
- MH-3 Soild Cover Overflow Stormwater Drain

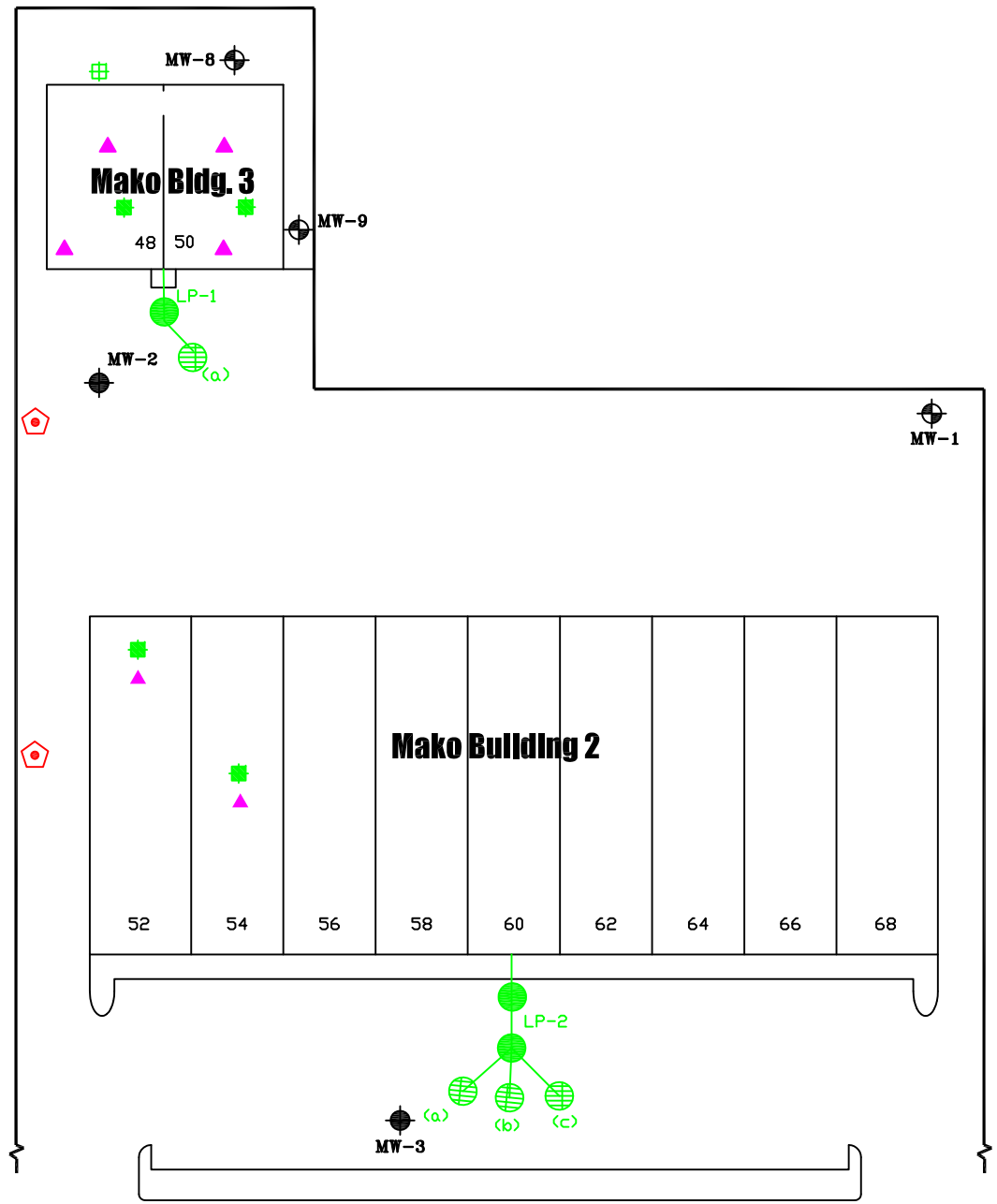


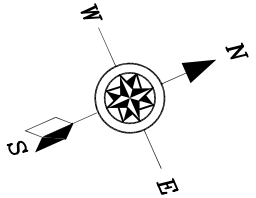
Graphic Scale in Feet

CA RICH CONSULTANTS, INC.

Certified Groundwater and Environmental Specialists
17 Dupont Street, Plainview, New York 11803

TITLE: Proposed Groundwater Monitoring Well Locations		DATE: 4/19/2010
		SCALE: As Shown
FIGURE: 4	MAKO PROPERTIES BLDG. #3 48-50 ENTER LANE ISLANDIA, NEW YORK	DRAWN BY: S.T.M.
DRAWING NO: 2010-11A		APPR. BY: C.A.R.





LEGEND

- Proposed Sub-Slab Soil Vapor Point
- Proposed Outdoor Air Sample
- Proposed Indoor Air Sample
- Proposed Soil Vapor Sample
- Upgradient Monitoring Well
- Downgradient Monitoring Well
- LP-1 Septic Tank
- (a) Leaching Pool

0 25 50 75 100

Graphic Scale in Feet

CA RICH CONSULTANTS, INC.

Environmental Specialists Since 1982

17 Dupont Street, Plainview, New York 11803

TITLE: Proposed Soil Vapor, Sub-Slab Soil Vapor, Ambient Air & Indoor Air Sample Locations		DATE: 3/2/2011
		SCALE: As Shown
FIGURE: 5	MAKO PROPERTIES BLDG. #3 48-50 ENTER LANE ISLANDIA, NEW YORK	DRAWN BY: S.T.M.
DRAWING NO: 2010-10A		APPR. BY: C.A.R.

Appendix A

Quality Assurance Project Plan

FINAL

QUALITY ASSURANCE PROJECT PLAN

For

SITE CHARACTERIZATION WORK PLAN

48-50 Enter Lane, Islandia, NY
NYSDEC SITE #152230

March 2011

Prepared for:

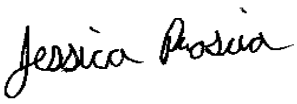
MAKO PROPERTIES LIMITED PARTNERSHIP
931B Conklin Street
Farmingdale, NY 11735-2429

Prepared by:

CA RICH CONSULTANTS, INC.
17 Dupont Street
Plainview, NY 11803-1614

Quality Assurance Project Plan

1.1 Introduction - The following Quality Assurance Project Plan ("QAPP") has been prepared specifically for the Site Characterization Work Plan at 48-50 Enter Lane in Islandia, New York. This Plan was prepared and approved as stated below.



Prepared by: _____ Date: 3/31/11

Jessica Proscia, Project Manger

Approved by: _____ Date: 3/31/11

Steve Sobstyl, Senior Project Manager

1.2 QAPP - Table of Contents

The following elements are included in this QAPP:

1.3 Project Description - The Site Characterization Work Plan subject to this QAPP have been prepared to address the following issues:

- Determine the nature and extent of the contamination at the subject Property; and,

- Obtain the necessary information needed to design a Remedial Program for the Site.

The investigative methods that will be used include well drilling, monitoring well installation, monitoring well sampling, soil vapor probe installation and sampling and soil sampling. These are described in detail in the Site Characterization Work Plan.

1.4 Project Organization – Ms. Jessica Proscia will serve as the Project Manager (PM) and will be responsible for the overall scheduling and performance of all investigative activities.

Ms. Proscia will also serve as the Quality Assurance Officer (QAO) for this project. Her duties will include:

- Review of laboratory data packages
- Interface with laboratory
- Performance of Field Audits

Experienced CA RICH staff will perform and/or oversee completion of all the field activities described in the Investigation Work Plan.

1.5 Quality Assurance Objectives and Data Measurement – There are two sources of data collection methodology that will provide data information during this Investigation.

Field Screening - Organic vapor readings will be recorded from the head space of soil samples. This data is intended to be used only as a screening tool. To meet these goals, clean sampling tools will be used for each head space measurement and the photo-ionization detector (PID) will be calibrated at the beginning of each screening day on-site.

Chemical Analysis – All environmental samples will delivered to a New York State-Certified laboratory contracted to CA RICH for chemical analysis. This data is intended to determine the nature and extent of contamination in soil and groundwater. The laboratory will follow the NYSDEC – Analytical Services Protocol dated 1995. All analytical reports will be prepared in NYSDEC ASP Category B deliverables. All samples will be placed in iced-filled coolers and delivered to the laboratory within 48 hours of collection.

Quality assurance objectives are generally defined in terms of five parameters:

- **Representativeness -** Representativeness is the degree to which sampling data accurately and precisely represents site conditions, and is dependent on sampling and analytical variability. The Supplemental Site Investigation Work Plan has been designed to assess the presence of the constituents in the target media at the time of sampling. The Plan present the rationale for sample quantities and location. The Plan also present field sampling methodologies and laboratory analytical methodologies.

  The use of the prescribed field and laboratory analytical methods with associated holding times and preservation requirements are intended to provide representative data. Further discussion of QC checks is presented in Section 1.11.

- **Comparability** - Comparability is the degree of confidence with which one data set can be compared to another data set. Comparability between this investigation and to the extent possible, with existing data will be maintained through consistent sampling and analytical methodology set forth in the QAPP; the and the Supplemental Site Investigation Work Plan; the NYSDEC ASP analytical methods (1995) with NYSDEC ASP QA/QC requirements (1995); and through use of QA/QC procedures and appropriately trained personnel.

- **Completeness -** Completeness is defined as a measure of the amount of valid data obtained from a sampling event compared to the amount that was expected to be obtained under normal conditions. This will be determined upon assessment of the analytical results.

- **Precision -** Precision is the measure of reproducibility of sample results. The goal is to maintain a level of analytical precision consistent with the objectives of the Work Plan. To maximize precision, sampling and analytical procedures will be followed. All work for the investigation phase of this project will adhere to established protocols presented in the QAPP, and Supplemental Site Investigation Work Plan. Checks for analytical precision will include the analysis of matrix spike duplicated, laboratory duplicates, and field duplicates. Checks for field measurement precision will include obtaining duplicate field measurements. Further discussion of precision QC checks is provided in Section 1.11.

- **Accuracy** - Accuracy is the deviation of a measurement from the true value of a known standard. Both field and analytical accuracy will be monitored through initial and continuing calibration of instruments. In addition, internal standards, matrix spikes, blank spikes, and surrogates (system monitoring compounds) will be used to assess the accuracy of the laboratory analytical data.

1.6 Sampling Procedures - The sampling procedures that will be employed are discussed in detail in the Site Characterization Work Plan.

1.7 Sample and Document Custody Procedures

- **General** - The Chain-of-Custody program allows for the tracing of possession and handling of the sample from its time of collection through its chemical analysis in the laboratory. The chain-of-custody program at this site will include:

  - Sample labels
  - Chain-of-Custody records
  - Field records

- **Sample Container Details**

Sample Matrix and Parameters	Container Type and Preservative	Method	Holding Time*
Groundwater			
VOCs	Two (2) - 40 Vial with HCL - ICE	USEPA 8260	14 Days
Sub Slab Vapor			
VOCs	Six-liter Summa Canister	TO-15	30 Days

*Holding Time is calculated from collection date

- **Sample Labels** - To prevent misidentification of samples, a label will be affixed to the sample container and will contain the following information:

  - Site Name
  - Sample identification number
  - Date and time of collection
  - Initials of Sampler
  - Preservation (if any)
  - Type of analysis to be conducted.

- **Chain-of-Custody Records** - To establish the documentation necessary to trace sample possession from the time of collection, a chain-of-custody record (sample attached) will be filled out and will accompany samples at all times. The record will contain the following information:

  - Project name:
  - Printed name and signature of samplers
  - Sample number
  - Date and time of collection
  - Sampling location
  - Number of containers for each sample
  - Signature of individuals involved in sample transfer (when relinquishing and accepting samples)
  - Inclusive dates and times of possession.

- **Field Records** - Field records will be maintained during each sampling effort in a logbook. All aspects of sample collection, handling and visual observations will be recorded. All sample collection equipment, field analytical equipment and equipment utilized to make physical measurements will be identified in the field logbook.

  All calculations, results and calibration data for field sampling, field analytical and field physical measurement equipment will also be recorded in the field logbook. Entries will be dated and initialed. Entries will be made in ink, and will be legible.

1.8 Calibration Procedures and Frequency - The contracted laboratory will follow the NYSDEC Category-B requirements for equipment calibration procedures and frequency.

The QA Officer will be responsible for ensuring that the Field PID is calibrated at the beginning of each day of field sampling using calibration gas supplied by the manufacturer. A log of the meter calibration will be kept in the field logbook.

1.9 Analytical Procedures - All laboratory analysis will follow NYSDEC ASP (1995) protocols with Category B deliverables. The following samples will be collected for QA/QC purposes: 1 trip blank, 1 field blank, 1 duplicate samples, 1 matrix spike, and 1 matrix spike duplicate per every twenty field samples. A qualified data validator will review the laboratory data and a Data Usability Summary Report (DUSR) will be prepared.

1.10 Data Reduction, Validation and Reporting

- **Field Data** - All field data recorded in logbooks or on log sheets will be evaluated in the Office and transferred to word processor text by field personnel or clerical staff. PID readings will be included on the logs. The QAO and/or PM will review this data for accuracy and completeness. Typed test pit logs will be prepared for all test pits. Construction diagrams will be prepared for all monitoring wells and soil vapor probes installed by CA RICH.

- **Laboratory Data** - The laboratory will transfer the instrument readings to laboratory report forms. Ms. Renee Cohen will perform independent data validation of all analytical data using NYSDEC DUSR protocols.

  The Data Validator will provide CA RICH with a Data Validation Summary Report. The QAO will review the summary report as well as other field data and prepare a Data Usability Report.

  CA RICH will prepare summary tables of the validated analytical data using computer spreadsheet software. The data entries will be reviewed using the red check-green check method. All entries will be reviewed and entry errors will be marked in red ink. Once these entries are corrected, the printouts will be marked with green ink and placed in the project file.

1.11 Internal Quality Control Checks

Both field and laboratory quality control checks are proposed for this project. In the event that there are any deviations from these checks, the Project Manager and Quality Assurance Officer will be notified. The proposed field and laboratory control checks are discussed below.

Field Quality Control Checks

- **Field Measurements -** To verify the quality of data collected using field instrumentation, at least one duplicate measurement will be obtained per day and reported for all field analytical measurements.

- **Sample Containers -** Certified-clean sample containers will be supplied by the contracted laboratory.

- **Field Duplicates** – Field duplicates will be collected to check reproducibility of the sampling methods. Field duplicates will be prepared as discussed in the Supplemental Site Investigation Work Plan. Field duplicates will be analyzed every 20 field samples.

- **Field Rinse Blanks** – Field rinse blanks are used to monitor the cleanliness of the sampling equipment and the effectiveness of the cleaning procedures. Field rinse blanks will be prepared and submitted for analysis during this investigation. Field rinse blanks will be prepared by filling sample containers with analyte-free water (supplied by the laboratory), which has been routed through a cleaned sampling device.

- **Trip Blanks** – Trip blanks will be used to assess whether site samples have been exposed to non-site-related volatile constituents during storage and transport. Trip blanks will be analyzed at a frequency of once per day, and will be analyzed for volatile organic constituents. A trip blank will consist of a container filled with analyte-free water (supplied by the laboratory), which remains unopened with field samples throughout the sampling event. Trip blanks will only be analyzed for volatile organic constituents.

1.12 Performance and Systems Audits

Performance and systems audits will be completed in the field and the laboratory during the investigation phase of this project as described below.

- **Field Audits –** CA RICH's Project Manager and Quality Assurance Officer will monitor field performance and field meter calibrations to verify that measurements are taken according to established protocols. The Project Manager will review all field logs. In addition, the Project Manager and the Quality Assurance Officer will review the field rinse and trip blank data to identify potential deficiencies in field sampling and cleaning procedures.

- **Laboratory Audits** – The contracted laboratory will perform internal audits consistent with NYSDEC ASP (1995).

1.13 Preventive Maintenance

Preventive maintenance schedules have been developed for both field and laboratory instruments. A summary of the maintenance activities to be performed is presented below.

