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Weissman Holdings, Inc.

Final Engineering Report

RE: Groundwater On-Site Remedial Action Work Plan

Former Kings Electronics Co., Inc. Site,
Tuckahoe, New York

VCA # W3-0855-99-07

11 February 2009

ARCADIS

Final Engineering Report Certification

This is to certify that:

The Final Engineering Report for the On-Site Groundwater Remediation for the Former Kings Electronics Co. Inc. Site located in Tuckahoe, New York (the subject remedial program) was prepared in accordance with the NYSDEC approved Revised On-Site Remedial Action Work Plan (RAWP-revised; ARCADIS 2002) and the Voluntary Cleanup Agreement (W3-0855-99-07), as entered into by Weissman Holdings Inc. (formerly Kings Electronics Co. Inc.) and the NYSDEC.

The RAWP was implemented and that all construction activities were completed substantially in accordance with the NYSDEC approved RAWP and were personally witnessed by me or by a person under my direction.

I, Moh Mohiuddin, residing at 75 Edgewood Road, Morganville, NJ 07751, at all pertinent times hereinafter mentioned, was a currently registered professional engineer; was the individual who had primary direct responsibility for the implementation of the subject remedial program; and that all requirements of the remedial program have been complied with.

ARCADIS of New York, Inc.
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Principal Engineer-Engineer of Record
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Power Liang
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Final Engineering Report

Re: Groundwater On-Site
Remedial Action Work Plan

Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

VCA# W3-0855-99-07

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Date:
11 February 2009

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Addenda – Reports Previously Submitted to NYSDEC (Included on enclosed CD)

1.0 Introduction

ARCADIS of New York, Inc. (ARCADIS) on behalf of Weissman Holdings, Inc. (formerly Kings Electronics Co., Inc.), has prepared this Final Engineering Report (FER) for the on-site groundwater remediation at the former Kings Electronics Co., Inc. facility located at 40 Marbledale Road, Village of Tuckahoe, Town of Eastchester, Westchester County, New York, with Tax Map Identifier Numbers Section 68, Block 4, and Lots 29 and 36 E (Site). The FER was prepared pursuant to the NYSDEC approved Revised On-site Remedial Action Work Plan dated July 3, 2002. A survey map of the Site is included in Appendix A. A current site plan showing existing site features is presented on Figure 1.

A Site Investigation Work Plan has been completed pursuant to the Voluntary Cleanup Agreement (VCA) entered into by Kings Electronics Co., Inc. (Kings) and the New York State Department of Environmental Conservation (NYSDEC) on May 9, 2000, pursuant to the Voluntary Cleanup Program (VCP). Prior to the execution of the VCA, Kings carried out a voluntary site investigation and the excavation and removal of soils impacted at the source area (former degreaser). The Summary of Environmental Conditions Report dated February 23, 1999 and the April 1999 Soil Removal Summary Report dated June 24, 1999 were prepared by Cody Ehlers Group, Kings' contractor, and submitted to NYSDEC in connection with Kings' VCP application dated March 1, 1999.

In the Revised On-Site Remedial Action Work Plan, prepared by ARCADIS and approved by NYSDEC on October 15, 2002 (RAWP), In-situ Reactive Zone (IRZ) technology was identified as the preferred remedy for remediation of contaminants in groundwater at the source area and downgradient control. In 2008, the objectives of the remediation were successfully completed. The RAWP is provided in Appendix B.

The purpose of this FER is to present the full-scale remedial action implementation, description of the IRZ system, remedial system performance evaluation, the long term groundwater monitoring program established for the Site, and operation and maintenance activities in connection with the RAWP.

1.1 Additional Site Activities

Kings and Storage Deluxe (current site owner) performed additional site investigation and remediation activities prior to and during the on-site groundwater remediation. The reported results of these activities were previously submitted to NYSDEC and are being resubmitted with this FER pursuant to a request by NYSDEC. Relevant site specific environmental data was used by ARCADIS in its implementation of the Revised On-Site Remedial Action Work Plan. The reports for the additional activities, which were not conducted and are not certified by ARCADIS as part of the FER but are included as addenda to the FER, are as follows:

- Summary of Remedial Investigative Findings, Leggette, Brashears & Graham, Inc., June 1, 2000
- Additional Soil Sampling Report, Geovation, March 30, 2001 [Test Pit north of excavation]
- Well Installation Report, Geovation, May 9, 2001 [MW-10/11/12 w/ soil samples]
- Additional Site Investigation Activities, Geovation, February 6, 2002 [Silt layer in excavation, GW in Park]
- Preliminary Regional Ground Water Characterization Report, Geovation, May 9, 2002 [off-site temporary GW MWs in street, groundwater divide]
- Additional Silt Layer Sampling and Silt Layer Summary Report, Geovation, July 8, 2002 [Soil coring into excavation sidewalls]
- September 2004 Additional Off-Site Investigation Report (GW), Geovation, [OS-MW's installation & temporary GW MWs in street]
- September 2004 Off-Site Soil Gas Investigation Report, EML/Geovation
- October 2004 On-Site Indoor Air Sampling Report, EML
- On-Site Sub-Slab Soil Sampling Report, November 2004, EML
- Sub-Slab Soil Sampling Reports (April, May & August 2005), Geovation
- February 2006 Groundwater Elevation Report, Geovation
- Construction Health & Safety Plan (CHASP) and Soil Management Plan (SMP), AKRF, February 2, 2006 (for Storage Deluxe)
- Underground Storage Tank (UST) Closure Report, AKRF, October 16, 2006 (for Storage Deluxe)
- Soil Vapor Intrusion (SVI) Reports, Tuckahoe DPW (2006/2007/2008) EML

- Updated Site Sampling and Groundwater Contour Maps, Geovation, May 2008
- Comprehensive On-Site SSD Report, EML, May 2008
- Comprehensive Off-Site SSD Reports (Three Residences & Church), EML, May 2008
- Draft Deed Restriction, Kings/Storage Deluxe, January 2006

Institutional and/or engineering controls required to be maintained during the post-closure period are described within the Draft Deed Restriction being constructed by attorneys for Weissman Holdings, the current property owner (Storage Deluxe) and the NYSDEC. These institutional and/or engineering controls are not certified as part of the FER and have not been reviewed by ARCADIS. Site use limitations, a groundwater use restriction, a Soil Management Plan, Health and Safety Plan and Sub-Slab (soil vapor) Depressurization Systems are included within the Site Deed Restriction. See Addenda 13, 17 and 19.

2.0 Objective

The general objective of the full-scale remedial action was to remediate on-site groundwater concentrations for constituents of concern to levels less than the standards, cleanup, and guidance (SCGs) values contained within the NYSDEC Division of Water Technical and Operational Guidance Series (TOGS), as set forth in Table 1.

Remediation of groundwater was accomplished through the use of in-situ bioremediation technology. The specific objective for the post remediation monitoring program is to document the long-term effectiveness of the groundwater remediation.

3.0 Summary of Environmental Conditions

The constituents of concern (COCs) for the Site are chlorinated volatile organic compounds (CVOCs). Trichloroethene (TCE), typically associated with degreasing, has been determined to be the diagnostic COC at the site. The highest concentrations of CVOCs in groundwater were detected in the upper unconsolidated unit (10 to 20 feet below ground surface [bgs]). Concentrations of CVOCs detected in the lower unconsolidated unit generally decrease by two to three orders of magnitude, demonstrating that the downward migration of CVOCs is limited.

The following sections of the FER describe the pre and post remedial groundwater quality.

3.1 Pre-Remedial Groundwater Quality

To establish pre-remedial baseline groundwater conditions, in January 2003, prior to the start of the full-scale remedial action, an initial round of groundwater elevation measurements and groundwater quality samples were collected from selected on-site and off-site wells. A summary of the groundwater levels (i.e.; depth to groundwater) from January 2003, (pre remedial) to July 2008 (post remedial) is shown in Table 2. The groundwater quality sample results, which were collected from January 2003 (pre remedial) to July 2008 (post remedial), for CVOCs, biogeochemical parameters and field parameters analyses are shown in Table 3.