- **Field Instruments and Equipment -** Prior to any field sampling, each piece of field equipment will be inspected to assure it is operational. If the equipment is not operational, it must be serviced prior to use. All meters which require charging or batteries will be fully charged or have fresh batteries. If instrument servicing is required, it is the responsibility of the field personnel to follow the maintenance schedule and arrange for prompt service.

- **Laboratory Instruments and Equipment -** The laboratory will document Laboratory instrument and equipment procedures. Documentation includes details of any observed problems, corrective measure(s), routine maintenance, and instrument repair (which will include information regarding the repair and the individual who performed the repair).

  Preventive maintenance of laboratory equipment generally will follow the guidelines recommended by the manufacturer. A malfunctioning instrument will be repaired immediately by in-house staff or through a service call from the manufacturer.

1.14 Data Assessment Procedures

The analytical data generated during the Investigation Work Plan and IRM Work Plan will be evaluated with respect to precision, accuracy, and completeness. The procedures utilized when assessing data precision, accuracy, and completeness are presented below.

- **Data Precision Assessment Procedures -** Field precision is difficult to measure because of temporal variations in field parameters. However, precision will be controlled through the use of experienced field personnel, properly calibrated meters, and duplicate field measurements. Field duplicates will be used to assess precision for the entire measurement system including sampling, handling, shipping, storage, preparation and analysis.

  Laboratory data precision for organic analyses will be monitored through the use of matrix spike duplicate sample analyses. For other parameters, laboratory data precision will be monitored through the use of field duplicates and/or laboratory duplicates.

  The precision of data will be measured by calculation of the standard deviation (SD) and the coefficient of variation (CV) of duplicate sample sets. The SD and CV are calculated for duplicate sample sets by:

  $$SD = (A-B)/1.414$$
  $$CV = SD/((A+B)/2) = 1.414(A-B)/(A+B)$$

  Where:

  A = Analytical result from one of two duplicate measurements
  B = Analytical result from the second measurement.

  Where appropriate, A and B may be either the raw measurement or an appropriate mathematical transformation of the raw measurement (e.g., the logarithm of the concentration of a substance).

  Alternately, the relative percent difference (RPD) can be calculated by the following equation:

  $$RPD = \frac{(A-B)}{(A+B)/2} \times 100$$

  $$RPD = 1.414\ (CV)(100)$$

- **Data Accuracy Assessment Procedures -** The accuracy of field measurements will be controlled by experienced field personnel, properly calibrated field meters, and adherence to established protocols. The accuracy of field meters will be assessed by review of calibration and maintenance logs.

  Laboratory accuracy will be assessed via the use of matrix spikes, surrogate spikes, and internal standards. Where available and appropriate, QA performance standards will be analyzed periodically to assess laboratory accuracy. Accuracy will be calculated as a percent recovery as follows:

  $$Accuracy = \frac{A-X}{B} \times 100$$

  Where:

  A = Value measured in spiked sample or standard
  X = Value measured in original sample
  B = True value of amount added to sample or true value of standard

This formula is derived under the assumption of constant accuracy over the original and spiked measurements. If any accuracy calculated by this formula is outside of the acceptable levels, data will be evaluated to determine whether the deviation represents unacceptable accuracy, or variable, but acceptable accuracy. Accuracy objectives for matrix spike recoveries and surrogate recovery objectives are identified in the NYSDEC, ASP (1995).

- **Data Completeness Assessment Procedures -** Completeness of a field or laboratory data set will be calculated by comparing the number of samples collected or analyzed to the proposed number.

$$\text{Completeness} = \frac{\text{No. Valid Samples Collected or Analyzed}}{\text{No. Proposed Samples Collected or Analyzed}} \times 100$$

As general guidelines, overall project completeness is expected to be at least 90 percent. The assessment of completeness will require professional judgment to determine data usability for intended purposes.

1.15 Corrective Action

Corrective actions are required when field or analytical data are not within the objectives specified in this QAPP, or the Supplemental Investigation Work Plan. Corrective actions include procedures to promptly investigate, document, evaluate, and correct data collection and/or analytical procedures. Field and laboratory corrective action procedures for this project are described below.

- **Field Procedures** - When conducting the investigative fieldwork, if a condition is noted that would have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause and corrective action implemented will be documented as a memo to the project file and reported to the Project Manager.

  Examples of situations, which would require corrective actions, are provided below:

  - Protocols as defined by the QAPP and the Supplemental Site Investigation Work Plan have not been followed;
  - Equipment is not in proper working order or properly calibrated;
  - QC requirements have not been met; and
  - Issues resulting from performance or systems audits.

  Project field personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

- **Laboratory Procedures -** In the laboratory, when a condition is noted to have an adverse effect on data quality, corrective action will be taken so as not to repeat this condition. Condition identification, cause and corrective action to be taken will be documented, and reported to the Quality Assurance Officer.

Corrective action may be initiated, at a minimum, under the following conditions:

- Specific laboratory analytical protocols have not been followed;
- Predetermined data acceptance standards are not obtained;
- Equipment is not in proper working order or calibrated;
- Sample and test results are not completely traceable;
- QC requirements have not been met; and
- Issues resulting from performance or systems audits.

Laboratory personnel will continuously monitor ongoing work performance in the normal course of daily responsibilities.

1.16 Quality Assurance Reports and Management

- **Internal Reporting -** The analytical laboratory will submit analytical reports using NYSDEC ASP (1995), Category B requirements. The analytical reports will be submitted to the Data Validator for review. Supporting data (i.e., historic data, related field or laboratory data) will also be reviewed to evaluate data quality, as appropriate. The Quality Assurance Officer will incorporate results of data validation reports (if any) and assessments of data usability into a summary report. This report will be filed in the project file and will include the following:

  - Assessment of data accuracy, precision, and completeness for field & laboratory data;
  - Results of the performance and systems audits;
  - Significant QA/AC problems, solutions, corrections, and potential consequences;
  - Analytical data validation report; and
  - Data usability report.

- **Reporting** - The Site Characterization Report will contain a separate QA/QC section including the DUSR and a summary of data collected and/or used as appropriate to the project DQOs. The Quality Assurance Officer will prepare the QA/QC summary tables and reports and memoranda documenting the data assessment and validation.

Appendix B

Health and Safety &
Community Air Monitoring Plan

FINAL
HEALTH AND SAFETY PLAN
&
COMMUNITY AIR MONITORING PLAN

For

SITE CHARACTERIZATION WORK PLAN

48-50 Enter Lane, Islandia, NY
NYSDEC SITE #152230

March 2011

Prepared for:

MAKO PROPERTIES LIMITED PARTNERSHIP
931B Conklin Street
Farmingdale, NY 11735-2429

Prepared by:

CA RICH CONSULTANTS, INC.
17 Dupont Street
Plainview, NY 11803-1614

HEALTH AND SAFETY PLAN
&
COMMUNITY AIR MONITORING PLAN

1.0 INTRODUCTION

This Health and Safety Plan (HASP) is developed for implementation during the planned site characterization activities at 48-50 Enter Lane, Islandia, New York, NYSDEC Site #152230 (hereinafter referred to a 'Mako Building #3' or the 'Site'. The HASP is to be enforced by the Project Health and Safety Manager and on-site Health & Safety Coordinator (HSC). The on-site HSC will interface with the Project Manager and is vested with the authority to make field decisions including the termination of on-site activities if an imminent health and safety hazard, condition or related concern arises. Information and protocol in the HASP is applicable to all on-site personnel who will be entering the work zone.

2.0 POTENTIAL HAZARDS

2.1 Chemical Hazards

During the investigation activities, CA RICH Consultants, Inc. (CA RICH) will operate as if the contaminants of concern are 1,1,1-trichloroethane (TCA) and its degradation products.

TCA looks like water and has a mild sweet odor like the odor of chloroform or ether. TCA vapor is heavier than air, so it can collect in very high concentrations in pits, tanks, or other low spots. Acute exposure to significant concentrations of TCA can cause irritation of the skin, eyes and mucus membrane, headache, dizziness, nausea, and in high enough concentrations, loss of consciousness and death *(Sax, 1984)*. It is suspected to be carcinogenic with chronic exposure.

Physical properties and additional toxicological information is included in Appendix A.

2.2 Other Health and Safety Risks

The HASP addresses the environmentally-related chemical hazards identified on the Site. Normal physical hazards associated with using drilling equipment and hand tools as well as hazards associated with adverse climatic conditions (heat & cold) also exist and represent a certain degree of risk to be assumed by on-site personnel.

Certain provisions in this Plan, specifically the use of personnel protective equipment, may tend to increase the risk of physical injury, as well as susceptibility to cold or heat stress. This is primarily due to restrictions in dexterity, hearing, sight, and normal body heat transfer inherent in the use of protective gear.

3.0 RISK MANAGEMENT

3.1 Work / Exclusion Zones

For each proposed investigation activity dealing (eg. monitoring well installation, soil vapor sampling, etc.), a work / exclusion zone will be established surrounding the activity. Access to this area will be limited to properly trained, properly protected personnel directly involved with the on-site activities. Enforcement of the work / exclusion zone boundaries is the responsibility of the on-site Health and Safety Coordinator.

3.2 Personnel Protection

Health & Safety regulatory personnel have developed different levels of personnel protection to deal with differing degrees of potential risks of exposure to chemical constituents. The levels are designated as **A, B, C,** and **D** and ranked according to the amount of personnel protection afforded by each level. Level **A** is the highest level of protection and Level **D** is the lowest level of protection as described below.

A – Fully encapsulating suit, SCBA, hard hat, chemcial-resistant steel-toed boots, boot covers, inner and outer gloves.

B – One-piece, hooded chemical-resistant splash suit, SCBA, hard hat, chemcial-resistant steel-toed boots, boot covers, inner and outer gloves.

C – One-piece, hooded chemical-resistant splash suit, hard hat, canister equipped face mask, chemcial-resistant steel-toed boots, boot covers, inner and outer gloves.

D – Work clothes, hard hat (optional), work boots/shoes, gloves (as needed).

The different levels are primarily dependent upon the degree of respiratory protection necessary, in conjunction with appropriate protective clothing. Levels of protection mandate a degree of respiratory protection. However, flexibility exists within the lower levels (B, C, and D) concerning proper protective clothing.

The four levels of protection were developed for utilization in situations which involve suspected or known atmospheric and/or environmental hazards including airborne contamination and skin-affecting substances.

It is anticipated that all of the investigation work will be performed using Level D protection (no respiratory protection with protective clothing requirements limited to long sleeved shirts, long pants or coveralls, work gloves and steel-toe leather work boots).

Level D may be modified by the HSC to include protective clothing or equipment (Saran-coated disposable coveralls or PVC splash suits, safety glasses, hard hat with face shield, and chemically resistant boots) based upon physical hazards, skin contact concerns, and real-time monitoring.

Real-time air monitoring for total airborne organics using either a photo-ionization detector will determine if and when an upgrade from Level D to a higher level of respiratory protection is warranted. Decisions for an upgrade from Level D to higher levels of protection, mitigative actions, and/or suspension of work are the responsibility of the Project Manager and/or the designated on-site Health & Safety Coordinator.

3.3 Air Monitoring

The Health & Safety Coordinator or his properly trained assignee will conduct “Real Time” air monitoring for total organic vapor and total particulates. 'Real-time' monitoring refers to the utilization of instrumentation, which yields immediate measurements. The utilization of real time monitoring helps determine immediate or long-term risks to on-site personnel and the general public, the appropriate level of personnel respiratory protection necessary, and actions to mitigate the recognized hazard. Air monitoring will be conducted in accordance with NYSDOH's Community Air Monitoring Program.

3.3.1. Particulate Monitoring

a. Instrumentation

Dust particulates in air will be monitored using a light scattering technique MINIRAM Model PDM-3 Miniature Real-time Aerosol Monitor (MINIRAM) or equivalent. The MINIRAM is capable of measuring airborne dust particles within the range of 10 to 100,000 micrograms per cubic meter ($\mu g/m^3$).

b. Application

Dust monitoring will occur at regular intervals excavation work activities. Monitoring will be conducted in upgradient and downgradient locations, relative to prevailing wind direction) along the perimeter of the work zone. The HSC or his designee will perform monitoring. As outlined in the NYSDOH Community Air Monitoring Plan, if particluate levels in the downwind location are 150 mg/m^3 greater than those measured in the upwind location, dust suppression techniques shall be employed.

3.3.2 Organic Vapor

a. Instrumentation

Real-time monitoring for total organic vapor (TOV) utilizes either a photo-ionization detector (PID) or flame ionization detector (FID). The appropriate PID is an intrinsically safe HNU Systems Model PI-101 Photoionization detector (HNU) or MiniRae™ Photo-ionization detector or equivalent, which is factory, calibrated to benzene. The appropriate FID is a Foxboro model 128 Organic vapor Analyzer (OVA) or equivalent, which is factory calibrated to methane.

b. Application

Organic vapor monitoring is performed as outlined in the NYSDOH Community Air Monitoring Plan. Specifically, monitoring shall be conducted at the downwind perimeter of the work zone periodically during work activities. If TOV levels exceed 5 parts per million (ppm) above established pre-work background levels, work activities will be halted and monitoring will be continued under the provision of a Vapor Emission Response Plan (as outlined in the Community Air Monitoring Plan).

3.4 Worker Training

Personnel overseeing the excavation of the contaminated soil will be trained, fit-tested, and medically certified (OSHA 29 CFR 1910. 134). This includes the Health & Safety Coordinator or his/her properly trained assignee.

Prior to any work, all workers involved with the project should be aware of the potential chemical, physical and biological hazards discussed in this document, as well as the general safety practices outlined below. A safety briefing by the on-site HSC and/or assistant designee shall take place at the outset of work activities.

The HSC will be available to address project-related health & safety issues a site worker (such as an equipment operator or laborer) may have regarding the site conditions. Once an issue is brought to the HCS's attention, he or she will evaluate the issue and apply the procedures outlined in this Health & Safety Plan.

3.5 General Safety Practices

All project personnel shall follow the following safety practices:

1. Avoid unnecessary skin exposure to subsurface materials. Long-sleeved shirts tucked into long pants (or coveralls), work gloves, and steel-toe leather work boots are required unless modified gear is approved by the HSC. Remove any excess residual soil from clothes prior to leaving the site.

2. No eating, drinking, gum or tobacco chewing, or smoking allowed in designated work areas. Thoroughly wash hands prior to these activities outside the work area. Avoid sitting on the ground during breaks or while eating and drinking. Thoroughly wash all exposed body areas at the end of the workday.

3. Some symptoms of acute exposure include: nausea, dizziness, light-headedness, impaired coordination, headache, blurred vision, and nose/throat/eye irritation. If these symptoms are experienced or strong odor is detected, leave the work area and immediately report the incident to the on-site HSC.

3.6 Enforcement

Enforcement of the Site Safety Plan will be the responsibility of the HSC. The Coordinator should be on-site on a full-time basis and perform or directly oversee all aspects of Project Health & Safety operations including: air monitoring; environmental mitigation; personnel respiratory and skin protection; general safety practices; documentation; emergency procedures and protocol; and reporting and recordkeeping as described below.

3.7 Reporting and Recordkeeping

Incidents involving injury, symptoms of exposure, discovery of contained (potentially hazardous) materials, or unsafe work practices and/or conditions should be immediately reported to the HSC.

A log book must be maintained on-site to document all aspects of HASP enforcement. The log is paginated and dated with entries made on a daily basis in waterproof ink, initialed by the HSC or designee. Log entries should include date and time of instrument monitoring, instrument type, measurement method, test results, calibration and maintenance information, as well as appropriate mitigative actions responding to detections. Miscellaneous information to be logged may include weather conditions, reported complaints or symptoms, regulatory inspections, and reasons to upgrade personnel protection above the normal specification (Level D).

4.0 EMERGENCIES

4.1 EMERGENCY RESPONSE SERVICES

(1)	**HOSPITAL** Southside Hospital 301 East Main Street Bay Shore, NY 11706 (See Figure 1 for Map Route)	**(631) 968-3000**
(2)	**AMBULANCE**	**911**
(3)	**FIRE DEPARTMENT** **HAZARDOUS MATERIAL**	**911**
(4)	**POLICE DEPARTMENT**	**911**
(5)	**POISON CONTROL CENTER**	**(800) 222-1222**

The preceding list and associated attached map (Figure 1) illustrating the fastest route to the nearest hospital must be conspicuously posted in areas of worker congregation and adjacent to all on-site telephones (if any).

4.2 EMERGENCY PROCEDURES

4.2.1 Contact or Exposure to Suspected Hazardous Materials

In the event of a fire, chemical discharge, medical emergency, workers are instructed to immediately notify the HSC and proper emergency services (posted). Should physical contact with unknown or questionable materials occur, immediately wash the affected body areas with clean water and notify the HSC. Anyone experiencing symptoms of exposure should exit the work area, notify the HSC, and seek medical attention.

4.2.2 Personnel Decontamination, First Aid, and Fire Protection

The first step in the treatment of skin exposure to most chemicals is to rinse the affected area with water. For this reason, adequate amounts of potable water and soap are maintained on-site in a clearly designated and readily-accessible location. Portable emergency eyewash stations and a first aid kit must be made available and maintained in the same locations as the potable water. Fire extinguishers are also to be maintained on-site in designated locations. All on-site personnel are to be made aware of the locations of the above-mentioned on-site Health & Safety accommodations during the initial Health and Safety briefing.

4.2.3 Ingress/egress

Clear paths of ingress/egress to work zones and site entrances/exits must be maintained at all times. Unauthorized personnel are restricted from accessing the site.

5.0 COMMUNITY AIR MONITORING PLAN

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area is necessary. This plan includes the following:

- Volatile organic compounds must be monitored at the downwind perimeter of the work area on a continuous basis. If total organic vapor levels exceed 5 ppm above background, work activities must be halted and monitoring continued under the provisions of a Vapor Emission Response Plan. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

- Particulates should be continuously monitored upwind, downwind and within the work area at temporary particulate monitoring stations during excavation activities. If the downwind particulate level is 150 µg/m^3 greater than the upwind particulate level, then dust suppression techniques must be employed. All readings must be recorded and be available for State (DEC & DOH) personnel to review.

Vapor Emission Response Plan

If the ambient air concentration of organic vapors exceeds 5 ppm above background at the perimeter of the work area, activities will be halted and monitoring continued. If the organic vapor level decreases below 5 ppm above background, work activities can resume. If the organic vapor levels are greater than 5 ppm over background but less than 25 ppm over background at the perimeter of the work area, activities can resume provided:

- The organic vapor level 200 ft. downwind of the work area or half the distance to the nearest residential or commercial structure, whichever is less, is below 5 ppm over background.

If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown. When work shutdown occurs, downwind air monitoring as directed by the Safety Officer will be implemented to ensure that vapor emission does not impact the nearest residential or commercial structure at levels exceeding those specified in the Major Vapor Emission section.

Major Vapor Emission

If any organic levels greater than 5 ppm over background are identified 200 feet downwind from the work area or half the distance to the nearest residential or commercial property, whichever is less, all work activities must be halted.

If, following the cessation of the work activities, or as the result of an emergency, organic levels persist above 5 ppm above background 200 feet downwind or half the distance to the nearest residential or commercial property from the work area, then the air quality must be monitored within 20 feet of the perimeter of the nearest residential or commercial structure (20 Foot Zone).

If efforts to abate the emission source are unsuccessful and, if organic vapor levels are approaching 5 ppm above background for more than 30 minutes in the 20 Foot Zone, then the Major Vapor Emission Response Plan shall automatically be placed into effect;

However, the Major Vapor Emission Response Plan shall be immediately placed into effect if organic vapor levels are greater than 10 ppm above background.

Major Vapor Emission Response Plan

Upon activation, the following activities will be undertaken:

1. All Emergency Response Contacts as listed in the Health and Safety Plan of the Work Plan will go into effect.

2. The local police authorities will immediately be contacted by the Safety Officer and advised of the situation.

3. Frequent air monitoring will be conducted at 30 minutes intervals within the 20 Foot Zone. If two successive readings below action levels are measured, air monitoring may be halted or modified by the Safety Officer.

6.0 HEALTH AND SAFETY PLAN REFERENCES

1. American Conference Governmental Industrial Hygienists, 1989; Threshold Limit Values And Biological Exposure Indices, 111 Pp.

2. Geoenvironmental Consultants, Inc.; 1987; Safety & Operations At Hazardous Materials Sites

3. NIOSH Guide To Chemical Hazards, 1985, US Department Of Health And Human Services, Centers For Disease Control

4. US Department Of Labor Occupational Safety & Health Administration, 1989; Hazardous Waste Operations And Emergency Response Interim Final Rule, 29 CFR Part 1910

5. Sax, N. I. Dangerous Properties Of Industrial Materials; © 1984

7.0 KEY PERSONNEL

Responsibility	Name and Phone Number	Task Description
Project Manager	Steve Sobstyl (516) 576-8844	Oversee and coordinate all technical aspects for the project
Site Safety Officer	Jessica Proscia (516) 576-8844	Coordinate and inspect all health and safety operations from the project site
Client Representative	Steven Woods (516) 903-0085 and Jim Kogel (631) 420-0070	
Project Manager Alternate	Steven Malinowski (516) 576-8844	
Site Safety Officer Alternate	Mike Yager (516) 576-8844	

Figure 1

Hospital Route Map

mapquest

Trip to:
Southside Hospital
301 E Main St
Bay Shore, NY 11706
(631) 968-3000
9.95 miles
20 minutes

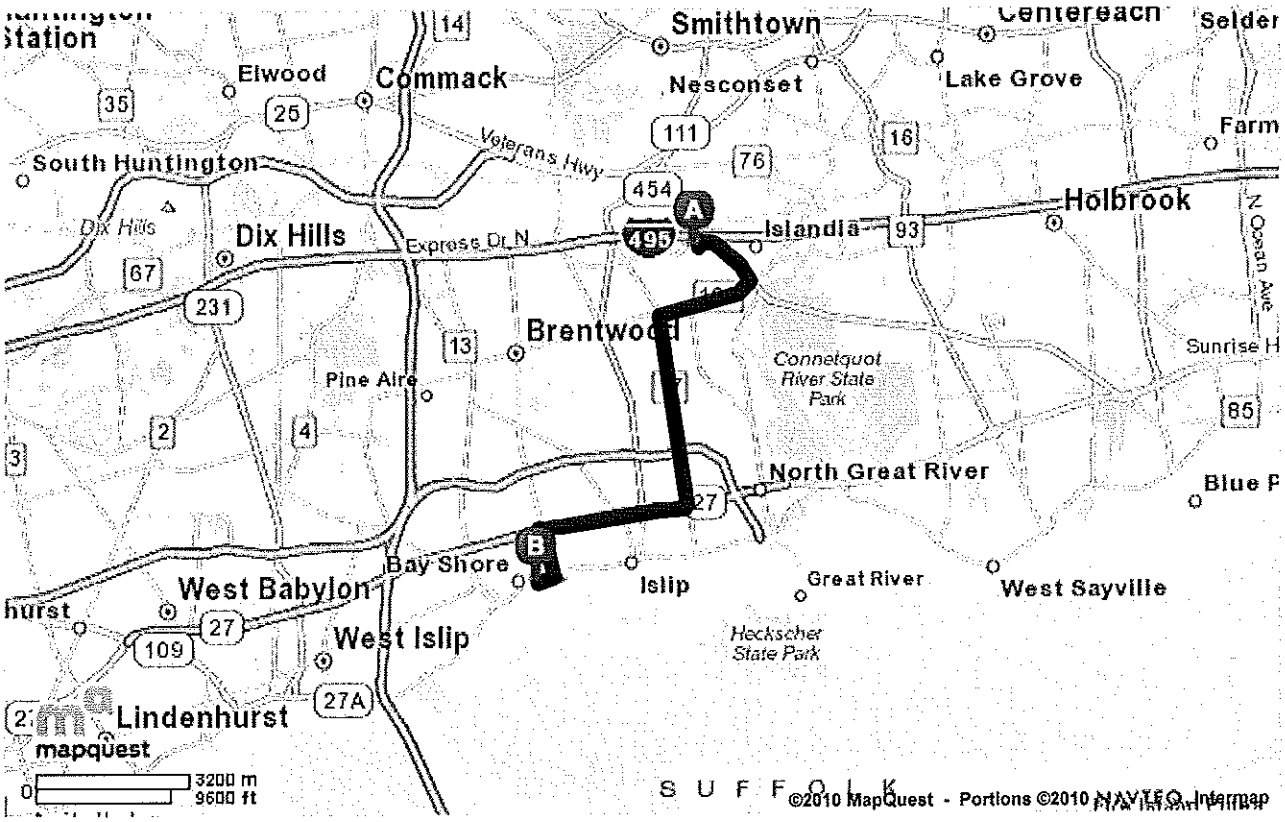
Notes

Figure 1
Hospital Route Map

		Miles Per Section	Miles Driven
	48 Enter Ln Islandia, NY 11749-4811		
	1. Start out going NORTH on ENTER LN toward EXPRESS DR S / EXPRESSWAY DR S.	**go 0.10 mi**	0.10 mi
	2. Turn RIGHT onto EXPRESS DR S / EXPRESSWAY DR S.	**go 0.3 mi**	0.4 mi
EAST 454	3. Take the 2nd RIGHT onto VETERANS HWY / VETERANS MEMORIAL HWY / RT-454 E. *If you are on EXPRESS DR S and reach BLYDENBURGHS RD you've gone about 0.1 miles too far*	**go 0.9 mi**	1.3 mi
	4. Turn RIGHT onto E SUFFOLK AVE / CR-100 W. *E SUFFOLK AVE is 0.3 miles past SYCAMORE AVE*	**go 1.6 mi**	2.9 mi
	5. Turn LEFT onto CR-17 S / CARLETON AVE. *CR-17 S is 0.1 miles past CHURCH ST*	**go 3.2 mi**	6.1 mi
	6. Turn RIGHT toward RT-27 W. *If you are on CR-17 and reach JACKSON ST you've gone about 0.1 miles too far*	**go 0.02 mi**	6.2 mi
	7. Turn SLIGHT RIGHT onto ISLIP BLVD.	**go 0.03 mi**	6.2 mi
	8. Take the 1st LEFT onto GARFIELD AVE. *If you reach WASHINGTON AVE you've gone a little too far*	**go 0.06 mi**	6.3 mi
	9. Turn RIGHT onto SUNRISE HWY.	**go 0.4 mi**	6.6 mi

 	10. Merge onto RT-27 W / SUNRISE HWY via the ramp on the LEFT.	**go 1.7 mi**	8.3 mi
	11. Take EXIT 44 toward BRENTWOOD RD / BRENTWOOD / BAY SHORE.	**go 0.1 mi**	8.4 mi
	12. Stay STRAIGHT to go onto SUNRISE HWY.	**go 0.3 mi**	8.7 mi
	13. Take the BRENTWOOD RD ramp toward BAY SHORE. *If you reach PENATAQUIT AVE you've gone about 0.1 miles too far*	**go 0.1 mi**	8.8 mi
	14. Turn SLIGHT RIGHT onto BRENTWOOD RD.	**go 0.9 mi**	9.6 mi
 	15. Turn RIGHT onto E MAIN ST / E MONTAUK HWY / RT-27A / MONTAUK HWY. Continue to follow E MAIN ST / E MONTAUK HWY / RT-27A. *E MAIN ST is 0.1 miles past UNION BLVD*	**go 0.3 mi**	10.0 mi
	16. 301 E MAIN ST is on the RIGHT. *Your destination is just past N MONTGOMERY AVE* *If you reach MOWBRAY AVE you've gone a little too far*	**go 0.01 mi**	10.0 mi
	**Southside Hospital** 301 E Main St, Bay Shore, NY 11706 (631) 968-3000	**10.0 mi**	**10.0 mi**

Total Travel Estimate: **9.95 miles 20 minutes**



APPENDIX A

Physical Properties and Toxicological Information

MSDS Number: **T4914** * * * * * *Effective Date: 05/26/09* * * * * *Supercedes: 07/06/06*

MSDS Material Safety Data Sheet

From: Mallinckrodt Baker, Inc.
222 Red School Lane
Phillipsburg, NJ 08865

J.T.Baker

24 Hour Emergency Telephone: 908-859-2151
CHEMTREC: 1-800-424-9300
National Response in Canada
CANUTEC: 613-996-6666
Outside U.S. And Canada
Chemtrec: 703-527-3887

NOTE: CHEMTREC, CANUTEC and National Response Center emergency numbers to be used only in the event of chemical emergencies involving a spill, leak, fire, exposure or accident involving chemicals.

All non-emergency questions should be directed to Customer Service (1-800-582-2537) for assistance

1,1,1-TRICHLOROETHANE

1. Product Identification

Synonyms: Methyl chloroform; trichloroethane; chloroetene
CAS No.: 71-55-6
Molecular Weight: 133.40
Chemical Formula: CH3CCl3
Product Codes: 9435, 9437, W509, W510

2. Composition/Information on Ingredients

Ingredient	CAS No	Percent	Hazardous
Methyl Chloroform	71-55-6	96 - 100%	Yes
Dioxane	123-91-1	< 3%	Yes
1,2-Epoxybutane	106-88-7	< 0.5%	Yes
Actual concentrations proprietary			

3. Hazards Identification

Emergency Overview

WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, AND CARDIOVASCULAR SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. CONTAINS DIOXANE WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

SAF-T-DATA(tm) Ratings (Provided here for your convenience)

Health Rating: 3 - Severe (Cancer Causing)
Flammability Rating: 1 - Slight
Reactivity Rating: 1 - Slight
Contact Rating: 3 - Severe (Life)
Lab Protective Equip: GOGGLES; LAB COAT; VENT HOOD; PROPER GLOVES
Storage Color Code: Blue (Health)

Potential Health Effects

Inhalation:
Inhalation of vapors will irritate the respiratory tract. Affects the central nervous system. Symptoms include headache, dizziness, weakness, nausea. Higher levels of exposure (> 5000 ppm) can cause irregular heart beat, kidney and liver damage, fall in blood pressure, unconsciousness and even death.
Ingestion:
Harmful if swallowed. Symptoms similar to inhalation will occur along with nausea, vomiting. Aspiration of material into the lungs can cause chemical pneumonitis which can be fatal. If aspirated, may be rapidly absorbed through the lungs and result in injury to other body systems.
Skin Contact:
Causes mild irritation and redness, especially on prolonged contact. Repeated contact may cause drying or flaking of the skin.
Eye Contact:
Liquids and vapors cause irritation. Symptoms include tearing, redness, stinging, swelling.
Chronic Exposure:
Prolonged or repeated skin contact may cause dermatitis. Chronic exposure may affect the kidneys and liver. Dioxane is a suspected human carcinogen based on animal data.
Aggravation of Pre-existing Conditions:
Personnel with CNS, kidney, liver or heart disease may be more susceptible to the effects of this substance. Use of alcoholic beverages may aggravate symptoms.

4. First Aid Measures

Inhalation:
Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.
Ingestion:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. Get medical attention immediately.
Skin Contact:
In case of contact, immediately flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Call a physician.
Eye Contact:
Immediately flush eyes with plenty of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

5. Fire Fighting Measures

Fire:
Autoignition temperature: 500C (932F)
Flammable limits in air % by volume:
lel: 7.0; uel: 16.0
Vapors in containers can explode if subjected to high energy source.
Dioxane has a flash point below 16C (60F).
Explosion:
Can react with strong caustic, such as potash to form a flammable or explosive material. Air/vapor mixtures may explode when heated. Vapors can flow along surfaces to distant ignition source and flash back. Sealed containers may rupture when heated.
Fire Extinguishing Media:
Use any means suitable for extinguishing surrounding fire.
Special Information:
In the event of a fire, wear full protective clothing and NIOSH-approved self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode. Combustion by-products include phosgene and hydrogen chloride gases. Structural firefighters' clothing provides only limited protection to the combustion products of this material.