The following CVOCs detected in monitoring wells (at the start of implementation of the RAWP) exceeded the NYSDEC TOGS: TCE, tetrachloroethene (PCE), 1,1,1-trichloroethane (1,1,1-TCA), 1,1-dichloroethane (1,1-DCA), 1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), trans-1,2-dichloroethene (trans-1,2-DCE) and vinyl chloride (VC). Total CVOC concentrations in groundwater from all the wells ranged from 7 ug/L to 17,200 ug/L. The highest concentration was found at the central portion of the Site. The detection of biodegradation products and daughter compounds indicated that natural bio-attenuation of CVOCs at the Site was occurring.

3.2 Operational and Post-Remedial Groundwater Quality

Pursuant to the RAWP, a full-scale remedial action was conducted from January 2003 through August 2008. Quarterly and monthly groundwater monitoring were conducted to track the performance of the remedial system. At the end of the remedial system operation in August 2008, a significant decrease of CVOC concentrations was observed in all on-site wells that were impacted by the former source area. During quarterly monitoring in January, April and July of 2008, all site specific cleanup goals were met.

Approximately 99% reduction of total CVOC mass was observed at the end of the remedial system operation. A summary of historical CVOCs, from January 2003 (Pre remedial) to July 2008, detected in groundwater for all of the on-site and off-site wells is presented in Table 3. The groundwater sampling results for January 2007 to July 2008, which demonstrate the success of the on-site remediation in reducing CVOC concentrations to less than SCGs, are summarized on Figure 3.

4.0 Full-Scale In-Situ Bioremediation Program

The full-scale remedial action used an enhanced in-situ microbiological process that has been termed as enhanced reductive dechlorination (ERD). This enhanced in-situ bioremediation was achieved by introducing a carbohydrate substrate (i.e., in the form of a molasses and water solution), thus providing an organic carbon source for microbes already present in the aquifer. This created an in-situ reactive zone (IRZ), which was the zone within the aquifer where enhancement of degradation occurred.

4.1 Injection Well Network

A series of injection wells were installed at the Site for the delivery of a substrate solution to create an IRZ. Injection wells were spaced across the width of the plume to form injection lines. The shallow overburden groundwater system (10 to 20 feet bgs) was targeted for remediation.

The injection well spacing is approximately 30 feet within each injection line. The spacing was based on an estimated radius of influence (ROI) of 15 feet determined during pilot testing conducted September 2000 to December 2002. Depending on the length of the injection line, each completed injection line consisted of three to five injection wells.

The distance between each injection line was approximately 90 feet apart extending across the whole length of the on-site plume. Because injection lines were acting as reactive zones, by treating water as it flowed across them, it was not necessary to saturate the whole footprint of the plume with a substrate solution. In total, there were 23 injection wells forming six injection lines. The location of all the injection wells and the typical injection well construction and design details are presented in Appendix C.

4.2 Monitoring Well Network

Downgradient of the former source area, on-site monitoring wells (six) located downgradient of each injection line were utilized to evaluate IRZ development and document the remediation results. One additional on-site monitoring well located upgradient of the former source area at the northern property line was utilized to document upgradient groundwater conditions. Five off-site monitoring wells located at sidegradient and downgradient locations were utilized to monitor groundwater quality off-site.. In total, there are 12 wells within the monitoring well network. Six of these wells, on-site wells located downgradient of the former source area (MW-9S, MW-9D, PTW-2, GP-104R, GP-103R and MW-13R), are subject to the site specific cleanup goals outlined in Table 1. The locations of all the monitoring wells are presented on Figure 1.

Over the years, numerous injection and monitoring wells were damaged, destroyed or unable to be located due to the renovations by the current owner, Storage Deluxe. In January 2008, repairs were completed for the onsite injection and monitoring wells as indicated in the NYSDEC letter dated April 2, 2008. An updated survey map for the Site was prepared to correctly show the current site conditions. The updated survey map is included as Appendix A.

4.3 Full-Scale Remedial Action

Substrate injections were conducted bi-weekly for the first month in order to establish the IRZ. After the first month, the injection frequency was then modified to monthly. Based on the pilot test results, sufficient organic carbon loading (TOC greater than 1,000 mg/L) would last for up to 2 months. The molasses was delivered to the subsurface as a 10:1 to 20:1 (water to molasses) solution. A diluted and completely mixed molasses solution was either prepared on-site or supplied by a tanker truck. The solution was delivered to the subsurface through each injection well using a transfer pump. The total volume of molasses feed solution injected into each well during each injection event was between 100 to 1000 gallons. A summary of the full-scale injection parameters is presented in Table 4.

5.0 Groundwater Monitoring Program

During the course of the remediation, monitoring was conducted to assess the effectiveness of the IRZ system, assess compliance with the time related cleanup goals, and monitor for off-site groundwater quality. Table 5 presents the list of wells and analytes for all of the quarterly and monthly/bi-monthly monitoring programs.

5.1 Off-Site Groundwater Monitoring

Off-site groundwater monitoring included groundwater elevation measurements and groundwater sampling at offsite wells downgradient and sidegradient of the IRZ. Components of the off-site monitoring program are described below:

- Monitor groundwater flow patterns during full-scale remedial system operation; and
- Monitor CVOC concentrations in groundwater at off-site downgradient and sidegradient areas during full-scale remedial system operation.

Water level elevations were measured quarterly (beginning March 2003) prior to each sampling event. The groundwater samples were typically collected and analyzed for CVOCs, TOC and field parameters including pH, specific conductivity, temperature, turbidity, dissolved oxygen, and redox potential on a quarterly basis.

5.2 Remedial Action Performance Monitoring

Performance monitoring for on-site wells downgradient of the former source area was conducted on a quarterly basis. In addition, on-site monitoring of one well located upgradient of the source area was conducted on a quarterly basis to document groundwater chemistry upgradient of the source area. Performance monitoring for injection wells was conducted on a monthly to bimonthly basis, as needed. The primary goals of the performance monitoring program were as follows:

- Provide operational data to determine the optimal injection loading and frequency to maintain the IRZ
- Confirm that an anaerobic IRZ was established and maintained;
- Confirm that a clean water front was being established within a reasonable timeframe such that the remedial goal for the Site was achieved;
- Confirm that the injection methodology provided remediation to the full extent of the plume; and,
- Confirm that mass released through former operation at the source area IRZ was being completely degraded through operation of the source area and downgradient IRZs.

The remedial action performance monitoring consisted of water level measurements and groundwater sampling of monitoring wells and active injection wells within the IRZ.

5.2.1 Monitoring Wells

During each quarterly sampling event, prior to collection of samples, water level measurements for all monitoring wells were collected to facilitate characterization (if needed) of the groundwater flow. All samples were analyzed for CVOCs, TOC, and field parameters. In addition, samples were collected and analyzed for dissolved gases and biogeochemical parameters semi-annually. Dissolved gases included ethane, ethene, methane, and carbon dioxide. Biogeochemical parameters were comprised of total and dissolved iron, total and dissolved manganese, nitrate, nitrite, sulfate, sulfide, chloride and total alkalinity.

5.2.2 Injection Wells

Active injection wells were sampled monthly to bimonthly, prior to an injection event for TOC and field parameters. This monitoring was conducted to ensure that a sufficient concentration of organic carbon was maintained and the pH concentrations were kept above 4.0 to avoid the creation of excessive fermentative conditions. Based on the groundwater monitoring results, the substrate volume, concentration, and injection location and frequency were adjusted accordingly to maintain optimal conditions.

5.3 Sampling Methodology

The low-flow groundwater sampling technique was utilized for collecting groundwater samples during each monitoring event. A modified low-flow groundwater sampling technique using a peristaltic pump was used for collecting TOC samples from the injection wells. All groundwater samples were transferred properly into sample containers and placed in coolers with ice and maintained at 4 ºC for delivery to a certified laboratory for analyses under proper chain of custody.

Standard QA/QC samples were collected during each round of the sampling events. QA/QC procedures are described in detail in Section 5.5.

5.4 Analytical and Field Parameters

Groundwater analyses, except for dissolved gases, were conducted by Integrated Analytical Laboratories located in Randolph, New Jersey. Dissolved gases samples were sent to Microseeps, Inc. in Pittsburgh, Pennsylvania.

Groundwater samples submitted for analysis of CVOCs were analyzed for Target Compound List (TCL) VOCs using USEPA Method 8260. Groundwater samples submitted for analysis of TOC were analyzed using USEPA Method 415.2. Groundwater samples submitted for dissolved gases analysis were analyzed using Method AM20GAX. Groundwater samples submitted for analysis of inorganics were analyzed using USEPA Method 310.1, Method 300 and/or Method 6010. Due to their reactivity, sulfide and ferrous iron analyses were completed in the field using a HACH spectrophotometer. During sampling, field parameters including dissolved oxygen, redox potential, pH, temperature, turbidity and specific conductivity were measured using a field calibrated water quality probe as part of the low flow sampling procedure.

5.5 Quality Assurance/Quality Control Procedures

To ensure that data collected in the field is consistent, accurate and complete, field sampling forms were utilized for repetitive data collection, such as depth-to-groundwater in wells, groundwater sampling parameters, and purge and sample collection times.

QA/QC samples were collected to assure quality control for the compliance and performance monitoring programs. Analyses of QA/QC samples enabled data evaluation for accuracy and integrity. A QA/QC sample set included a trip blank, field blank, and blank duplicate. All QA/QC samples were used to verify the quality of the sampling and analytical results.

Trip blanks consisted of laboratory supplied sealed sample bottles of analyte-free water, transported to the Site and returned to the laboratory without opening. This served as a check for contamination originating from the laboratory, sample transport, and from Site conditions. A trip blank was shipped to the laboratory with each cooler containing samples collected for VOC analyses.

Field blank samples were collected to verify the effectiveness of the field equipment decontamination process for non-dedicated or reusable sampling equipment. Field blanks were collected by pouring laboratory supplied analyte-free water through or over a decontaminated piece of sampling equipment. A field blank for each parameter was collected for each day of any sampling event.

Duplicate and MS/MSD samples were analyzed at a frequency of one per every twenty samples in a sample delivery group (SDG) to determine the quality of laboratory analysis.

6.0 Contingency Plan

The objectives of the remediation were successfully completed. Therefore, a contingency plan was not implemented during the remedial action.

7.0 Remedial System Performance Evaluation

A summary of the key conclusions from the monitoring programs are as follows:

- Groundwater level measurements and flow directions were similar and consistent throughout the operation of the remedial system. This suggested that the onsite contaminants in groundwater were being remediated and did not migrate to offsite properties. A groundwater contour map for the shallow overburden and the deep overburden unit during the January 2008 quarterly sampling events are shown on Figure 2A and 2B, respectively.

- Sufficient organic carbon has been distributed throughout the intended treatment zone to maintain the reducing conditions. The data indicated that the IRZ extends to the vicinity of the downgradient boundary near MW-13R.

- Significant increases in reduced forms of alternate electron acceptors (dissolved iron, dissolved manganese, sulfide and methane) also demonstrated that an anaerobic and reducing IRZ was established and maintained at the Site.

- Complete CVOC degradation was successful within the limits of the IRZ through biotic and potentially abiotic pathway. This is evidenced by significant shift from the parent compound (e.g., TCE) to daughter compounds (e.g., 1,2-DCE and vinyl chloride) and observation of degradation end products (e.g., ethene). Complete CVOC degradation was most evident in the wells: MW-9D, MW-9SR, GP-104R and GP-103R. CVOC concentration trends for the COCs since the initiation of the full-scale remedial system operation are presented in Appendix D.

The groundwater monitoring results indicated that IRZ technology was a viable and effective remedial technique to aggressively access and degrade contaminant mass and achieve the remedial goals for the Site.

8.0 Post-Remedial Implementation Plan and Schedule

It is anticipated that the declining to stable CVOC concentrations observed within the IRZ, which have met the SCGs, will continue in the current and future biogeochemical environment. In addition, a post-remediation monitoring program (consisting of quarterly sampling and analysis) for eight consecutive quarters, as required under the Revised RAWP, will be conducted. During this period, all injection and monitoring wells and associated remediation equipment will be maintained in operable condition and ready for use as needed.

The implementation plan and schedule are detailed in the Post-Remedial Operation, Maintenance and Monitoring Plan – On-site Groundwater Remediation System (the OM&M Plan), included in Appendix E. A copy of the health and safety plan (HASP) is included in Appendix F.

8.1 Post-Remediation Monitoring

Eight quarters of on-site post-remediation monitoring are proposed at the Site to document the long-term effectiveness of the groundwater remediation. Performance monitoring wells MW-9SR, MW-9D, PTW-2, GP-104R, GP-103R and MW-13R will be analyzed quarterly for CVOCs and field parameters. In addition, Well MW-6S will continue to be monitored for CVOCs and field parameters to document the contribution of CVOCs upgradient of the former source area.

9.0 References

ARCADIS G&M. July 2002. Revised On-Site Remedial Action Work Plan, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, Westchester County, New York.

The Cody Ehlers Group. 1999. Summary of Environmental Conditions, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, New York. February 23, 1999.

The Cody Ehlers Group. 1999. April 1999 Soil Removal Summary Report, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, New York. June 24, 1999.

Hall, Leo. M. 1968. Bedrock Geology in the Vicinity of White Plains, New York. University of Massachusetts, May 1968.

Leggette, Brashears & Graham, Inc. 2000. Summary of Remedial Investigative Findings, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, Westchester County, New York. June 1, 2000.

Table 1. Standards, Cleanup, and Guidance Values for Select Chlorinated Volatile Organic Compounds in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York.

Parameters	NYSDEC Standard (a) (ug/L)
Vinyl chloride	2
1,1-Dichloroethylene	5
cis-1,2-Dichloroethylene	5
trans-1,2-Dichloroethylene	5
Tetrachloroethylene	5
1,1,1-Trichloroethane	5
Trichloroethylene	5

ug/L Micrograms per liter, equivalent to parts per billion.
NYSDEC New York State Department of Environmental Conservation.
(a) Source: NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) (1.1.1), Ambient Water Quality Standards and Guidance Values, June 1998.

Note: SCGs are from Table 2 of the NYSDEC approved Revised On-Site Remedial Action Work Plan

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Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Well ID	6/19/2003 Measuring Point Elevation[1] (ft)	6/19/2003 Depth to Water (ft)	6/19/2003 Groundwater Elevation (ft)	9/8/2003 Measuring Point Elevation[1] (ft)	9/8/2003 Depth to Water (ft)	9/8/2003 Groundwater Elevation (ft)	12/1/2003 Measuring Point Elevation[1] (ft)	12/1/2003 Depth to Water (ft)	12/1/2003 Groundwater Elevation (ft)
Shallow Overburden Wells									
MW-HP-1S	99.43	9.23	90.20	99.43	10.48	88.95	99.43	10.80	88.63
MW-HP-2S	100.71	10.25	90.46	100.71	11.35	89.36	100.71	11.74	88.97
MW-1	100.51	9.23	91.28	100.51	10.38	90.13	100.51	10.81	89.70
MW-4S	100.85	NR	NR	100.85	11.93	88.92	100.85	12.23	88.62
MW-5S	101.41	10.65	90.76	101.41	11.83	89.58	101.41	12.18	89.23
MW-6S	102.06	10.32	91.74	102.06	11.53	90.53	102.06	11.99	90.07
MW-HP-8S	101.12	---	---	101.12	10.63	90.49	101.12	---	---
MW-9S	100.10	9.19	90.91	100.10	10.34	89.76	100.10	10.76	89.34
MW-13/13R	97.70	---	---	97.70	---	---	97.70	---	---
GP-102S	98.31	12.77	85.54	98.31	14.12	84.19	98.31	14.75	83.56
GP-103/103R	94.23	4.65	89.58	94.23	5.92	88.31	94.23	6.36	87.87
GP-104/104R	94.09	4.30	89.79	94.09	5.56	88.53	94.09	5.88	88.21
GP-105	100.11	9.98	90.13	100.11	11.11	89.00	100.11	11.52	88.59
GP-120	101.65	11.49	90.16	101.65	12.97	88.68	101.65	13.15	88.50
GP-121	100.90	10.80	90.10	100.90	12.37	88.53	100.90	12.60	88.30
PTW-1	99.80	9.68	90.12	99.80	10.91	88.89	99.80	11.23	88.57
PTW-2	99.90	---	---	99.90	---	---	99.90	---	---
Deep Overburden Wells									
MW-HP-1D	99.54	9.41	90.13	99.54	10.62	88.92	99.54	10.96	88.58
MW-HP-2D	100.56	10.06	90.50	100.56	11.16	89.40	100.56	11.56	89.00
MW-3	100.22	---	---	100.22	10.23	89.99	100.22	10.65	89.57
MW-4D	100.85	---	---	100.85	11.91	88.94	100.85	12.41	88.44
MW-5D	101.56	10.87	90.69	101.56	12.03	89.53	101.56	12.33	89.23
MW-6D	102.10	10.47	91.63	102.10	11.64	90.46	102.10	12.36	89.74
MW-7D	97.90	10.53	87.37	97.90	11.85	86.05	97.90	12.19	85.71
MW-HP-8D	101.27	9.80	91.47	101.27	10.93	90.34	101.27	11.38	89.89
MW-9D	100.20	9.50	90.70	100.20	10.62	89.58	100.20	11.04	89.16
GP-102D	98.48	12.90	85.58	98.48	14.25	84.23	98.48	14.67	83.81
Additional Off-Site Well									
OS-MW-1	98.08	9.41	88.67	98.08	10.62	87.46	98.08	10.96	87.12
OS-MW-2	98.46	10.06	88.40	98.46	11.16	87.30	98.46	11.56	86.90
OS-MW-3PL	100.62	---	---	100.62	10.23	90.39	100.62	10.65	89.97