6. Accidental Release Measures

Ventilate area of leak or spill. Remove all sources of ignition. Wear appropriate personal protective equipment as specified in Section 8. Isolate hazard area. Keep unnecessary and unprotected personnel from entering. Contain and recover liquid when possible. Use non-sparking tools and equipment. Collect liquid in an appropriate container or absorb with an inert material (e. g., vermiculite, dry sand, earth), and place in a chemical waste container. Do not use combustible materials, such as saw dust. Do not flush to sewer! Do not use aluminum, magnesium or zinc metal for storage container. US Regulations (CERCLA) require reporting spills and releases to soil, water and air in excess of reportable quantities. The toll free number for the US Coast Guard National Response Center is (800) 424-8802.

7. Handling and Storage

Keep in a tightly closed container, stored in a cool, dry, ventilated area. Protect against physical damage. Isolate from any source of heat or ignition. Containers of this material may be hazardous when empty since they retain product residues (vapors, liquid); observe all warnings and precautions listed for the product. Do not use aluminum equipment or storage containers. Contact with aluminum parts in a pressurized fluid system may cause violent reactions.

8. Exposure Controls/Personal Protection

Airborne Exposure Limits:
-OSHA Permissible Exposure Limit (PEL):
350 ppm (TWA) for trichloroethane
100 ppm (TWA) skin for dioxane
-ACGIH Threshold Limit Value (TLV):
350 ppm (TWA), 450 ppm (STEL) for trichloroethane
20 ppm (TWA) skin, A3 - Animal Carcinogen for dioxane
Ventilation System:
A system of local and/or general exhaust is recommended to keep employee exposures below the Airborne Exposure Limits. Local exhaust ventilation is generally preferred because it can control the emissions of the contaminant at its source, preventing dispersion of it into the general work area. Please refer to the ACGIH document, *Industrial Ventilation, A Manual of Recommended Practices*, most recent edition, for details.
Personal Respirators (NIOSH Approved):
If the exposure limit is exceeded and engineering controls are not feasible, wear a supplied air, full-facepiece respirator, airlined hood, or full-facepiece self-contained breathing apparatus. Breathing air quality must meet the requirements of the OSHA respiratory protection standard (29CFR1910.134). This substance has questionable warning properties. Where respirators are required, you must have a written program covering the basic requirements in the OSHA respirator standard. These include training, fit testing, medical approval, cleaning, maintenance, cartridge change schedules, etc. See 29CFR1910.134 for details.
Skin Protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact. Viton is a recommended material for personal protective equipment.
Eye Protection:
Use chemical safety goggles and/or a full face shield where splashing is possible. Maintain eye wash fountain and quick-drench facilities in work area.

9. Physical and Chemical Properties

Appearance:
Clear, colorless liquid.
Odor:
Mild chloroform-like odor.
Solubility:
4,400 ppm in water @ 20C (68F)
Specific Gravity:
1.34 @ 20C/4C
pH:
No information found.
% Volatiles by volume @ 21C (70F):
100
Boiling Point:
74C (165F)
Melting Point:
-32C (-26F)
Vapor Density (Air=1):
4.63
Vapor Pressure (mm Hg):
100 @ 20C (68F)
Evaporation Rate (BuAc=1):
12.8

10. Stability and Reactivity

Stability:
Requires inhibitor content to prevent corrosion of metals. Slowly hydrolyzes in water to form hydrochloric and acetic acid.
Hazardous Decomposition Products:
May produce carbon monoxide, carbon dioxide, hydrogen chloride and phosgene when heated to decomposition. Carbon dioxide and carbon monoxide may form when heated to decomposition.
Hazardous Polymerization:
Hazardous polymerization can occur in contact with aluminum trichloride.
Incompatibilities:
Open flames, welding arcs, nitrogen tetroxide, oxygen, liquid oxygen, sodium, sodium hydroxide, and sodium-potassium alloy, strong alkalis, oxidizers, aluminum and other reactive metals.
Conditions to Avoid:
Insufficient inhibitor, incompatibles, heat, flame and ignition sources

11. Toxicological Information

Oral rat LD50: 9600 mg/kg; inhalation rat LC50: 18000 ppm/4H; investigated as a mutagen, tumorigen, reproductive effector; irritation eye rabbit, Standard Draize, 2mg/24H severe.

--------\Cancer Lists\----------

Ingredient	---NTP Carcinogen--- Known	Anticipated	IARC Category
Methyl Chloroform (71-55-6)	No	No	3
Dioxane (123-91-1)	No	Yes	2B
1,2-Epoxybutane (106-88-7)	No	No	2B

12. Ecological Information

Environmental Fate:
When released into the soil, this material is not expected to biodegrade. When released into the soil, this material is expected to leach into groundwater. When released into the soil, this material is expected to quickly evaporate. When released to water, this material is expected to quickly evaporate. This material is not expected to significantly bioaccumulate. When released into the air, this material may be removed from the atmosphere to a moderate extent by wet deposition. When released to the atmosphere, this material has an average global half-life of 6.0 - 6.9 years. When released into the air, this material may adversely affect the ozone layer.
Environmental Toxicity:
This material is expected to be slightly toxic to aquatic life. The LC50/96-hour values for fish are between 10 and 100 mg/l.

13. Disposal Considerations

Whatever cannot be saved for recovery or recycling should be handled as hazardous waste and sent to a RCRA approved incinerator or disposed in a RCRA approved waste facility. Processing, use or contamination of this product may change the waste management options. State and local disposal regulations may differ from federal disposal regulations. Dispose of container and unused contents in accordance with federal, state and local requirements.

14. Transport Information

Domestic (Land, D.O.T.)

Proper Shipping Name: 1,1,1-TRICHLOROETHANE
Hazard Class: 6.1
UN/NA: UN2831
Packing Group: III
Information reported for product/size: 20L

15. Regulatory Information

--------\Chemical Inventory Status - Part 1\--------

Ingredient	TSCA	EC	Japan	Australia
Methyl Chloroform (71-55-6)	Yes	Yes	Yes	Yes
Dioxane (123-91-1)	Yes	Yes	Yes	Yes
1,2-Epoxybutane (106-88-7)	Yes	Yes	Yes	Yes

--------\Chemical Inventory Status - Part 2\--------

Ingredient	Korea	--Canada-- DSL	NDSL	Phil.
Methyl Chloroform (71-55-6)	Yes	Yes	No	Yes
Dioxane (123-91-1)	Yes	Yes	No	Yes
1,2-Epoxybutane (106-88-7)	Yes	Yes	No	Yes

--------\Federal, State & International Regulations - Part 1\--------

Ingredient	-SARA 302- RQ	TPQ	------SARA 313------ List	Chemical Catg.
Methyl Chloroform (71-55-6)	No	No	Yes	No
Dioxane (123-91-1)	No	No	Yes	No
1,2-Epoxybutane (106-88-7)	No	No	Yes	No

--------\Federal, State & International Regulations - Part 2\--------

Ingredient	CERCLA	-RCRA- 261.33	-TSCA- 8(d)
Methyl Chloroform (71-55-6)	1000	U226	No
Dioxane (123-91-1)	100	U108	No
1,2-Epoxybutane (106-88-7)	100	No	No

Chemical Weapons Convention: No TSCA 12(b): No CDTA: No
SARA 311/312: Acute: Yes Chronic: Yes Fire: No Pressure: No
Reactivity: No (Mixture / Liquid)

WARNING:
THIS PRODUCT CONTAINS A CHEMICAL(S) KNOWN TO THE STATE OF CALIFORNIA TO CAUSE CANCER.

Australian Hazchem Code: 2[Z]
Poison Schedule: S6
WHMIS:
This MSDS has been prepared according to the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all of the information required by the CPR.

16. Other Information

NFPA Ratings: Health: 2 Flammability: 1 Reactivity: 0
Label Hazard Warning:
WARNING! HARMFUL IF SWALLOWED, INHALED OR ABSORBED THROUGH SKIN. AFFECTS CENTRAL NERVOUS SYSTEM, LIVER, KIDNEYS, AND CARDIOVASCULAR SYSTEM. CAUSES IRRITATION TO SKIN, EYES AND RESPIRATORY TRACT. POSSIBLE CANCER HAZARD. CONTAINS DIOXANE WHICH MAY CAUSE CANCER BASED ON ANIMAL DATA. Risk of cancer depends on duration and level of exposure.

Label Precautions:
Avoid breathing vapor.
Keep container closed.
Use only with adequate ventilation.
Wash thoroughly after handling.
Avoid contact with eyes, skin and clothing.
Label First Aid:
If swallowed, DO NOT INDUCE VOMITING. Give large quantities of water. Never give anything by mouth to an unconscious person. If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. In case of contact, immediately flush eyes or skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. In all cases call a physician.
Product Use:
Laboratory Reagent.
Revision Information:
MSDS Section(s) changed since last revision of document include: 3.
Disclaimer:
****
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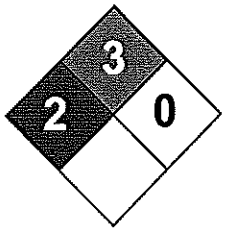
****

Prepared by: Environmental Health & Safety
Phone Number: (314) 654-1600 (U.S.A.)

ScienceLab.com
Chemicals & Laboratory Equipment



Health	2
Fire	3
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,1-Dichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1-Dichloroethane

Catalog Codes: SLD3280

CAS#: 75-34-3

RTECS: KI0175000

TSCA: TSCA 8(b) inventory: 1,1-Dichloroethane

CI#: Not available.

Synonym:

Chemical Name: 1,1-Dichloroethane

Chemical Formula: C2-H4-Cl2

Contact Information:

Sciencelab.com, Inc.
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

CHEMTREC (24HR Emergency Telephone), call:
1-800-424-9300

International CHEMTREC, call: 1-703-527-3887

For non-emergency assistance, call: 1-281-441-4400

Section 2: Composition and Information on Ingredients

Composition:

Name	CAS #	% by Weight
{1,1-}Dichloroethane	75-34-3	100

Toxicological Data on Ingredients: 1,1-Dichloroethane: ORAL (LD50): Acute: 725 mg/kg [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects: Hazardous in case of skin contact (irritant), of eye contact (irritant), of ingestion, of inhalation.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified 2 (Reasonably anticipated.) by NTP. A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Not available. TERATOGENIC EFFECTS: Not available. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to kidneys, lungs, liver, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

Section 4: First Aid Measures

Eye Contact: Check for and remove any contact lenses. Do not use an eye ointment. Seek medical attention.

Skin Contact:
After contact with skin, wash immediately with plenty of water. Gently and thoroughly wash the contaminated skin with running water and non-abrasive soap. Be particularly careful to clean folds, crevices, creases and groin. Cover the irritated skin with an emollient. If irritation persists, seek medical attention. Wash contaminated clothing before reusing.

Serious Skin Contact:
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek immediate medical attention.

Inhalation: Allow the victim to rest in a well ventilated area. Seek immediate medical attention.

Serious Inhalation:
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

Ingestion:
Do not induce vomiting. Examine the lips and mouth to ascertain whether the tissues are damaged, a possible indication that the toxic material was ingested; the absence of such signs, however, is not conclusive. Loosen tight clothing such as a collar, tie, belt or waistband. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek immediate medical attention.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Flammable.

Auto-Ignition Temperature: 458°C (856.4°F)

Flash Points: CLOSED CUP: -17°C (1.4°F). OPEN CUP: -6°C (21.2°F).

Flammable Limits: LOWER: 5.6% UPPER: 11.4%

Products of Combustion: These products are carbon oxides (CO, CO2), halogenated compounds.

Fire Hazards in Presence of Various Substances: Not available.

Explosion Hazards in Presence of Various Substances:
Risks of explosion of the product in presence of mechanical impact: Not available. Risks of explosion of the product in presence of static discharge: Not available.

Fire Fighting Media and Instructions:
Flammable liquid. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

Special Remarks on Fire Hazards: Not available.

Special Remarks on Explosion Hazards: Not available.

Section 6: Accidental Release Measures

Small Spill: Absorb with an inert material and put the spilled material in an appropriate waste disposal.

Large Spill:
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Eliminate all ignition sources. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

Section 7: Handling and Storage

Precautions:
Keep locked up Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. Wear suitable protective clothing In case of insufficient ventilation, wear suitable respiratory equipment If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes Keep away from incompatibles such as oxidizing agents, alkalis.

Storage:
Flammable materials should be stored in a separate safety storage cabinet or room. Keep away from heat. Keep away from sources of ignition. Keep container tightly closed. Keep in a cool, well-ventilated place. Ground all equipment containing material. A refrigerated room would be preferable for materials with a flash point lower than 37.8°C (100°F).

Section 8: Exposure Controls/Personal Protection

Engineering Controls:
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

Personal Protection:
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves.

Personal Protection in Case of a Large Spill:
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

Exposure Limits:
TWA: 100 STEL: 250 (ppm) from ACGIH (TLV) [1999] TWA: 100 (ppm) from OSHA (PEL) Australia: TWA: 200 (ppm) Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid. (Oily liquid.)

Odor: Chloroform like odor (Slight.)

Taste: Not available.

Molecular Weight: 98.96 g/mole

Color: Colorless.

pH (1% soln/water): Not available.

Boiling Point: 57.3°C (135.1°F)

Melting Point: -96.9°C (-142.4°F)

Critical Temperature: 261.5°C (502.7°F)

Specific Gravity: 1.175 (Water = 1)

Vapor Pressure: 180 mm of Hg (@ 20°C)

Vapor Density: 3.44 (Air = 1)

Volatility: Not available.

Odor Threshold: 120 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties:
Partially dispersed in diethyl ether. See solubility in water, diethyl ether.

Solubility: Partially soluble in diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Reactive with oxidizing agents, alkalis.

Corrosivity: Corrosive in presence of aluminum.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Will attack some forms of plastic and rubber

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Absorbed through skin. Eye contact. Inhalation. Ingestion.

Toxicity to Animals: Acute oral toxicity (LD50): 725 mg/kg [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 2 (Reasonably anticipated.) by NTP. A4 (Not classifiable for human or animal.) by ACGIH. DEVELOPMENTAL TOXICITY: Classified Development toxin [POSSIBLE]. The substance is toxic to kidneys, lungs, liver, central nervous system (CNS).

Other Toxic Effects on Humans: Hazardous in case of skin contact (irritant), of ingestion, of inhalation.

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Not available.

Special Remarks on other Toxic Effects on Humans: Not available.

Section 12: Ecological Information

Ecotoxicity: Not available.

BOD5 and COD: Not available.

Products of Biodegradation:
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

Toxicity of the Products of Biodegradation: The products of degradation are as toxic as the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification:
CLASS 3: Combustible liquid with a flash point greater than 37.8C (100F). Marine pollutant

Identification: : 1,1-Dichloroethane : UN2362 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65 (no significant risk level): 1,1-Dichloroethane California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer which would require a warning under the statute: 1,1-Dichloroethane Rhode Island RTK hazardous substances: 1,1-Dichloroethane Pennsylvania RTK: 1,1-Dichloroethane Florida: 1,1-Dichloroethane Minnesota: 1,1-Dichloroethane Massachusetts RTK: 1,1-Dichloroethane New Jersey: 1,1-Dichloroethane New Jersey spill list: 1,1-Dichloroethane TSCA 8(b) inventory: 1,1-Dichloroethane TSCA 8(a) PAIR: 1,1-Dichloroethane TSCA 8(d) H and S data reporting: 1,1-Dichloroethane: June 1999 TSCA 12(b) one time export: 1,1-Dichloroethane SARA 313 toxic chemical notification and release reporting: 1,1-Dichloroethane: 1% CERCLA: Hazardous substances.: 1,1-Dichloroethane: 1000 lbs. (453.6 kg)

Other Regulations:
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

Other Classifications:

WHMIS (Canada):
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R11- Highly flammable. R22- Harmful if swallowed. R37/38- Irritating to respiratory system and skin. R41- Risk of serious damage to eyes. R52- Harmful to aquatic organisms.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 3

Reactivity: 0

Personal Protection: h

National Fire Protection Association (U.S.A.):

Health: 2

Flammability: 3

Reactivity: 0

Specific hazard:

Protective Equipment:
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

Created: 10/09/2005 05:07 PM

Last Updated: 11/06/2008 12:00 PM

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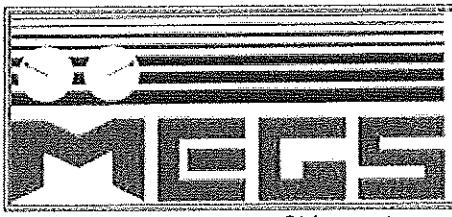

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Quebec	Quebec	Tel : 418-834-7447	Fax : 418-834-3774

1,1,-DICHLORETHYLENE- MATERIAL SAFETY DATA SHEET

TABLE OF CONTENTS:

24 Hour EMERGENCY CONTACT

U.S- CHEMTREC 1-800-424-9300

CANADA- CANUTEC 613-996-6666

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Up to Table of Contents

Matheson Tri-Gas, Inc.