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Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

	3/22/2004			6/14/2004			9/7/2004		
Well ID	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
Shallow Overburden Wells									
MW-HP-1S	99.43	10.30	89.13	99.43	10.20	89.23	99.43	11.02	88.41
MW-HP-2S	100.71	11.24	89.47	100.71	11.14	89.57	100.71	11.91	88.80
MW-1	100.51	10.26	90.25	100.51	10.10	90.41	100.51	11.13	89.38
MW-4S	100.85	11.71	89.14	100.85	11.70	89.15	100.85	12.62	88.23
MW-5S	101.41	11.66	89.75	101.41	11.54	89.87	101.41	12.44	88.97
MW-6S	102.06	11.39	90.67	102.06	11.21	90.85	102.06	12.22	89.84
MW-HP-8S	101.12	10.56	90.56	101.12	10.40	90.72	101.12	11.38	89.74
MW-9S	100.10	10.21	89.89	100.10	9.99	90.11	100.10	10.85	89.25
MW-13/13R	97.70	13.44	84.26	97.70	---	---	97.70	---	---
GP-102S	98.31	14.47	83.84	98.31	14.05	84.26	98.31	14.90	83.41
GP-103/103R	94.23	5.76	88.47	94.23	5.62	88.61	94.23	6.38	87.85
GP-104/104R	94.09	5.37	88.72	94.09	5.25	88.84	94.09	6.12	87.97
GP-105	100.11	10.97	89.14	100.11	10.85	89.26	100.11	11.72	88.39
GP-120	101.65	12.70	88.95	101.65	12.19	89.46	101.65	13.60	88.05
GP-121	100.90	12.17	88.73	100.90	12.69	88.21	100.90	13.09	87.81
PTW-1	99.80	10.73	89.07	99.80	10.63	89.17	99.80	11.47	88.33
PTW-2	99.90	10.64	89.26	99.90	---	---	99.90	---	---
Deep Overburden Wells									
MW-HP-1D	99.54	10.47	89.07	99.54	10.34	89.20	99.54	11.26	88.28
MW-HP-2D	100.56	11.06	89.50	100.56	10.93	89.63	100.56	11.73	88.83
MW-3	100.22	10.13	90.09	100.22	9.98	90.24	100.22	10.84	89.38
MW-4D	100.85	11.89	88.96	100.85	11.76	89.09	100.85	12.66	88.19
MW-5D	101.56	11.77	89.79	101.56	11.33	90.23	101.56	12.31	89.25
MW-6D	102.10	11.96	90.14	102.10	11.66	90.44	102.10	13.40	88.70
MW-7D	97.90	11.70	86.20	97.90	11.68	86.22	97.90	12.59	85.31
MW-HP-8D	101.27	10.83	90.44	101.27	10.61	90.66	101.27	---	---
MW-9D	100.20	10.51	89.69	100.20	10.38	89.82	100.20	11.25	88.95
GP-102D	98.48	14.45	84.03	98.48	14.06	84.42	98.48	15.06	83.42
Additional Off-Site Well									
OS-MW-1	98.08	10.47	87.61	98.08	10.34	87.74	98.08	11.26	86.82
OS-MW-2	98.46	11.06	87.40	98.46	10.93	87.53	98.46	11.73	86.73
OS-MW-3PL	100.62	10.13	90.49	100.62	9.98	90.64	100.62	10.84	89.78

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Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

	1/27/2005			4/18/2005			7/26/2005		
Well ID	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
Shallow Overburden Wells									
MW-HP-1S	99.43	---	---	99.43	0.52	98.91	99.43	10.84	88.59
MW-HP-2S	100.71	---	---	100.71	---	---	100.71	11.68	89.03
MW-1	100.51	---	---	100.51	8.77	91.74	100.51	10.71	89.80
MW-4S	100.85	---	---	100.85	10.45	90.40	100.85	12.35	88.50
MW-5S	101.41	---	---	101.41	10.35	91.06	101.41	12.18	89.23
MW-6S	102.06	10.26	91.80	102.06	9.80	92.26	102.06	11.89	90.17
MW-HP-8S	101.12	---	---	101.12	---	---	101.12	---	---
MW-9S	100.10	9.23	90.87	100.10	8.79	91.31	100.10	10.58	89.52
MW-13/13R	97.70	12.07	85.63	97.70	11.54	86.16	97.70	13.75	83.95
GP-102S	98.31	---	---	98.31	11.54	86.77	98.31	14.84	83.47
GP-103/103R	94.23	4.67	89.56	94.23	12.48	81.75	94.23	6.31	87.92
GP-104/104R	94.09	4.14	89.95	94.09	4.48	89.61	94.09	5.90	88.19
GP-105	100.11	---	---	100.11	4.05	96.06	100.11	---	---
GP-120	101.65	---	---	101.65	11.42	90.23	101.65	---	---
GP-121	100.90	---	---	100.90	11.42	89.48	100.90	---	---
PTW-1	99.80	---	---	99.80	10.90	88.90	99.80	11.26	88.54
PTW-2	99.90	10.65	89.25	99.90	9.41	90.49	99.90	11.29	88.61
Deep Overburden Wells									
MW-HP-1D	99.54	---	---	99.54	9.30	90.24	99.54	10.96	88.58
MW-HP-2D	100.56	---	---	100.56	---	---	100.56	11.49	89.07
MW-3	100.22	---	---	100.22	8.72	91.50	100.22	10.56	89.66
MW-4D	100.85	---	---	100.85	10.55	90.30	100.85	12.34	88.51
MW-5D	101.56	---	---	101.56	9.93	91.63	101.56	12.39	89.17
MW-6D	102.10	---	---	102.10	10.16	91.94	102.10	12.00	90.10
MW-7D	97.90	---	---	97.90	10.60	87.30	97.90	12.34	85.56
MW-HP-8D	101.27	---	---	101.27	9.30	91.97	101.27	11.19	90.08
MW-9D	100.20	8.70	91.50	100.20	9.20	91.00	100.20	10.98	89.22
GP-102D	98.48	---	---	98.48	12.52	85.96	98.48	14.91	83.57
Additional Off-Site Well									
OS-MW-1	98.08	---	---	98.08	9.30	88.78	98.08	10.96	87.12
OS-MW-2	98.46	---	---	98.46	---	---	98.46	11.49	86.97
OS-MW-3PL	100.62	---	---	100.62	8.72	91.90	100.62	10.56	90.06

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Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