The telephone numbers listed below are emergency numbers, please contact your local branch for routine inquiries.

USA	CANADA
959 Route 46 East	530 Watson Street
Parsippany, New Jersey	Whitby, Ontario
07054-0624 USA	L1N 5R9 Canada
Phone: 973-257-1100	**Phone:** 905-668-3570

SUBSTANCE: 1,1-DICHLOROETHYLENE

SYMBOL: $C_2H_2Cl_2$

TRADE NAMES/SYNONYMS:
1,1-DICHLOROETHENE; 1,1-DICHLOROETHYLENE; VDC; VINYLIDENE CHLORIDE MONOMER; VINYLIDENE DICHLORIDE; VINYLIDENE CHLORIDE, INHIBITED; RCRA U078; UN 1303; C2H2CL2; MAT25070; RTECS KV9275000

CHEMICAL FAMILY: halogens

CREATION DATE: Jan 24 1989
REVISION DATE: Mar 16 1999

2. COMPOSITION, INFORMATION ON INGREDIENTS

Up to Table of Contents

COMPONENT: 1,1-DICHLOROETHYLENE

CAS NUMBER: 75-35-4

EC NUMBER (EINECS): 200-864-0

PERCENTAGE: >99.9

COMPONENT: 4-METHOXYPHENOL

CAS NUMBER: 150-76-5

EC NUMBER (EINECS): 205-769-8

PERCENTAGE: 0.02000

3. HAZARDS IDENTIFICATION

Up to Table of Contents

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=4 REACTIVITY=2

WHMIS CLASSIFICATION: BD2

EC CLASSIFICATION (ASSIGNED):
F+ Extremely Flammable
Xn Harmful

R 12-20-40

EC Classification may be inconsistent with independently-researched data.


EMERGENCY OVERVIEW:
Color: colorless

Physical Form: volatile liquid

Odor: faint odor, sweet odor

Major Health Hazards: harmful if swallowed, respiratory tract irritation, skin irritation, eye irritation, central nervous system depression

Physical Hazards: Flammable liquid and vapor. Vapor may cause flash fire. May polymerize. Containers may rupture or explode. May form peroxides during prolonged storage.

POTENTIAL HEALTH EFFECTS:

INHALATION:
Short Term Exposure: irritation, symptoms of drunkenness, lung congestion, liver damage, convulsions
Long Term Exposure: kidney damage, tumors

SKIN CONTACT:
Short Term Exposure: irritation (possibly severe)
Long Term Exposure: same as effects reported in short term exposure

EYE CONTACT:
Short Term Exposure: irritation (possibly severe), eye damage
Long Term Exposure:same as effects reported in short term exposure

INGESTION:
Short Term Exposure: same as effects reported in short term exposure
Long Term Exposure: same as effects reported in short term exposure

CARCINOGEN STATUS:
OSHA: N
NTP: N
IARC: N

---

4. FIRST AID MEASURES

Up to Table of Contents

INHALATION:
Remove from exposure immediately. Use a bag valve mask or similar device to perform artificial respiration (rescue breathing) if needed. Get medical attention.

SKIN CONTACT:
Remove contaminated clothing, jewelry, and shoes immediately. Wash with soap or mild detergent and large amounts of water until no evidence of chemical remains (at least 15-20 minutes). Get medical attention, if needed.

EYE CONTACT:
Wash eyes immediately with large amounts of water or normal saline, occasionally lifting upper and lower lids, until no evidence of chemical remains. Get medical attention immediately.

INGESTION:
If vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention, if needed.

5. FIRE FIGHTING MEASURES

Up to Table of Contents

FIRE AND EXPLOSION HAZARDS:
Severe fire hazard. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Vapor/air mixtures are explosive above flash point. Containers may rupture or explode if exposed to heat.

EXTINGUISHING MEDIA:
alcohol resistant foam, carbon dioxide, regular dry chemical, water

Large fires: Use alcohol-resistant foam or flood with fine water spray.

FIRE FIGHTING:
Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

FLASH POINT:
14 F (-10 C)

LOWER FLAMMABLE LIMIT:
5.6%

UPPER FLAMMABLE LIMIT:
11.4%

AUTOIGNITION:
855 F (457 C)

FLAMMABILITY CLASS (OSHA):
IA

6. ACCIDENTAL RELEASE MEASURES

Up to Table of Contents

AIR RELEASE:
Reduce vapors with water spray. Stay upwind and keep out of low areas.

SOIL RELEASE:
Dig holding area such as lagoon, pond or pit for containment. Dike for later disposal. Absorb with sand or other non-combustible material.

WATER RELEASE:
Collect with absorbent into suitable container. Collect spilled material using mechanical equipment.

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other sources of ignition. Remove sources of ignition. Stop leak if possible without personal risk. Reduce vapors with water spray. Small spills: Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Large spills: Dike for later disposal. Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Reportable Quantity (RQ): Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

7. HANDLING AND STORAGE

Up to Table of Contents

Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106. Grounding and bonding required. Store in a cool, dry place. Store in a well-ventilated area. Keep in the dark. Keep separated from incompatible substances. Store outside or in a detached building. Store with flammable liquids. Store in a tightly closed container. Containers must have overpressure release device. Avoid heat, flames, sparks and other sources of ignition. Keep separated from incompatible substances. Monitor inhibitor content. Avoid exposure to low temperatures or freezing. May form explosive peroxides. Store in a tightly closed container. Avoid contact with light. Store in a cool, dry place. Monitor inhibitor content. Do not evaporate or distill to dryness. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Up to Table of Contents

EXPOSURE LIMITS:
1,1-DICHLOROETHYLENE:
1 ppm (4 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
5 ppm (20 mg/m3) ACGIH TWA
20 ppm (80 mg/m3) ACGIH STEL

VENTILATION: Provide local exhaust ventilation system. Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Ensure compliance with applicable exposure limits.

EYE PROTECTION: Wear splash resistant safety goggles. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

CLOTHING: Wear appropriate chemical resistant clothing.

GLOVES: Wear appropriate chemical resistant gloves.

RESPIRATOR: The following respirators and maximum use concentrations are drawn from

NIOSH and/or OSHA.
At any detectable concentration -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Escape -
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.
For Unknown Concentrations or Immediately Dangerous to Life or Health -
Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Any self-contained breathing apparatus with a full facepiece.

9. PHYSICAL AND CHEMICAL PROPERTIES

Up to Table of Contents

PHYSICAL STATE: liquid

COLOR: colorless

PHYSICAL FORM: volatile liquid

ODOR: faint odor, sweet odor

MOLECULAR WEIGHT: 96.64

MOLECULAR FORMULA: C2-H2-CL2

BOILING POINT: 86-90 F (30-32 C)

FREEZING POINT: -188 F (-122 C)

VAPOR PRESSURE: 400 mmHg @ 14.8 C

VAPOR DENSITY (air=1): 3.4

SPECIFIC GRAVITY (water=1): 1.213

WATER SOLUBILITY: 0.04% @ 20 C

PH: Not available

VOLATILITY: Not available

ODOR THRESHOLD: 500 ppm

EVAPORATION RATE: Not available

COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:
Soluble: organic solvents

10. STABILITY AND REACTIVITY

Up to Table of Contents

REACTIVITY:
May form explosive peroxides. Avoid contact with temperatures above -40 C. Avoid contact with heat, air, light or moisture and monitor inhibitor content. May polymerize. Closed containers may rupture violently.

CONDITIONS TO AVOID:
Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

INCOMPATIBILITIES:
metals, acids, oxidizing materials

HAZARDOUS DECOMPOSITION:
Thermal decomposition products: phosgene, halogenated compounds, oxides of carbon

POLYMERIZATION:
May polymerize. Avoid contact with heat or light and monitor inhibitor content.

11. TOXICOLOGICAL INFORMATION

Up to Table of Contents

VINYLIDENE CHLORIDE:

TOXICITY DATA:
6350 ppm/4 hour(s) inhalation-rat LC50; 200 mg/kg oral-rat LD50

CARCINOGEN STATUS:
IARC: Human Inadequate Evidence, Animal Limited Evidence, Group 3; ACGIH: A3 -Animal Carcinogen

LOCAL EFFECTS:
Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:
Toxic: ingestion
Slightly Toxic: inhalation

TARGET ORGANS:
central nervous system, liver

TUMORIGENIC DATA:
Available.

MUTAGENIC DATA:
Available.

REPRODUCTIVE EFFECTS DATA:
Available.

12. ECOLOGICAL INFORMATION

Up to Table of Contents

ECOTOXICITY DATA:

FISH TOXICITY:
74000 ug/L 96 hour(s) LC50 (Mortality) Bluegill (Lepomis macrochirus)

INVERTEBRATE TOXICITY:
224000 ug/L 96 hour(s) LC50 (Mortality) Opossum shrimp (Mysidopsis bahia)

ALGAL TOXICITY:
>712000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (Skeletonema costatum)

ENVIRONMENTAL SUMMARY:
Moderately toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

Up to Table of Contents

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U078. Hazardous Waste Number(s): D029. Dispose of in accordance with U.S. EPA 40 CFR 262 for concentrations at or above the Regulatory level. Regulatory level- 0.7 mg/L. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION

Up to Table of Contents

U.S. DOT 49 CFR 172.101. SHIPPING NAME-UN NUMBER; HAZARD CLASS; PACKING GROUP; LABEL:
Vinylidene chloride, inhibited-UN1303; 3; I; Flammable liquid

15. REGULATORY INFORMATION

Up to Table of Contents

U.S. REGULATIONS:
TSCA INVENTORY STATUS: Y

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CERCLA SECTION 103 (40CFR302.4): Y
1,1-Dichloroethylene: 100 LBS RQ

SARA SECTION 302 (40CFR355.30): N

SARA SECTION 304 (40CFR355.40): N

SARA SECTION 313 (40CFR372.65): Y
1,1-Dichloroethylene

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):
ACUTE: Y
CHRONIC: Y
FIRE: Y
REACTIVE: Y
SUDDEN RELEASE: Y

OSHA PROCESS SAFETY (29CFR1910.119): N

STATE REGULATIONS:
California Proposition 65: N

EUROPEAN REGULATIONS:

EC NUMBER (EINECS): 200-864-0

EC RISK AND SAFETY PHRASES:

R 12	Extremely flammable.
R 20	Harmful by inhalation.
R 40	Possible risks of irreversible effects.
S 2	Keep out of reach of children.
S 7	Keep container tightly closed.
S 16	Keep away from sources of ignition - No smoking.
S 29	Do not empty into drains.

CONCENTRATION LIMITS:
C>=12.5% Xn R 20-40
1%<=C<12.5% Xn R 40

16. OTHER INFORMATION

Up to Table of Contents

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Linde Gas

Linde Gas LLC (216) 642-6600
P.O. Box 94737
Cleveland, Ohio 44101
www.us.lindegas.com

MATERIAL
SAFETY
DATA SHEET

No. 155

PRODUCT NAME Vinyl Chloride		CAS #	75-01-4
TRADE NAME AND SYNONYMS Vinyl chloride, inhibited (D.O.T.)		DOT I.D. No.:	UN 1086; RQ 1.0 (0.454)
CHEMICAL NAME AND SYNONYMS Vinyl Chloride, Chloroethylene; Chloroethene		DOT Hazard Class:	Division 2.1
		Formula	C_2H_3Cl or CH_2CHC
ISSUE DATES AND REVISIONS Revised january 1995		Chemical Family:	Halogenated Alkene

HEALTH HAZARD DATA

TIME WEIGHTED AVERAGE EXPOSURE LIMIT
TWA = 5 molar ppm with an A1 Carcinogen Rating (ACGIH 1994-1995). Al is a confirmed human carcinogen. OSHA 1993. 1910.1017, 8 Hr. TWA = 1 Molar PPM (Continued on Page 4)

SYMPTOMS OF EXPOSURE
Inhaling high concentrations causes mild symptoms of drowsiness, blurred vision, staggering gate and tingling and numbness in the extremities.

Liquid vinyl chloride may cause severe irritation or burns on skin or eye contact.

TOXICOLOGICAL PROPERTIES
Several workers who handled and used vinyl chloride developed a rare form of liver cancer.

IARC, NTP and OSHA all list vinyl chloride as a carcinogen.

Persons in ill health where such illness would be aggravated by exposure to vinyl chloride should not be allowed to work with or handle this product.

RECOMMENDED FIRST AID TREATMENT
PROMPT MEDICAL ATTENTION IS MANDATORY IN ALL CASES OF OVEREXPOSURE TO VINYL CHLORIDE. RESCUE PERSONNEL SHOULD BE EQUIPPED WITH SELF-CONTAINED BREATHING APPARATUS AND BE COGNIZANT OF EXTREME FIRE AND EXPLOSION HAZARD.

Inhalation: Conscious persons should be assisted to an uncontaminated area and inhale fresh air. Quick removal from the contaminated area is most important. Unconscious persons should be moved to an uncontaminated area, given assisted respiration and supplemental oxygen. Further treatment should be symptomatic and supportive.

(Continued an Page 4)

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES

Vinyl chloride polymerizes on exposure to sunlight, heat or in the presence of oxygen or air. The addition of phenol or hydroquinone inhibits the polymerization. It is flammable in air.

PHYSICAL DATA

BOILING POINT 7.3°F (-13.7°C)	LIQUID DENSITY AT BOILING POINT 60.6 lb/ft³ (971 kg/m³)
VAPOR PRESSURE @ 70°F (21.1°C) = 52 psia (360 kPa)	GAS DENSITY AT 70°F, 1 atm @ 77°F (25°C) = .164 lb/ft³ (2.63 kg/m³)
SOLUBILITY IN WATER Slightly Soluble	FREEZING POINT -244.8°F (-153.8°C)
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 77°F (25°C) = 2.22

APPEARANCE AND ODOR Colorless gas with a pleasant, sweet odor

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) -108°F (CC)	AUTO IGNITION TEMPERATURE 882°F (472°C)	FLAMMABLE LIMITS % BY VOLUME (See Page 4) LEL 3.6 UEL 33

EXTINGUISHING MEDIA Water, dry chemical, carbon dioxide	ELECTRICAL CLASSIFICATION Class 1, Group Not Specified

SPECIAL FIRE FIGHTING PROCEDURES
Attempt to stop the flow of vinyl chloride. Use water spray to cool surrounding containers.

UNUSUAL FIRE AND EXPLOSION HAZARDS
Vinyl chloride vapors are heavier than air and may travel a considerable distance to a source of ignition. Should fire be extinguished and flow of gas continue, increase ventilation to prevent formation of flammable mixtures in low areas or pockets.

REACTIVITY DATA

STABILITY		CONDITIONS TO AVOID
Unstable		None
Stable	X	

INCOMPATIBILITY (Materials to avoid) Oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS None

HAZARDOUS POLYMERIZATION		CONDITIONS TO AVOID
May Occur	X	It is inhibited with phenol or hydroquinone to prevent polymerization.
Will Not Occur		

SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
Evacuate all personnel from affected area. Use appropriate protective equipment. If leak is in user's equipment, be certain to purge piping with an inert gas prior to attempting repairs. If leak is in container or container valve, contact your closest supplier location or call the emergency telephone number listed herein.

WASTE DISPOSAL METHOD
Do not attempt to dispose of waste or unused quantities. Return in the shipping container properly labeled, with any valve outlet plugs or caps secured and valve protection cap in place to your supplier. For emergency disposal assistance, contact your closest supplier location or call the emergency telephone number listed herein.

SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION (Specify type)	Positive pressure air line with mask or self-contained breathing apparatus should be available for emergency use.	
VENTILATION	LOCAL EXHAUST	SPECIAL
Hood with forced ventilation	To prevent accumulation above the TWA	N/A
	MECHANICAL (Gen.)	OTHER
	In accordance with electrical codes	N/A
PROTECTIVE GLOVES	Most materials except natural rubber	
EYE PROTECTION	Safety goggles or glasses	
OTHER PROTECTIVE EQUIPMENT	Safety shoes, safety shower, eyewash "fountain," transparent face shield	

SPECIAL PRECAUTIONS*

SPECIAL LABELING INFORMATION

DOT Shipping Name: Vinyl chloride, inhibited
DOT Shipping Label: Flammable Gas
I.D. No.: UN 1086; RQ 1.0(0.454)
DOT Hazard Class: Division 2.1

SPECIAL HANDLING RECOMMENDATIONS

Use only in well-ventilated areas. Valve protection caps must remain in place unless container is secured with valve outlet piped to use point. Do not drag, slide or roll cylinders. Use a suitable hand truck for cylinder movement. Use a pressure reducing regulator when connectinn cylinder to lower pressure (<150 psiq) pipinq or systems. Do not heat cylinder by any means to increase tne discharge rate of product from the cylinder. Use a check valve or trap in the discharge line to prevent hazardous back flow into the cylinder.

For additional handling recommendations, consult Compressed Gas Association's Pamphlets I P-1 and P-10.

SPECIAL STORAGE RECOMMENDATIONS

Protect cylinders from physical damage. Store in cool, dry, well-ventilated area of noncombustible construction away from heavily trafficked areas and emergency exits.

Do not allow the temperature where cylinders are stored to exceed 125F (52C). Cylinders should be stored upright and firmly secured to prevent falling or being knocked over. Full and empty cylinders should be segregated. Use a "first in - first out" inventory system to prevent full cylinders beins stored for excessive periods of time. Post "No Smoking or Open Flames" signs in the storage or use area. There should be no sources of ignition in the storage or use area.

For additional storage recommendations, consult Compressed Gas Association's Pamphlet P-1 and P-10.

SPECIAL PACKAGING RECOMMENDATIONS

Most metals except copper and its alloys may be used with vinyl chloride. Copper and its alloys could form explosive acetylides by reacting with the acetylene impurity in the product.

Teflon® is the preferred gasketing material.

OTHER RECOMMENDATIONS OR PRECAUTIONS

Earth-ground and bond all lines and equipment associated with the vinyl chloride system. Electrical equipment should be non-sparking or explosion proof. Compressed gas cylinders should not be refilled except by qualified producers of compressed gases. Shipment of a compressed gas cylinder which has not been filled by the owner or with his (written) consent is a violation of federal Law (49CFR).

(Continued on Page 4)

*Various Government Agencies (i.e. Department of Transportation, Occupational Safety and Health Administration, Food and Drug Administration and others) may have specific regulations concerning the transportation, handling, storage or use of this product which will not be reflected in this data sheet. The customer should review these regulations to ensure that he is in full compliance.

HEALTH HAZARD DATA

TWA DATA: (continued)

(<5 Molar PPM averaged over any period not exceeding 15 minutes) with the prohibition of any personal direct contact with vinyl chloride liquid and it is classified as a cancer suspect agent.

RECOMMENDED FIRST AID TREATMENT: (Continued)

Eye Contact: PERSONS WITH POTENTIAL EXPOSURE TO VINYL CHLORIDE SHOULD NOT WEAR CONTACT LENSES.

Flush contaminated eye(s) with copious quantities of water. Part eyelids with fingers to assure complete flushing. Continue for minium of 15 minutes. An eye specialict should be summoned promptly.

Skin Contact: Flush affected areas with copious quantities of water. Remove affected clothing as rapidly as possible. A physician should see the patient. Follow the water flush with a soap and water wash.

SPECIAL PRECAUTIONS

OTHER RECOMMENDATIONS OR PRECAUTIONS: (Continued)

Always secure cylinders in an upright position before transporting them. Never transport cylinders in trunks OT vehicles, enclosed vans, truck cabs or in passenger compartments. Transport cyclinders secured in open flatbed or in open pick-up type vehicles.

Vinyl chloride is a toxic chemical and it is subject to the reporting requirements of SARA, Title III, Section 313.

Material Safety Data Sheet

Ethyl Chloride

Airgas

Section 1. Chemical product and company identification

Product name	:	Ethyl Chloride
Supplier	:	AIRGAS INC., on behalf of its subsidiaries 259 North Radnor-Chester Road Suite 100 Radnor, PA 19087-5283 1-610-687-5253
Product use	:	Synthetic/Analytical chemistry.
Synonym	:	Ethane, chloro-; Aethylis; Aethylis chloridum; Anodynon; Chelen; Chlorene; Chlorethyl; Chloridum; Chloroethane; Chloryl; Chloryl anesthetic; Cloretilo; Dublofix; Ether chloratus; Ether hydrochloric; Ether muriatic; Hydrochloric ether; Kelene; Monochlorethane; Monochloroethane; Muriatic ether; Narcotile; C2H5Cl; Aethylchlorid; Chloorethaan; Chloroaethan; Chlorure D'ethyle; Cloroetano; Cloruro di etile; Etylu chlorek; NCI-C06224; UN 1037; Aethylisaethylis chloridum; Chloryle anesthetic; 1-Chloroethane
MSDS #	:	001023
Date of Preparation/Revision	:	**4/26/2010.**
In case of emergency	:	1-866-734-3438

Section 2. Hazards identification

Physical state	:	Gas. [COLORLESS LIQUID OR GAS WITH A PUNGENT, ETHER-LIKE ODOR]
Emergency overview	:	WARNING! FLAMMABLE GAS. MAY CAUSE FLASH FIRE. MAY CAUSE EYE AND SKIN IRRITATION. MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. CONTENTS UNDER PRESSURE. Keep away from heat, sparks and flame. Do not puncture or incinerate container. Avoid contact with eyes, skin and clothing. May cause target organ damage, based on animal data. Use only with adequate ventilation. Wash thoroughly after handling. Keep container closed. Contact with rapidly expanding gases can cause frostbite.
Target organs	:	May cause damage to the following organs: kidneys, liver, mucous membranes, cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS).
Routes of entry	:	Inhalation Dermal Eyes
Potential acute health effects		
Eyes	:	Moderately irritating to eyes. Contact with rapidly expanding gas may cause burns or frostbite.
Skin	:	Moderately irritating to the skin. Contact with rapidly expanding gas may cause burns or frostbite.
Inhalation	:	Acts as a simple asphyxiant.
Ingestion	:	Ingestion is not a normal route of exposure for gases
Potential chronic health effects	:	**CARCINOGENIC EFFECTS**: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animals.) by ACGIH, 3 (Possible for humans.) by European Union. 3 (Not classifiable for humans.) by IARC. **MUTAGENIC EFFECTS**: Not available. **TERATOGENIC EFFECTS**: Not available.
Medical conditions aggravated by over-exposure	:	Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (section 11)

Section 3. Composition, Information on Ingredients

Name	CAS number	% Volume	Exposure limits
Ethyl Chloride	75-00-3	100	**ACGIH TLV (United States, 1/2009).** **Absorbed through skin.** TWA: 264 mg/m³ 8 hour(s). TWA: 100 ppm 8 hour(s). **OSHA PEL (United States, 11/2006).** TWA: 2600 mg/m³ 8 hour(s). TWA: 1000 ppm 8 hour(s). **OSHA PEL 1989 (United States, 3/1989).** TWA: 2600 mg/m³ 8 hour(s). TWA: 1000 ppm 8 hour(s).

Section 4. First aid measures

No action shall be taken involving any personal risk or without suitable training.If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus.It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : As this product is a gas, refer to the inhalation section.

Section 5. Fire-fighting measures

Flammability of the product : Flammable.

Auto-ignition temperature : 518.75°C (965.8°F)

Flash point : Closed cup: -50.15°C (-58.3°F).

Flammable limits : Lower: 3.8% Upper: 15.4%

Products of combustion : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Fire hazards in the presence of various substances : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge, heat and oxidizing materials.

Fire-fighting media and instructions : In case of fire, use water spray (fog), foam or dry chemical.

In case of fire, allow gas to burn if flow cannot be shut off immediately. Apply water from a safe distance to cool container and protect surrounding area. If involved in fire, shut off flow immediately if it can be done without risk.

Contains gas under pressure. Flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions : Immediately contact emergency personnel. Keep unnecessary personnel away. Use suitable protective equipment (section 8). Shut off gas supply if this can be done safely. Isolate area until gas has dispersed.

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Methods for cleaning up : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see section 1 for emergency contact information and section 13 for waste disposal.

Section 7. Handling and storage

Handling : Use only with adequate ventilation. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Keep container closed. Avoid contact with skin and clothing. Avoid contact with eyes. Keep away from heat, sparks and flame. To avoid fire, eliminate ignition sources. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Storage : Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Segregate from oxidizing materials. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

The applicable standards are (US) 29 CFR 1910.134 and (Canada) Z94.4-93

Hands : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Personal protection in case of a large spill : Self-contained breathing apparatus (SCBA) should be used to avoid inhalation of the product. Full chemical-resistant suit and self-contained breathing apparatus should be worn only by trained and authorized persons.

Product name

chloroethane

ACGIH TLV (United States, 1/2009). Absorbed through skin.
TWA: 264 mg/m³ 8 hour(s).
TWA: 100 ppm 8 hour(s).
OSHA PEL (United States, 11/2006).
TWA: 2600 mg/m³ 8 hour(s).
TWA: 1000 ppm 8 hour(s).
OSHA PEL 1989 (United States, 3/1989).
TWA: 2600 mg/m³ 8 hour(s).
TWA: 1000 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Section 9. Physical and chemical properties

Molecular weight	: 64.52 g/mole
Molecular formula	: C2-H5-Cl
Boiling/condensation point	: 12.2°C (54°F)
Melting/freezing point	: -138.9°C (-218°F)
Critical temperature	: 187.3°C (369.1°F)
Vapor density	: 2.2 (Air = 1)
Specific Volume (ft^3/lb)	: 6.0241
Gas Density (lb/ft^3)	: 0.166

Section 10. Stability and reactivity

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Extremely reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	: Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	: Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Toxicity data

Product/ingredient name	Result	Species	Dose	Exposure
chloroethane	TDLo Oral	Rat	250 mg/kg	-
	LC50 Inhalation Vapor	Rat	152 g/m3	10 minutes
	LC50 Inhalation Vapor	Rat	152 g/m3	2 hours
	LC50 Inhalation Vapor	Rat	150000 mg/m3	2 hours

IDLH : 3800 ppm

Chronic effects on humans : **CARCINOGENIC EFFECTS**: Classified + (Proven.) by NIOSH. Classified A3 (Proven for animals.) by ACGIH, 3 (Possible for humans.) by European Union. 3 (Not classifiable for humans.) by IARC.
May cause damage to the following organs: kidneys, liver, mucous membranes, cardiovascular system, upper respiratory tract, skin, eyes, central nervous system (CNS).

Other toxic effects on humans : No specific information is available in our database regarding the other toxic effects of this material to humans.

Specific effects

Carcinogenic effects	: No known significant effects or critical hazards.
Mutagenic effects	: No known significant effects or critical hazards.
Reproduction toxicity	: No known significant effects or critical hazards.

Section 12. Ecological information

Aquatic ecotoxicity

Not available.

Products of degradation : Products of degradation: carbon oxides (CO, CO_2) and water, halogenated compounds.

Environmental fate	: Not available.
Environmental hazards	: No known significant effects or critical hazards.
Toxicity to the environment	: Not available.

Section 13. Disposal considerations

Product removed from the cylinder must be disposed of in accordance with appropriate Federal, State, local regulation.Return cylinders with residual product to Airgas, Inc.Do not dispose of locally.

Section 14. Transport information

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN1037	ETHYL CHLORIDE	2.1	Not applicable (gas).		**Reportable quantity** 100 lbs. (45.4 kg) **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: Forbidden. **Cargo aircraft** Quantity limitation: 150 kg **Special provisions** B77, T50
TDG Classification	UN1037	ETHYL CHLORIDE	2.1	Not applicable (gas).		**Explosive Limit and Limited Quantity Index** 0.125 **ERAP Index** 3000 **Passenger Carrying Road or Rail Index** Forbidden
Mexico Classification	UN1037	ETHYL CHLORIDE	2.1	Not applicable (gas).		-

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Section 15. Regulatory information

United States

U.S. Federal regulations : **United States inventory (TSCA 8b):** This material is listed or exempted.

SARA 302/304/311/312 extremely hazardous substances: No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: chloroethane
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: chloroethane: Fire hazard, reactive, Sudden release of pressure, Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Water Act (CWA) 307: chloroethane

Clean Water Act (CWA) 311: No products were found.

Clean Air Act (CAA) 112 accidental release prevention: chloroethane

Clean Air Act (CAA) 112 regulated flammable substances: chloroethane

Clean Air Act (CAA) 112 regulated toxic substances: No products were found.

SARA 313

	Product name	CAS number	Concentration
Form R - Reporting requirements	Ethyl Chloride	75-00-3	100
Supplier notification	Ethyl Chloride	75-00-3	100

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations : **Connecticut Carcinogen Reporting:** This material is not listed.
Connecticut Hazardous Material Survey: This material is not listed.
Florida substances: This material is not listed.
Illinois Chemical Safety Act: This material is not listed.
Illinois Toxic Substances Disclosure to Employee Act: This material is not listed.
Louisiana Reporting: This material is not listed.
Louisiana Spill: This material is not listed.
Massachusetts Spill: This material is not listed.
Massachusetts Substances: This material is listed.
Michigan Critical Material: This material is not listed.
Minnesota Hazardous Substances: This material is not listed.
New Jersey Hazardous Substances: This material is listed.
New Jersey Spill: This material is not listed.
New Jersey Toxic Catastrophe Prevention Act: This material is not listed.
New York Acutely Hazardous Substances: This material is listed.
New York Toxic Chemical Release Reporting: This material is not listed.
Pennsylvania RTK Hazardous Substances: This material is listed.
Rhode Island Hazardous Substances: This material is not listed.

California Prop. 65 : **WARNING:** This product contains a chemical known to the State of California to cause cancer.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
Ethyl Chloride	Yes.	No.	Yes.	No.

Canada

WHMIS (Canada) : Class A: Compressed gas.
Class B-1: Flammable gas.

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

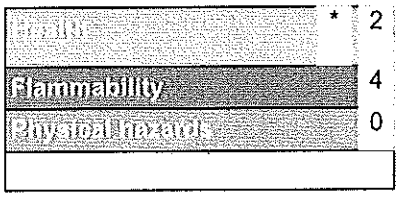
United States

Label requirements : FLAMMABLE GAS.
MAY CAUSE FLASH FIRE.
MAY CAUSE EYE AND SKIN IRRITATION.
MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
CONTENTS UNDER PRESSURE.

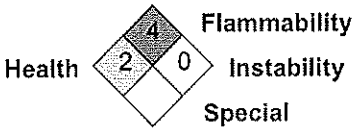
Canada

Label requirements : Class A: Compressed gas.
Class B-1: Flammable gas.

Hazardous Material Information System (U.S.A.) :



National Fire Protection Association (U.S.A.) :



Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

Appendix C

Order on Consent

NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

In the Matter of the
Development and Implementation
of a Remedial Program for an
Inactive Hazardous Waste Disposal
Site under Article 27, Title 13
of the Environmental Conservation Law
by

Mako Properties Limited Partnership,

Respondent.

ORDER ON CONSENT
and
ADMINISTRATIVE
SETTLEMENT

Index # A1-0649-08-10

Site # 152230

WHEREAS,

1. A. The New York State Department of Environmental Conservation ("Department") is responsible for inactive hazardous waste disposal site remedial programs pursuant to Article 27, Title 13 of the Environmental Conservation Law ("ECL") and Part 375 of Title 6 of the Official Compilation of Codes, Rules and Regulations ("6 NYCRR") and may issue orders consistent with the authority granted to the Commissioner by such statute.

B. The Department is responsible for carrying out the policy of the State of New York to conserve, improve and protect its natural resources and environment and control water, land, and air pollution consistent with the authority granted to the Department and the Commissioner by Article 1, Title 3 of the ECL.

C. This Order is issued pursuant to the Department's authority under, inter alia, ECL Article 27, Title 13 and ECL 3-0301, and resolves Respondent's liability to the State as provided at 6 NYCRR 375-1.5(b)(5).

2. Mako Properties Limited Partnership ("Respondent") is the owner of property situated at 48-50 Enter Lane, Islandia, NY 11749, Suffolk County (District 0504, Section 006, Block 1, Lot 18) (hereinafter the "Site"). Exhibit "A" is a map of the Site showing its general location.

3. The Site is not currently listed in the Registry of Inactive Hazardous Waste Disposal Sites in New York State.

4. Respondent consents to the issuance of this Order without (i) an admission or finding of liability, fault, wrongdoing, or violation of any law, regulation, permit, order, requirement, or standard of care of any kind whatsoever; (ii) an acknowledgment that there has been a release or threatened release of hazardous waste at or from the Site; and/or (iii) an acknowledgment that a release or threatened release of hazardous waste at or from the Site constitutes a significant threat to the public health or environment.

5. Solely with regard to the matters set forth below, Respondent hereby waives any right to a hearing as may be provided by law, consents to the issuance and entry of this Order, and agrees to be bound by its terms. Respondent consents to and agrees not to contest the authority or jurisdiction of the Department to issue or enforce this Order, and agrees not to contest the validity of this Order or its terms or the validity of data submitted to the Department by Respondent pursuant to this Order.

NOW, having considered this matter and being duly advised, **IT IS ORDERED THAT:**

I. Initial Submittal

Within thirty (30) Days after the effective date of this Order, Respondent shall submit to the Department a Records Search Report prepared in accordance with Exhibit "B" attached hereto. The Records Search Report can be limited if the Department notifies Respondent that prior submissions satisfy specific items required for the Records Search Report.

II. Development, Performance, and Reporting of Work Plans

A. Work Plans

All activities at the Site that comprise any element of an Inactive Hazardous Waste Disposal Site Remedial Program shall be conducted pursuant to one or more Department-approved work plans ("Work Plan" or "Work Plans") and this Order and all activities shall be consistent with the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300, as required under CERCLA, 42 U.S.C. § 9600 et seq. The Work Plan(s) under this Order shall address both on-Site and off-Site conditions and shall be developed and implemented in accordance with 6 NYCRR § 375-1.6(a). All Department-approved Work Plans shall be incorporated into and become enforceable parts of this Order. Upon approval of a Work Plan by the Department, Respondent shall implement such Work Plan in accordance with the schedule contained therein. Nothing in this Subparagraph shall mandate that any particular Work Plan be submitted.

Each Work Plan submitted shall use one of the following captions on the cover page:

1. Site Characterization ("SC") Work Plan: a Work Plan whose objective is to identify the presence of any hazardous waste disposal at the Site;

2. Remedial Investigation/Feasibility Study ("RI/FS") Work Plan: a Work Plan whose objective is to perform a Remedial Investigation and a Feasibility Study;

3. Interim Remedial Measure ("IRM") Work Plan: a Work Plan whose objective is to provide for an Interim Remedial Measure;

4. Remedial Design/Remedial Action ("RD/RA") Work Plan: a Work Plan whose objective is to provide for the development and implementation of final plans and specifications for implementing the remedial alternative set forth in the ROD; or

5. Site Management Plan: a Work Plan whose objective is to identify and implement the institutional and engineering controls required for the Site, as well as any necessary monitoring and/or operation and maintenance of the remedy.

B. Submission/Implementation of Work Plans

1. (a) A Site Characterization Work Plan shall be submitted to the Department within sixty (60) Days after the effective date of this Order.

(b) The Department may request that Respondent submit additional or supplemental Work Plans for the Site. Within thirty (30) Days after the Department's written request, Respondent shall advise the Department in writing whether it will submit and implement the requested additional or supplemental Work Plan or whether it elects to terminate this Order pursuant to Paragraph XIII. If Respondent elects to submit and implement such Work Plan, Respondent shall submit the requested Work Plan within sixty (60) Days after such election. If Respondent elects to terminate this Order or fails to make a timely election, this Order shall terminate pursuant to Paragraph XIII.

(c) Respondent may opt to propose one or more additional or supplemental Work Plans (including one or more IRM Work Plans) at any time, which the Department shall review for appropriateness and technical sufficiency.

(d) Any request made by the Department under Subparagraph II.B.1.(b) shall be subject to dispute resolution pursuant to Paragraph XII.

2. A Professional Engineer must stamp and sign all Work Plans other than SC or RI/FS Work Plans.

3. During all field activities conducted under this Order, Respondent shall have on-Site a representative who is qualified to supervise the activities undertaken. Such representative may be an employee or a consultant retained by Respondent to perform such supervision as set forth in 6 NYCRR Part 375-1.6(a)(3).

C. Modifications to Work Plans

The Department shall notify Respondent in writing if the Department determines that any element of a Department-approved Work Plan needs to be modified in order to achieve the objectives of the Work Plan as set forth in Subparagraph II.A or to ensure that the Remedial Program otherwise protects human health and the environment. Upon receipt of such notification, Respondent shall, subject to Respondent's right to terminate pursuant to Paragraph XIII, provide

written notification as provided at 6 NYCRR 375-1.6(d)(3) as to whether it will modify the Work Plan, or invoke dispute resolution

D. Submission of Final Reports and Annual Reports

1. In accordance with the schedule contained in a Work Plan, Respondent shall submit a final report as provided at 6 NYCRR 375-1.6(b) and a final engineering report as provided at 6 NYCRR 375-1.6(c).

2. Any final report or final engineering report that includes construction activities shall include "as built" drawings showing any changes made to the remedial design or the IRM.

3. In the event that the final engineering report for the Site requires Site management, Respondent shall submit an annual report by the 1st Day of the month following the anniversary of the start of the Site management. Such annual report shall be signed by a Professional Engineer or by such other qualified environmental professional as the Department may find acceptable and shall contain a certification as provided at 6 NYCRR 375-1.8(h)(3). Respondent may petition the Department for a determination that the institutional and/or engineering controls may be terminated. Such petition must be supported by a statement by a Professional Engineer that such controls are no longer necessary for the protection of public health and the environment. The Department shall not unreasonably withhold its approval of such petition.

E. Review of Submittals other than Progress Reports and Health and Safety Plans

1. The Department shall make a good faith effort to review and respond in writing to each submittal Respondent makes pursuant to this Order within sixty (60) Days. The Department's response shall include an approval or disapproval of the submittal, in whole or in part. All Department-approved submittals shall be incorporated into and become an enforceable part of this Order.

2. If the Department disapproves a submittal, it shall specify the reasons for its disapproval. Within fifteen (15) Days after the date of the Department's written notice that Respondent's submittal has been disapproved, Respondent shall, subject to Respondent's right to terminate pursuant to Paragraph XIII in the event the rejected submittal is a Work Plan submitted prior to the Department's approval of the RD/RA Work Plan, elect as provided at 6 NYCRR 375-1.6(d)(4). If Respondent elects to modify the submittal, Respondent shall, within thirty (30) Days after such election, make a revised submittal that addresses all of the Department's stated reasons for disapproving the first submittal. In the event that Respondent's revised submittal is disapproved, the Department shall set forth its reasons for such disapproval in writing and Respondent shall be in violation of this Order unless it invokes dispute resolution pursuant to Paragraph XII and its position prevails. Failure to make an election or failure to comply with the election is a violation of this Order.

3. Within thirty (30) Days after the Department's approval of a final report, Respondent shall submit such final report, as well as all data gathered and drawings and submittals made pursuant to such Work Plan, in an electronic format acceptable to the Department. If any document cannot be converted into electronic format, Respondent shall submit such document in an alternative format acceptable to the Department.

F. Department's Issuance of a ROD

Respondent shall cooperate with the Department and provide reasonable assistance, consistent with the Citizen Participation Plan, in soliciting public comment on the proposed remedial action plan ("PRAP"), if any. After the close of the public comment period, the Department shall select a final remedial alternative for the Site in a ROD. Nothing in this Order shall be construed to abridge any rights of Respondent, as provided by law, to judicially challenge the Department's ROD.

G. Release and Covenant Not to Sue

Upon the Department's issuance of a Certificate of Completion as provided at 6 NYCRR 375-1.9 and 375-2.9, Respondent shall obtain the benefits conferred by such provisions, subject to the terms and conditions described therein.

III. Progress Reports

Respondent shall submit written progress reports to the parties identified in Subparagraph XI.A.1 by the 10th Day of each month commencing with the month subsequent to the approval of the first Work Plan and ending with the Termination Date, unless a different frequency is set forth in an approved Work Plan. Such reports shall, at a minimum, include: all actions taken pursuant to this Order during the reporting period and those anticipated for the upcoming reporting period; all approved modifications to work plans and/or schedules; all results of sampling and tests and all other data received or generated by or on behalf of Respondent in connection with the Site during the reporting period, including quality assurance/quality control information; information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the future schedule, and efforts made to mitigate such delays; and information regarding activities undertaken in support of the Citizen Participation Plan during the reporting period and those anticipated for the upcoming reporting period.

IV. Penalties

A. 1. Respondent's failure to comply with any term of this Order constitutes a violation of this Order, the ECL, and 6 NYCRR 375-2.11(a)(4). Nothing herein abridges Respondent's right to contest any allegation that it has failed to comply with this Order.

2. Payment of any penalties shall not in any way alter Respondent's obligations under this Order.

B. 1. Respondent shall not suffer any penalty or be subject to any proceeding or action in the event it cannot comply with any requirement of this Order as a result of any Force Majeure Event as provided at 6 NYCRR 375-1.5(b)(4). Respondent must use best efforts to anticipate the potential Force Majeure Event, best efforts to address any such event as it is occurring, and best efforts following the Force Majeure Event to minimize delay to the greatest extent possible. "Force Majeure" does not include Respondent's economic inability to comply with any obligation, the failure of Respondent to make complete and timely application for any required approval or permit, and non-attainment of the goals, standards, and requirements of this Order.

2. Respondent shall notify the Department in writing within five (5) Days of the onset of any Force Majeure Event. Failure to give such notice within such five (5) Day period constitutes a waiver of any claim that a delay is not subject to penalties. Respondent shall be deemed to know of any circumstance which it, any entity controlled by it, or its contractors knew or should have known.

3. Respondent shall have the burden of proving by a preponderance of the evidence that (i) the delay or anticipated delay has been or will be caused by a Force Majeure Event; (ii) the duration of the delay or the extension sought is warranted under the circumstances; (iii) best efforts were exercised to avoid and mitigate the effects of the delay; and (iv) Respondent complied with the requirements of Subparagraph IV.B.2 regarding timely notification.

4. If the Department agrees that the delay or anticipated delay is attributable to a Force Majeure Event, the time for performance of the obligations that are affected by the Force Majeure Event shall be extended for a period of time equivalent to the time lost because of the Force Majeure event, in accordance with 375-1.5(4).

5. If the Department rejects Respondent's assertion that an event provides a defense to non-compliance with this Order pursuant to Subparagraph IV.B, Respondent shall be in violation of this Order unless it invokes dispute resolution pursuant to Paragraph XII and Respondent's position prevails.

V. Entry upon Site

A. Respondent hereby consents, upon reasonable notice under the circumstances presented, to entry upon the Site (or areas in the vicinity of the Site which may be under the control of Respondent) by any duly designated officer or employee of the Department or any State agency having jurisdiction with respect to matters addressed pursuant to this Order, and by any agent, consultant, contractor, or other person so authorized by the Commissioner, all of whom shall abide by the health and safety rules in effect for the Site, for inspecting, sampling, copying records related to the contamination at the Site, testing, and any other activities necessary to ensure Respondent's compliance with this Order. Upon request, Respondent shall (i) provide the Department with suitable work space at the Site, including access to a telephone, to the extent available, and (ii) permit the Department full access to all non-privileged records relating to matters addressed by

this Order. Raw data is not considered privileged and that portion of any privileged document containing raw data must be provided to the Department. In the event Respondent is unable to obtain any authorization from third-party property owners necessary to perform its obligations under this Order, the Department may, consistent with its legal authority, assist in obtaining such authorizations.

B. The Department shall have the right to take its own samples and scientific measurements and the Department and Respondent shall each have the right to obtain split samples, duplicate samples, or both, of all substances and materials sampled. The Department shall make the results of any such sampling and scientific measurements available to Respondent.

VI. Payment of State Costs

A. Within forty-five (45) days of the effective date of this Order, Respondent shall pay to the Department a sum of money which shall represent reimbursement for past State Costs as provided at 6 NYCRR 375-1.5(b)(3).

B. Within forty-five (45) Days after receipt of an itemized invoice from the Department, Respondent shall pay to the Department a sum of money which shall represent reimbursement for State Costs, other than those identified in Subparagraph VI.A, for work performed at or in connection with the Site through and including the Termination Date, as provided at 6 NYCRR 375-1.5(b)(3).

C. Costs shall be documented as provided by 6 NYCRR 375-1.5(b)(3)(ii). The Department shall not be required to provide any other documentation of costs, provided however, that the Department's records shall be available consistent with, and in accordance with, Article 6 of the Public Officers Law.

D. Such invoice shall be sent to Respondent at the following address:

Mako Properties Limited Partnership
Attn: Jim Kogel
931B Conklin Street
Farmingdale, NY 11735
jimkog@optonline.net

With a copy to:

Charlotte Biblow, Esq.
Farrell Fritz, P.C.
1320 RXR Plaza
Uniondale, NY 11556-1320
cbiblow@farrellfritz.com

E. Each such payment shall be made payable to the New York State Department of Environmental Conservation and shall be sent to:

Bureau of Program Management
Division of Environmental Remediation
New York State Department of Environmental Conservation
625 Broadway
Albany, New York 12233-7012
Attn: Bureau Director

F. Each party shall provide written notification to the other within ninety (90) Days of any change in the foregoing addresses.

G. Respondent may contest invoiced costs as provided at 6 NYCRR 375-1.5(b)(3)(v) and (vi).

VII. Reservation of Rights

A. Except as provided at 6 NYCRR 375-1.9 and 375-2.9, nothing contained in this Order shall be construed as barring, diminishing, adjudicating, or in any way affecting any of the Department's rights or authorities, including, but not limited to, the right to require performance of further investigations and/or response action(s), to recover natural resource damages, and/or to exercise any summary abatement powers with respect to any person, including Respondent.

B. Except as otherwise provided in this Order, Respondent specifically reserves all rights and defenses under applicable law respecting any Departmental assertion of remedial liability and/or natural resource damages against Respondent, and further reserves all rights respecting the enforcement of this Order, including the rights to notice, to be heard, to appeal, and to any other due process. The existence of this Order or Respondent's compliance with it shall not be construed as an admission of liability, fault, wrongdoing, or breach of standard of care by Respondent, and shall not give rise to any presumption of law or finding of fact, or create any rights, or grant any cause of action, which shall inure to the benefit of any third party. Further, Respondent reserves such rights as it may have to seek and obtain contribution, indemnification, and/or any other form of recovery from its insurers and from other potentially responsible parties or their insurers for past or future response and/or cleanup costs or such other costs or damages arising from the contamination at the Site as may be provided by law, including but not limited to rights of contribution under section 113(f)(3)(B) of CERCLA, 42 U.S.C. § 9613(f)(3)(B).

VIII. Indemnification

Respondent shall indemnify and hold the Department, the State of New York, the Trustee of the State's natural resources, and their representatives and employees harmless as provided by 6 NYCRR 375-2.5(a)(3)(i).

IX. Public Notice

A. Within thirty (30) Days after the effective date of this Order, Respondent shall provide notice as required by 6 NYCRR 375-1.5(a). Within sixty (60) Days of such filing, Respondent shall provide the Department with a copy of such instrument certified by the recording officer to be a true and faithful copy.