	11/11/2005			4/17/2006			7/25/2006		
Well ID	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[1] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
Shallow Overburden Wells									
MW-HP-1S	99.43	10.19	89.24	99.43	10.24	89.19	99.43	9.39	90.04
MW-HP-2S	100.71	11.06	89.65	100.71	11.13	89.58	100.71	10.48	90.23
MW-1	100.51	10.08	90.43	100.66	---	---	100.66	---	---
MW-4S	100.85	11.68	89.17	100.85	11.73	89.12	100.85	9.93	90.92
MW-5S	101.41	11.57	89.84	101.41	11.62	89.79	101.41	10.84	90.57
MW-6S	102.06	11.23	90.83	102.06	11.27	90.79	102.06	10.54	91.52
MW-HP-8S	101.12	---	---	101.12	---	---	101.12	---	---
MW-9S	100.10	10.04	90.06	100.10	10.06	90.04	100.10	9.15	90.95
MW-13/13R	97.70	12.98	84.72	97.70	13.32	84.38	97.70	12.50	85.20
GP-102S	98.31	14.11	84.20	98.31	14.43	83.88	98.31	13.47	84.84
GP-103/103R	94.23	5.82	88.41	94.23	5.67	88.56	94.23	4.89	89.34
GP-104/104R	94.09	5.21	88.88	94.09	5.23	88.86	94.09	4.36	89.73
GP-105	100.11	---	---	100.11	---	---	100.11	---	---
GP-120	101.65	12.66	88.99	101.65	12.69	88.96	101.65	---	---
GP-121	100.90	12.16	88.74	100.90	12.18	88.72	100.90	11.29	89.61
PTW-1	99.80	10.63	89.17	99.80	10.68	89.12	99.80	9.90	89.90
PTW-2	99.90	10.65	89.25	99.90	10.69	89.21	99.90	9.93	89.97
Deep Overburden Wells									
MW-HP-1D	99.54	10.32	89.22	99.54	10.32	89.22	99.54	9.71	89.83
MW-HP-2D	100.56	10.86	89.70	100.56	10.86	89.70	100.56	10.30	90.26
MW-3	100.22	9.95	90.27	100.22	9.95	90.27	100.22	---	---
MW-4D	100.85	11.61	89.24	100.85	11.61	89.24	100.85	10.91	89.94
MW-5D	101.56	11.77	89.79	101.56	11.77	89.79	101.56	11.03	90.53
MW-6D	102.10	11.32	90.78	102.10	11.32	90.78	102.10	10.70	91.40
MW-7D	97.90	11.57	86.33	97.90	11.57	86.33	97.90	10.99	86.91
MW-HP-8D	101.27	10.61	90.66	101.27	10.61	90.66	101.27	10.02	91.25
MW-9D	100.20	10.32	89.88	100.20	10.32	89.88	100.20	9.72	90.48
GP-102D	98.48	14.06	84.42	98.48	14.06	84.42	abandoned	---	---
Additional Off-Site Well									
OS-MW-1	98.08	15.48	82.60	98.08	16.02	82.06	98.08	15.19	82.89
OS-MW-2	98.46	12.26	86.20	98.46	12.47	85.99	98.46	11.65	86.81
OS-MW-3PL	100.62	10.56	90.06	100.62	10.62	90.00	100.62	10.01	90.61

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Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Well ID	10/23/2006 Measuring Point Elevation[1] (ft)	10/23/2006 Depth to Water (ft)	10/23/2006 Groundwater Elevation (ft)	1/29/2007 Measuring Point Elevation[1] (ft)	1/29/2007 Depth to Water (ft)	1/29/2007 Groundwater Elevation (ft)	4/23/2007 Measuring Point Elevation[1] (ft)	4/23/2007 Depth to Water (ft)	4/23/2007 Groundwater Elevation (ft)
Shallow Overburden Wells									
MW-HP-1S	99.43	10.72	88.71	abandoned	---	---	abandoned	---	---
MW-HP-2S	100.71	10.65	90.06	100.71	10.68	90.03	100.71	8.45	92.26
MW-1	100.66	10.78	89.88	100.66	NR	---	100.66		100.66
MW-4S	100.85	12.18	88.67	abandoned	---	---	abandoned		---
MW-5S	101.41	12.14	89.27	101.41	11.16	90.25	101.41		101.41
MW-6S	102.06	11.88	90.18	102.06	10.86	91.20	102.06	7.96	94.10
MW-HP-8S	101.12	---	---	101.12	NR	---	101.12		101.12
MW-9S	100.10	10.52	89.58	100.10	9.65	90.45	100.10	9.23	90.87
MW-13/13R	97.70	13.74	83.96	97.70	12.62	85.08	97.70		97.70
GP-102S	abandoned	---	---	abandoned	---	---	abandoned	---	---
GP-103/103R	94.23	6.08	88.15	94.23	no access	---	94.23	2.68	91.55
GP-104/104R	94.09	5.65	88.44	94.09	no access	---	94.09	2.20	91.89
GP-105	100.11	---	---	100.11	---	---	abandoned	---	---
GP-120	101.65	---	---	abandoned	---	---	abandoned	---	---
GP-121	100.90	---	---	abandoned	---	---	abandoned	---	---
PTW-1	99.80	11.15	88.65	99.80	10.08	89.72	99.80	7.79	92.01
PTW-2	99.90	11.20	88.70	99.90	no access	---	99.90	7.77	92.13
Deep Overburden Wells									
MW-HP-1D	99.54	10.82	88.72	99.54	9.82	89.72	99.54	7.51	92.03
MW-HP-2D	100.56	10.40	90.16	100.56	10.51	90.05	100.56	8.26	92.30
MW-3	100.22	---	---	abandoned	---	---	abandoned	---	---
MW-4D	100.85	12.15	88.70	abandoned	---	---	abandoned	---	---
MW-5D	101.56	12.35	89.21	abandoned	---	---	abandoned	---	---
MW-6D	102.10	11.95	90.15	102.10	10.96	91.14	102.10	8.21	93.89
MW-7D	97.90	12.25	85.65	97.90	---	---	97.90	9.23	88.67
MW-HP-8D	101.27	---	---	101.27	---	---	101.27		101.27
MW-9D	100.20	10.95	89.25	100.20	10.00	90.20	100.20	7.60	92.60
GP-102D	abandoned	---	---	abandoned	---	---	abandoned	---	---
Additional Off-Site Well									
OS-MW-1	98.08	16.35	81.73	98.08	15.14	82.94	98.08	11.63	86.45
OS-MW-2	98.46	12.97	85.49	98.46	11.89	86.57	98.46	8.80	89.66
OS-MW-3PL	100.62	11.14	89.48	100.62	10.26	90.36	100.62	7.99	92.63

Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

	7/24/2007			10/1/2007			1/17/2008		
Well ID	Measuring Point Elevation[2] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[3] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[3] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
Shallow Overburden Wells									
MW-HP-1S	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-HP-2S	100.71	11.95	88.76	100.70	13.10	87.60	100.70	12.14	88.56
MW-1	100.50	11.15	89.35	100.50		100.50	100.50	11.40	89.10
MW-4S	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-5S	101.41	NR	---	100.00	12.28	87.72	100.00	11.25	88.75
MW-6S	102.06	12.21	89.85	102.00	13.60	88.40	102.00	12.49	89.51
MW-HP-8S	101.12	NR	---	101.00		101.00	101.00	NR	---
MW-9S	100.10	10.90	89.20	100.20	12.11	88.09	100.20	11.23	88.97
MW-13/13R	damaged	---	---	97.50	14.81	82.69	97.50	13.85	83.65
GP-102S	abandoned	---	---	abandoned	---	---	abandoned	---	---
GP-103/103R	damaged	---	---	94.40	7.40	87.00	94.40	6.50	87.90
GP-104/104R	damaged	---	---	94.20	7.00	87.20	94.20	6.02	88.18
GP-105	abandoned	---	---	abandoned	---	---	abandoned	---	---
GP-120	abandoned	---	---	abandoned	---	---	abandoned	---	---
GP-121	abandoned	---	---	abandoned	---	---	abandoned	---	---
PTW-1	99.80	NR	---	100.00		100.00	100.00	11.59	88.41
PTW-2	99.90	11.45	88.45	99.90	12.82	87.08	99.90	11.59	88.31
Deep Overburden Wells									
MW-HP-1D	99.54	NR	---	99.50		99.50	99.50	11.34	88.16
MW-HP-2D	100.56	11.76	88.80	100.50	12.93	87.57	100.50	13.35	87.15
MW-3	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-4D	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-5D	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-6D	102.10	12.35	89.75	102.00	13.67	88.33	102.00	13.30	88.70
MW-7D	97.90	12.44	85.46	97.90		97.90	97.90	12.60	85.30
MW-HP-8D	101.27	11.61	89.66	101.10	12.92	88.18	101.10	11.84	89.26
MW-9D	100.20	11.29	88.91	100.20	12.51	87.69	100.20	11.48	88.72
GP-102D	abandoned	---	---	abandoned	---	---	abandoned	---	---
Additional Off-Site Well									
OS-MW-1	98.08	16.51	81.57	98.10	7.40	90.70	98.10	16.30	81.80
OS-MW-2	98.46	13.17	85.29	98.40	14.35	84.05	98.40	13.36	85.04
OS-MW-3PL	100.62	11.48	89.14	100.60	12.75	87.85	100.60	11.67	88.93