B. If Respondent proposes to transfer by sale or lease the whole or any part of Respondent's interest in the Site, or becomes aware of such transfer, Respondent shall, not fewer than forty-five (45) Days before the date of transfer, or within forty-five (45) Days after becoming aware of such conveyance, notify the Department in writing of the identity of the transferee and of the nature and proposed or actual date of the conveyance, and shall notify the transferee in writing, with a copy to the Department, of the applicability of this Order. However, such obligation shall not extend to a conveyance by means of a corporate reorganization or merger or the granting of any rights under any mortgage, deed, trust, assignment, judgment, lien, pledge, security agreement, lease, or any other right accruing to a person not affiliated with Respondent to secure the repayment of money or the performance of a duty or obligation.

X. Environmental Easement

A. If a Department-approved final engineering report for the Site relies upon one or more institutional and/or engineering controls, Respondent (or the owner of the Site) shall submit to the Department for approval an Environmental Easement to run with the land in favor of the State which complies with the requirements of ECL Article 71, Title 36, and 6 NYCRR 375-1.8(h)(2). Upon acceptance of Environmental Easement by the State, Respondent shall comply with the requirements of 6 NYCRR 375-1.8(h)(2).

B. If the ROD provides for no action other than implementation of one or more institutional controls, Respondent shall cause an environmental easement to be recorded under the provisions of Subparagraph X.A. If Respondent does not cause such environmental easement to be recorded in accordance with 6 NYCRR 375-1.8(h)(2), Respondent will not be entitled to the benefits conferred by 6 NYCRR 375-1.9 and 375-2.9.

XI. Communications

A. All written communications required by this Order shall be transmitted by United States Postal Service, by private courier service, or hand delivered as follows:

1. Communication from Respondent shall be sent to:

Jamie Ascher (1 hard copy (unbound for work plans) & 1 electronic copy)

Department of Environmental Conservation
Division of Environmental Remediation
SUNY @ Stony Brook
50 Circle Road
Stony Brook, New York 11790-3409
jxascher@gw.dec.state.ny.us

with electronic copies to:

Gary Litwin
Bureau of Environmental Exposure Investigation
New York State Department of Health
Flanigan Square
547 River Street
Troy, New York 12180-2216
gal09@health.state.ny.us

Dena Putnick, Esq.
Department of Environmental Conservation
625 Broadway, 14th Floor
Albany, New York 12233-1500
Correspondence only

2. Communication to be made from the Department shall be sent to:

Mako Properties Limited Partnership
Attn: Jim Kogel
931B Conklin Street
Farmingdale, NY 11735
jimkog@optonline.net

Charlotte Biblow, Esq.
Farrell Fritz, P.C.
1320 RXR Plaza
Uniondale, NY 11556-1320
cbiblow@farrellfritz.com

Charles A. Rich
CA Rich Consultants
17 Dupont Street
Plainview, NY 11803
crich@carichinc.com

B. The Department and Respondent reserve the right to designate additional or different addressees for communication upon written notice to the other.

C. Each party shall notify the other within ninety (90) Days after any change in the addresses in this Paragraph XI or in Paragraph VI.

XII. Dispute Resolution

In the event disputes arise under this Order, Respondent may, within fifteen (15) Days after Respondent knew or should have known of the facts which are the basis of the dispute, initiate dispute resolution in accordance with the provisions of 6 NYCRR 375-1.5(b)(2). Nothing contained in this Order shall be construed to authorize Respondent to invoke dispute resolution with respect to the remedy selected by the Department in the ROD or any element of such remedy, nor to impair any right of Respondent to seek judicial review of the Department's selection of any remedy.

XIII. Termination of Order

A. This Order will terminate upon the earlier of the following events:

1. Respondent's election to terminate pursuant to Subparagraphs II.B.1.b, II.C or II.E.2 so long as such election is made prior to the Department's approval of the RD/RA Work Plan. In the event of termination in accordance with this Subparagraph XIII.A.1, this Order shall terminate effective the 5th Day after the Department's receipt of the written notification terminating this Order or the 5th Day after the time for Respondent to make its election has expired, whichever is earlier, provided, however, that if there are one or more Work Plan(s) for which a final report has not been approved at the time of Respondent's notification of its election to terminate this Order pursuant to Subparagraphs II.B.1.b or II.E.2 or its failure to timely make such an election pursuant to Subparagraphs II.B.1.b or II.E.2, Respondent shall promptly complete the activities required by such previously approved Work Plan(s)consistent with the schedules contained therein. Thereafter, this Order shall terminate effective the 5th Day after the Department's approval of the final report for all previously approved Work Plans; or

2. The Department's written determination that Respondent has completed all phases of the Remedial Program (including Site Management), in which event the termination shall be effective on the 5th Day after the date of the Department's approval of the final report relating to the final phase of the Remedial Program.

B. Notwithstanding the foregoing, the provisions contained in Paragraphs VI and VIII shall survive the termination of this Order and any violation of such surviving Paragraphs shall be a violation of this Order, the ECL, and 6 NYCRR 375-2.11(a)(4), subjecting Respondent to penalties as provided under Paragraph IV so long as such obligations accrued on or prior to the Termination Date.

C. If the Order is terminated pursuant to Subparagraph XIII.A.1, neither this Order nor its termination shall affect any liability of Respondent for remediation of the Site and/or for payment of State Costs, including implementation of removal and remedial actions, interest, enforcement, and any and all other response costs as defined under CERCLA, nor shall it affect any defenses to such liability that may be asserted by Respondent. Respondent shall also ensure that it does not leave the Site in a condition, from the perspective of human health and environmental protection, worse than that which existed before any activities under this Order were commenced. Further, the Department's efforts in obtaining and overseeing compliance with this Order shall constitute reasonable efforts under law to obtain a voluntary commitment from Respondent for any further activities to be undertaken as part of a Remedial Program for the Site.

XIV. Miscellaneous

A. Respondent agrees to comply with and be bound by the provisions of 6 NYCRR Subparts 375-1 and 375-2; the provisions of such Subparts that are referenced herein are referenced for clarity and convenience only and the failure of this Order to specifically reference any particular regulatory provision is not intended to imply that such provision is not applicable to activities performed under this Order.

B. The Department may exempt Respondent from the requirement to obtain any state or local permit or other authorization for any activity conducted pursuant to this Order in accordance with 6 NYCRR 375-1.12(b), (c), and (d).

C. 1. Respondent shall use best efforts to obtain all Site access, permits, easements, approvals, institutional controls, and/or authorizations necessary to perform Respondent's obligations under this Order, including all Department-approved Work Plans and the schedules contained therein. If, despite Respondent's best efforts, any access, permits, easements, approvals, institutional controls, or authorizations cannot be obtained, Respondent shall promptly notify the Department and include a summary of the steps taken. The Department may, as it deems appropriate and within its authority, assist Respondent in obtaining same.

2. If an interest in property is needed to implement an institutional control required by a Work Plan and such interest cannot be obtained, the Department may require Respondent to modify the Work Plan pursuant to 6 NYCRR 375-1.6(d)(3) to reflect changes necessitated by Respondent's inability to obtain such interest.

D. The paragraph headings set forth in this Order are included for convenience of reference only and shall be disregarded in the construction and interpretation of any provisions of this Order.

E. 1. The terms of this Order shall constitute the complete and entire agreement between the Department and Respondent concerning the implementation of the activities required by this Order. No term, condition, understanding, or agreement purporting to modify or vary any term of this Order shall be binding unless made in writing and subscribed by the party to be bound. No

informal advice, guidance, suggestion, or comment by the Department shall be construed as relieving Respondent of Respondent's obligation to obtain such formal approvals as may be required by this Order. In the event of a conflict between the terms of this Order and any Work Plan submitted pursuant to this Order, the terms of this Order shall control over the terms of the Work Plan(s). Respondent consents to and agrees not to contest the authority and jurisdiction of the Department to enter into or enforce this Order.

2. i. Except as set forth herein, if Respondent desires that any provision of this Order be changed, Respondent shall make timely written application to the Commissioner with copies to the parties listed in Subparagraph XI.A.1.

ii. If Respondent seeks to modify an approved Work Plan, a written request shall be made to the Department's project manager, with copies to the parties listed in Subparagraph XI.A.1.

iii. Requests for a change to a time frame set forth in this Order shall be made in writing to the Department's project attorney and project manager; such requests shall not be unreasonably denied and a written response to such requests shall be sent to Respondent promptly.

F. 1. If there are multiple parties signing this Order, the term "Respondent" shall be read in the plural, the obligations of each such party under this Order are joint and several, and the insolvency of or failure by any Respondent to implement any obligations under this Order shall not affect the obligations of the remaining Respondent(s) under this Order.

2. If Respondent is a partnership, the obligations of all general partners (including limited partners who act as general partners) under this Order are joint and several and the insolvency or failure of any general partner to implement any obligations under this Order shall not affect the obligations of the remaining partner(s) under this Order.

3. Notwithstanding the foregoing Subparagraphs XIV.F.1 and 2, if multiple parties sign this Order as Respondents but not all of the signing parties elect to implement a Work Plan, all Respondents are jointly and severally liable for each and every obligation under this Order through the completion of activities in such Work Plan that all such parties consented to; thereafter, only those Respondents electing to perform additional work shall be jointly and severally liable under this Order for the obligations and activities under such additional Work Plan(s). The parties electing not to implement the additional Work Plan(s) shall have no obligations under this Order relative to the activities set forth in such Work Plan(s). Further, only those Respondents electing to implement such additional Work Plan(s) shall be eligible to receive the Liability Limitation referenced in Paragraph VI.

G. Respondent shall be entitled to receive contribution protection and/or to seek contribution to the extent authorized by ECL 27-1421(6) and 6 NYCRR 375-1.5(b)(5).

H. Unless otherwise expressly provided herein, terms used in this Order which are defined in ECL Article 27 or in regulations promulgated thereunder shall have the meaning assigned to them under said statute or regulations.

I. Respondent's obligations under this Order represent payment for or reimbursement of response costs, and shall not be deemed to constitute any type of fine or penalty.

J. Respondent and Respondent's successors and assigns shall be bound by this Order. Any change in ownership or corporate status of Respondent shall in no way alter Respondent's responsibilities under this Order.

K. This Order may be executed for the convenience of the parties hereto, individually or in combination, in one or more counterparts, each of which shall be deemed to have the status of an executed original and all of which shall together constitute one and the same.

L. The effective date of this Order is the 10th Day after it is signed by the Commissioner or the Commissioner's designee.

DATED:

AUG 20 2010

ALEXANDER B. GRANNIS
COMMISSIONER
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

By: _____
Dale A. Desnoyers, Director
Division of Environmental Remediation

CONSENT BY RESPONDENT

Respondent hereby consents to the issuing and entering of this Order, waives Respondent's right to a hearing herein as provided by law, and agrees to be bound by this Order.

Mako Properties Limited Partnership

By: _____

Title: Pres. General Partner

Date: 8.16.10

STATE OF NEW YORK)
) ss:
COUNTY OF)

On the 16 day of August, in the year 2010, before me, the undersigned, personally appeared Jacob J. Kogel, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Claudia A. Cositore
Signature and Office of individual taking acknowledgment

CLAUDIA A COSITORE
Notary Public, State of New York
No 4859752
Qualified in Suffolk County
Commission Expires 8/11/14

EXHIBIT "A"

Map of Site

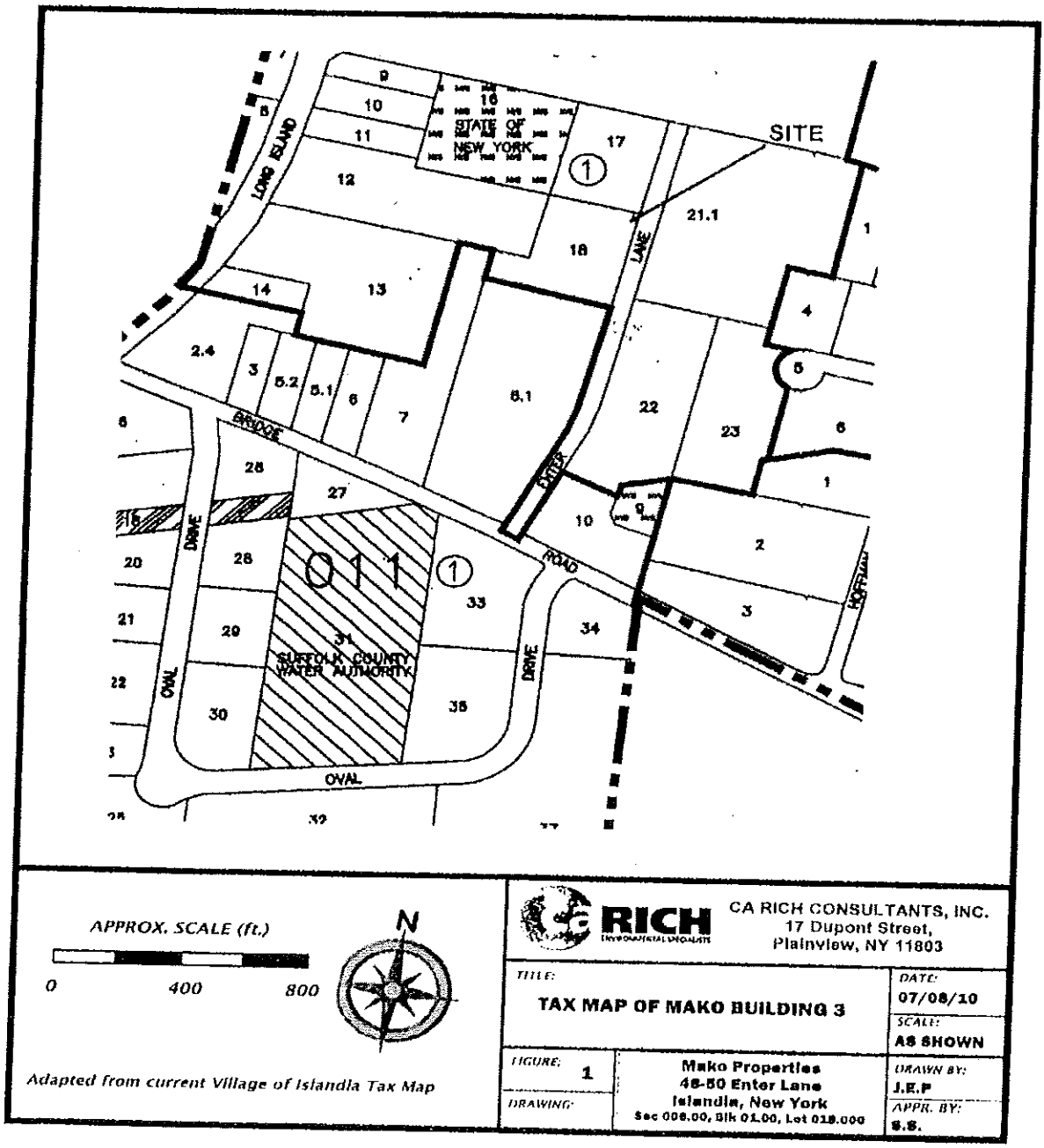


EXHIBIT "B"

RECORDS SEARCH REPORT

1. Detail all environmental data and information within Respondent's or Respondent's agents' or consultants' possession or control regarding environmental conditions at or emanating from the Site.

2. A comprehensive list of all existing relevant reports with titles, authors, and subject matter, as well as a description of the results of all previous investigations of the Site and of areas immediately surrounding the Site which are or might be affected by contamination at the Site, including all available topographic and property surveys, engineering studies, and aerial photographs.

3. A concise summary of information held by Respondent and Respondent's attorneys and consultants with respect to:

(i) a history and description of the Site, including the nature of operations;

(ii) the types, quantities, physical state, locations, methods, and dates of disposal or release of hazardous waste at or emanating from the Site;

(iii) a description of current Site security (i.e. fencing, posting, etc.); and

(iv) the names and addresses of all persons responsible for disposal of hazardous waste, including the dates of such disposal and any proof linking each such person responsible with the hazardous wastes identified.

Exhibit "C"
COST SUMMARY

Not applicable