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Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

	4/14/2008			7/23/2008			10/20/2008		
Well ID	Measuring Point Elevation[3] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[3] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)	Measuring Point Elevation[3] (ft)	Depth to Water (ft)	Groundwater Elevation (ft)
Shallow Overburden Wells									
MW-HP-1S	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-HP-2S	100.70	10.65	90.05	100.70	11.52	89.18	100.70	12.46	88.24
MW-1	100.50	9.55	90.95	100.50	10.75	89.75	100.50	11.72	88.78
MW-4S	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-5S	100.00	9.65	90.35	100.00	9.80	90.20	100.00	11.62	88.38
MW-6S	102.00	10.50	91.50	102.00	11.80	90.20	102.00	12.83	89.17
MW-HP-8S	101.00	9.37	91.63	101.00	10.85	90.15	101.00	11.85	89.15
MW-9S	100.20	9.50	90.70	100.20	10.50	89.70	100.20	10.50	89.70
MW-13/13R	97.50	12.40	85.10	97.50	13.39	84.11	97.50	14.06	83.44
GP-102S	abandoned	---	---	abandoned	---	---	abandoned	---	---
GP-103/103R	94.40	3.91	90.49	94.40	6.00	88.40	94.40	6.81	87.59
GP-104/104R	94.20	4.68	89.52	94.20	5.51	88.69	94.20	6.35	87.85
GP-105	abandoned	---	---	abandoned	---	---	abandoned	---	---
GP-120	abandoned	---	---	abandoned	---	---	abandoned	---	---
GP-121	abandoned	---	---	abandoned	---	---	abandoned	---	---
PTW-1	100.00	10.15	89.85	100.00	11.05	88.95	100.00	NR	---
PTW-2	99.90	10.15	89.75	99.90	11.07	88.83	99.90	11.98	87.92
Deep Overburden Wells									
MW-HP-1D	99.50	9.90	89.60	99.50	10.10	89.40	99.50	11.51	87.99
MW-HP-2D	100.50	10.45	90.05	100.50	11.35	89.15	100.50	12.27	88.23
MW-3	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-4D	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-5D	abandoned	---	---	abandoned	---	---	abandoned	---	---
MW-6D	102.00	10.66	91.34	102.00	11.90	90.10	102.00	12.92	89.08
MW-7D	97.90	11.20	86.70	97.90	12.10	85.80	97.90	12.85	85.05
MW-HP-8D	101.10	9.95	91.15	101.10	11.20	89.90	101.10	12.16	88.94
MW-9D	100.20	9.85	90.35	100.20	10.90	89.30	100.20	11.83	88.37
GP-102D	abandoned	---	---	abandoned	---	---	abandoned	---	---
Additional Off-Site Well									
OS-MW-1	98.10	15.05	83.05	98.10	16.10	82.00	98.10	12.52	85.58
OS-MW-2	98.40	11.90	86.50	98.40	12.80	85.60	98.40	13.61	84.79
OS-MW-3PL	100.60	10.11	90.49	100.60	11.10	89.50	100.60	12.02	88.58

Table 2. Summary of Historical Water-Level Measurements from June 2003 to July 2008, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Footnotes

1	Elevation referenced to on-site benchmark based on a January 2006 survey. August 2001 survey used for well MW-1 until March 2006, when well was modified.
2	Elevation referenced to on-site benchmark based on a January 2006 survey. January 2008 survey used for MW-1 due to modification in September 2007.
3	Elevation referenced to on-site benchmark based on January and December 2008 surveys. Resurveyed due to significant well modifications and site redevelopment.
---	Groundwater elevation not available, well was either abandoned, damaged or not measured.

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID:	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S	MW-6S
Date Sampled:	01/06/2003	05/28/2003	09/09/2003	12/3/2003	03/22/2004	06/14/2004	09/08/2004	01/26/2005	04/19/2005	07/27/2005	11/09/2005	02/15/2006	04/17/2006
Chlorinated VOCs (ug/L)													
Trichloroethene	**106**	**161**	**76.4**	**123**	**104**	**36.8**	**72.9**	**70.4**	**109**	**32.8**	**63.4**	**44.6**	**24.3**
cis-1,2-Dichloroethene	1.02	1.83	0.473	1.74	1.19	ND	0.599	0.802	0.762	ND	0.672	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	0.79	1.19	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	**14.5**	**23.7**	**11.3**	**18.9**	**17.9**	**6.16**	**12**	**10.1**	**17.7**	3.41	**6.48**	4.39	3.31
Tetrachloroethene	**12.3**	**14.8**	**8.67**	**14.6**	**11.2**	3.2	**9.33**	**7.23**	**9.12**	3.61	**7.23**	**5.21**	3
1,1-Dichloroethane	1.04	1.96	0.804	1.58	1.26	ND	0.516	0.877	1.18	ND	0.445	ND	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters													
Dissolved Oxygen (mg/L)	7.38	6.05	7.42	3.12	4.43	5.19	4.74	6.52	9.27	6	7.5	8.98	7.2
ORP (mV)	206.5	226.6	66.4	---	98.3	460.5	91.5	241.7	534.5	534.9	213.5	168	250.3
pH (SU)	6.7	6.96	6.18	6.78	6.76	6.47	6.6	6.83	5.78	5.19	6.75	6.82	6.59
S. Conductivity (umhos/cm)	1010	1301	1060	1005	1346	1391	1235	1053	1420	1680	1397	1377	1630
Total Organic Carbon (ppm)	2.2	2.06	2.01	2.02	1.52	1.67	6.47	1.18	1.69	5.75	2.72	7.46	1.81
Dissolved Organic Carbon (ppm)	2.18	1.82	1.93	1.94	1.41	1.42	1.43	---	1.55	1.1	2.1	1.54	---
Biogeochemical Parameters													
Carbon Dioxide (mg/L)	27	39	---	72	---	52	---	43	42	---	43	34	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	0.68	0.53	---	62	---	0.98	---	10	24	---	3.5	13	---
Ethane (ng/L)	8	ND	---	63	---	44	---	88	38	---	140	200	---
Ethene (ng/L)	23	77	---	220	---	410	---	72	26	---	ND	69	---
Sulfide (mg/L)	0.03	0.007	---	0.06	---	0.02	---	0.02	0.02	---	0	0	---
Ferrous Iron (mg/L)	0.2	0.01	---	0.16	---	0.001	---	0	0.01	---	0.01	0	---
Dissolved Iron (ug/L)	ND	ND	---	ND	---	ND	---	111	ND	---	ND	ND	---
Total Iron (ug/L)	143	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	40.2	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	150	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	248	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	9.25	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	64.2	62.6	---	44.4	---	59	---	53.2	57.6	---	72.6	53.6	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

ARCADIS

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: / Date Sampled:	MW-6S 07/25/2006	MW-6S 10/25/2006	MW-6S 01/30/2007	MW-6S 04/24/2007	MW-6S 07/26/2007	MW-6S 10/02/2007	MW-6S 01/16/2008	MW-6S 04/17/2008	MW-6S 07/24/2008
Chlorinated VOCs (ug/L)									
Trichloroethene	**74.4**	**66.3**	**53.1**	**66.5**	**44.2**	**20.6**	**31**	**46.8**	**38.8**
cis-1,2-Dichloroethene	1.13	0.706	0.588	0.528	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	**13.9**	**17.3**	**11.4**	**15.9**	**16.1**	4.56	3.91	**8.56**	**7.62**
Tetrachloroethene	**8.53**	**7.26**	**6**	**8.44**	**6.84**	3.32	3.97	4.93	4.66
1,1-Dichloroethane	0.979	1.12	0.694	1.03	ND	ND	ND	ND	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters									
Dissolved Oxygen (mg/L)	7.08	4.81	5.77	5.13	8.78	3.2	6.33	8.31	7.35
ORP (mV)	701	222	153.7	-20.7	164.3	76.6	27.8	125.8	89
pH (SU)	---	6.63	6.38	6.62	6.3	6.58	6.88	6.61	6.64
S. Conductivity (umhos/cm)	1291	1351	1554	1837	906	1353	1050	1293	1520
Total Organic Carbon (ppm)	1.4	1.87	---	---	---	2.19	---	1.9	1.69
Dissolved Organic Carbon (ppm)	1.33	---	---	---	---	---	---	---	---
Biogeochemical Parameters									
Carbon Dioxide (mg/L)	52	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---
Methane (ug/L)	1.9	---	---	---	---	---	---	---	---
Ethane (ng/L)	25	---	---	---	---	---	---	---	---
Ethene (ng/L)	55	---	---	---	---	---	---	---	---
Sulfide (mg/L)	0.009	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	0.03	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	119	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	59.2	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

ARCADIS

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	MW-9S 01/08/2003	MW-9S 05/28/2003	MW-9S 07/15/2003	MW-9S 09/10/2003	MW-9S 11/04/2003	MW-9S 12/2/2003	MW-9S 3/22/2004	MW-9S 6/16/2004	MW-9S 9/8/2004	MW-9S 1/27/2005	MW-9S 4/19/2005	MW-9S 7/27/2005
Chlorinated VOCs (ug/L)												
Trichloroethene	**1760 D**	**1650 D**	---	**916**	---	**662 D**	**371 D**	**144**	**93.4**	**22.5**	**12.1**	**9.27**
cis-1,2-Dichloroethene	**2950 D**	**2840 D**	---	**1380**	---	**391 D**	**502 D**	**921**	**1490**	**149**	**84.4**	**170**
trans-1,2-Dichloroethene	**26.9**	**19.5**	---	**14.9**	---	**6.29**	**8.2**	3.35	ND	0.526	0.598	ND
Vinyl Chloride	**99.2**	**149**	---	**413**	---	**41.2**	**76.3**	**28.3**	**20.8**	**19.7**	**17.8**	**27**
1,1-Dichloroethene	**8.25**	**7.24**	---	ND	---	1.22	1.01	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	2.43	---	ND	---	1.19	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**24.5**	**14.8**	---	**20.9**	---	1.59	**10.5**	**5.16**	ND	1.66	0.829	0.774
1,1-Dichloroethane	ND	0.652	---	ND	---	ND	ND	ND	ND	0.994	2.20	0.811
1,2-Dichloroethane(EDC)	ND	ND	---	ND	---	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	---	ND	---	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	---	ND	---	ND	ND	ND	ND	ND	ND	ND
Field Parameters												
Dissolved Oxygen (mg/L)	2.31	0.6	0.51	0.76	0.65	0.19	0.42	0.2	0.85	---	---	1.08
ORP (mV)	123.5	214.1	-64.3	36.7	-80.2	-132.5	-123.7	-47.7	-98.5	-220.8	-110.1	-2.9
pH (SU)	5.73	6.52	6.45	6.38	6.4	6.53	6.55	6.52	6.38	6.38	8.21	5.73
S. Conductivity (umhos/cm)	822	1174	1161	1259	1305	1425	1695	1738	1616	1662	1807	1705
Total Organic Carbon (ppm)	9.51	8.48	5.94	13	20.3	26.4	12.8	10	7	8.16	4.89	12
Dissolved Organic Carbon (ppm)	9.24	7.65	---	10.9	---	24.5	8.96	9.61	6.66	---	4.84	7.85
Biogeochemical Parameters												
Carbon Dioxide (mg/L)	110	110	---	---	---	170	---	230	---	210	200	---
Nitrogen (mg/L)			---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	9.7	16	---	---	---	29	---	3900	---	960	7100	---
Ethane (ng/L)	1100	3500	---	---	---	6400	---	20000	---	2900	9700	---
Ethene (ng/L)	14000	12000	---	---	---	9200	---	1100	---	39000	16000	---
Sulfide (mg/L)	0.07	0.003	---	---	---	0.04	---	0.03	---	0.37	0.02	---
Ferrous Iron (mg/L)	0.07	0.01	---	---	---	2.95	---	>3.3	---	2.14	1.63	---
Dissolved Iron (ug/L)	ND	ND	---	---	---	16300	---	29200	---	7660	24300	---
Total Iron (ug/L)	ND	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	796	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	807	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	308	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	144	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	0.858	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	0.108	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	72.4	98	---	---	---	43.6	---	41	---	26.2	23	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

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Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID:	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S	MW-9S
Date Sampled:	11/9/2005	2/15/2006	4/19/2006	7/26/2006	10/26/2006	1/30/2007	04/24/2007	07/25/2007	10/02/2007	01/15/2008	04/17/2008	07/22/2008
Chlorinated VOCs (ug/L)												
Trichloroethene	**13.9**	4.33	3.26	0.668	ND	ND	ND	0.893	0.406	0.707	0.383	ND
cis-1,2-Dichloroethene	**52.1**	**8.64**	**5.04**	3.35	1.31	2.06	1.37	ND	ND	0.703	0.918	0.637
trans-1,2-Dichloroethene	ND	0.41	ND	0.418	0.474	0.596	ND	ND	ND	0.775	1.34	0.795
Vinyl Chloride	**8.56**	**2.27**	1.08	**2.76**	1.24	1.22	**2**	ND	ND	ND	1.33	0.979
1,1-Dichloroethene	ND	1.12	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	0.971	ND	ND	ND	ND	ND	ND	ND	ND	0.492	ND	ND
1,1-Dichloroethane	1.4	1.12	1.25	ND	ND	ND	ND	1.08	1.24	0.878	1.02	0.672
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters												
Dissolved Oxygen (mg/L)	0.32	0.14	3.68	---	0.42	---	0.19	1.53	3.86	0.47	0.67	0.29
ORP (mV)	-37.2	-93.5	-67.3	-85.7	-124.1	-90.9	-53.2	-74.9	-123.7	-135.6	-115.1	-79.7
pH (SU)	6.34	6.47	6.59	6.18	6.5	6.62	6.4	6.49	6.66	6.73	7.12	6.6
S. Conductivity (umhos/cm)	1739	1732	1714	1851	2000	1634	2172	835	1589	1689	1661	1744
Total Organic Carbon (ppm)	12.1	17.6	6.12	71.2	48.2	---	---	---	12.9	---	15.6	27.7
Dissolved Organic Carbon (ppm)	12	13.7	---	68.9	---	---	---	---	---	---	---	---
Biogeochemical Parameters												
Carbon Dioxide (mg/L)	210	270	---	340	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	3400	6000	---	11000	---	---	---	---	---	---	---	---
Ethane (ng/L)	18000	17000	---	7300	---	---	---	---	---	---	---	---
Ethene (ng/L)	4600	1700	---	370	---	---	---	---	---	---	---	---
Sulfide (mg/L)	0.007	0.011	---	0.055	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	>3.3	5.88	---	2.71	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	12700	25200	---	55600	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	26.9	21.2	---	ND	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

ARCADIS

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	MW-9D 1/8/2003	MW-9D 9/10/2003	MW-9D 11/04/2003	MW-9D 12/2/2003	MW-9D 3/22/2004	MW-9D 6/16/2004	MW-9D 9/8/2004	MW-9D 1/27/2005	MW-9D 4/19/2005	MW-9D 7/27/2005	MW-9D 11/9/2005	MW-9D 2/14/2006	MW-9D 4/19/2006
Chlorinated VOCs (ug/L)													
Trichloroethene	**545 D**	**44**	---	**90.3**	**13**	0.479	ND	1.33	1.94	ND	ND	ND	ND
cis-1,2-Dichloroethene	2.71	**105**	---	**174**	**40.6**	**13.1**	**9.15**	1.59	ND	0.902	2.16	ND	ND
trans-1,2-Dichloroethene	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	**2.26**	---	**8.02**	**10.9**	**23.4**	**24.4**	**3.72**	1.12	**3.63**	**6.94**	**5.92**	**5.55**
1,1-Dichloroethene	ND	ND	---	0.873	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**13.9**	1.61	---	1.59	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	---	0.45	ND	ND	ND	ND	ND	ND	ND	ND	0.564
1,2-Dichloroethane(EDC)	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters													
Dissolved Oxygen (mg/L)	2.1	0.39	0.21	0.07	0.4	0.64	0.69	0.14	0.54	0.17	---	0.14	0.26
ORP (mV)	230.5	-264.3	-113.7	-343.5	-268.6	-145	-182.1	-249.4	-142.5	-123.3	-161.9	-177.4	-130.4
pH (SU)	5.98	6.05	6.35	6.5	6.73	6.6	6.71	6.76	6.67	7.14	6.8	6.89	6.74
S. Conductivity (umhos/cm)	1195	2002	1832	1991	1998	1450	1767	1731	1866	1633	1620	1543	1684
Total Organic Carbon (ppm)	1.16	402	136	133	162	12.4	14.4	7.82	5.55	8.25	4.95	3.11	3.19
Dissolved Organic Carbon (ppm)	1.07	297	---	122	147	11.4	14.3	---	5.78	4.83	3.8	2.93	---
Biogeochemical Parameters													
Carbon Dioxide (mg/L)	62	---	---	280	---	80	---	110	140	---	56	64	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	0.36	---	---	8600	---	6800	---	30000	23000	---	7300	13000	---
Ethane (ng/L)	ND	---	---	59	---	320	---	2900	1900	---	3100	5700	---
Ethene (ng/L)	26	---	---	3200	---	3600	---	600	170	---	820	980	---
Sulfide (mg/L)	0.01	---	---	0.63	---	0.21	---	0.14	0.11	---	0.144	0.103	---
Ferrous Iron (mg/L)	0.02	---	---	2.39	---	1.85	---	>3.30	2.8	---	>3.3	3.29	---
Dissolved Iron (ug/L)	ND	---	---	33300	---	40100	---	110000	104000	---	66300	57500	---
Total Iron (ug/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	116	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	128	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	98	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	407	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	3.22	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	46	---	---	20.4	---	ND	---	ND	2.4	---	18.5	9.4	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: / Date Sampled:	MW-9D 7/26/2006	MW-9D 10/26/2006	MW-9D 1/30/2007	MW-9D 04/24/2007	MW-9D 07/25/2007	MW-9D 10/02/2007	MW-9D 01/15/2008	MW-9D 04/17/2008	MW-9D 07/22/2008
Chlorinated VOCs (ug/L)									
Trichloroethene	0.856	ND	ND	ND	ND	0.452	ND	ND	ND
cis-1,2-Dichloroethene	0.485	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	**7.14**	**10.2**	**5.6**	**5.4**	**2.32**	**2.6**	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	0.645	ND	ND	ND	ND	ND	0.699	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	0.626	ND	ND	ND	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters									
Dissolved Oxygen (mg/L)	0.23	0.27	0.41	0.42	0.32	0.13	0.52	0.25	---
ORP (mV)	-85.6	-144.7	-101.5	-86.5	-101.5	-118.6	-125.3	-104.7	-104.5
pH (SU)	6.25	6.69	6.58	6.78	6.62	6.67	6.74	6.55	6.67
S. Conductivity (umhos/cm)	1601	1610	1345	1478	989	1468	1370	1249	1622
Total Organic Carbon (ppm)	2.28	3.38	---	---	---	2.91	---	3.61	3.12
Dissolved Organic Carbon (ppm)	1.95	---	---	---	---	---	---	---	---
Biogeochemical Parameters									
Carbon Dioxide (mg/L)	48	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---
Methane (ug/L)	4600	---	---	---	---	---	---	---	---
Ethane (ng/L)	4300	---	---	---	---	---	---	---	---
Ethene (ng/L)	860	---	---	---	---	---	---	---	---
Sulfide (mg/L)	0.3	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	1.82	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	44400	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	59.2	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

ARCADIS

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: / Date Sampled:	PTW-2 01/08/2003	PTW-2 05/27/2003	PTW-2 09/10/2003	PTW-2 12/02/2003	PTW-2 3/23/2004	PTW-2 6/15/2004	PTW-2 9/7/2004	PTW-2 1/26/2005	PTW-2 4/18/2005	PTW-2 7/27/2005	PTW-2 11/9/2005	PTW-2 2/15/2006	PTW-2 4/18/2006
Chlorinated VOCs (ug/L)													
Trichloroethene	**243 D**	**98.6**	**111**	**9.53**	**19.5**	**22.7**	**6.05**	1.73	**11.1**	3.3	1.63	2.53	1.75
cis-1,2-Dichloroethene	**434 D**	**31.6**	**62.6**	**123**	**19.5**	**16**	**16.6**	4	**12.1**	**5.94**	**9.48**	2.26	1.41
trans-1,2-Dichloroethene	3.81	0.627	0.733	1.58	ND	ND	0.747	0.473	ND	ND	0.67	ND	ND
Vinyl Chloride	**86.8**	**3.54**	**10.7**	**15.6**	**2.96**	**2.53**	1.13	ND	**2.37**	1.48	**3.06**	ND	ND
1,1-Dichloroethene	0.760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	2.45	1.48	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**7.87**	**6.5**	**6.06**	0.967	1.03	1.16	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.787	1.21	1.48	0.8	0.906	0.679	0.701	ND	0.911	0.97	0.784	0.72	1.97
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters													
Dissolved Oxygen (mg/L)	0.62	0.65	0.7	0.11	0.55	1.44	0.17	0.13	0.32	0.26	0.15	0.09	0.23
ORP (mV)	-272.6	-95.2	-197.6	-312.5	-112.2	113.5	-114.5	-147.4	-43.2	-27.1	-66.2	-108.5	-134
pH (SU)	5.65	6.56	6.56	6.69	6.57	6.55	6.29	6.43	6.62	6.56	6.45	6.7	6.67
S. Conductivity (umhos/cm)	848	1347	1411	1498	1485	1494	1603	1455	1333	1224	1361	745	1417
Total Organic Carbon (ppm)	34.3	11.9	13.9	11.3	6.45	5.95	8.57	6.27	4.98	11.7	16.7	11.8	8.45
Dissolved Organic Carbon (ppm)	31.4	9.38	8	11.2	5.97	5.67	7.96	---	3.41	11.7	16.6	5.53	---
Biogeochemical Parameters													
Carbon Dioxide (mg/L)	180	140	---	270	---	180	---	270	160	---	190	64	---
Nitrogen (mg/L)			---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	16000	18000	---	13000	---	12000	---	12000	13000	---	9300	5300	---
Ethane (ng/L)	70	2200	---	6200	---	10000	---	5900	4700	---	6500	3400	---
Ethene (ng/L)	41000	13000	---	21000	---	1700	---	2500	1200	---	5100	770	---
Sulfide (mg/L)	0.11	0.084	---	0.02	---	0.06	---	0.01	0.02	---	0.098	0.015	---
Ferrous Iron (mg/L)	>3.30	3.21	---	3	---	2.07	---	3.13	2.69	---	>3.3	>6.6	---
Dissolved Iron (ug/L)	49900	45300	---	33900	---	30700	---	35100	16600	---	33500	20700	---
Total Iron (ug/L)	49900	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	5640	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	5750	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	323	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	112	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	0.539	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	0.16	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	48.4	37.6	---	14.5	---	20.4	---	3.7	25.6	---	3.8	9.2	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

ARCADIS

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	PTW-2 7/27/2006	PTW-2 10/25/2006	PTW-2 3/2/2007	PTW-2 04/24/2007	PTW-2 07/25/2007	PTW-2 10/02/2007	PTW-2 01/15/2008	PTW-2 04/18/2008	PTW-2 07/22/2008
Chlorinated VOCs (ug/L)									
Trichloroethene	2.37	1.02	ND	**8.17**	0.449	ND	ND	0.871	0.968
cis-1,2-Dichloroethene	1.54	1.73	ND	**5.96**	ND	ND	ND	1.1	2.32
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	0.646
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	0.406	ND	ND
1,1-Dichloroethane	2.76	0.691	0.882	1.33	ND	0.783	2.44	1.41	2.68
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters									
Dissolved Oxygen (mg/L)	0.45	0.35	0.22	0.37	---	4.73	1.49	0.61	0.24
ORP (mV)	-68.2	117.1	-155.8	-120.5	-102.8	-147.5	-116.3	-99.9	-83.9
pH (SU)	6.23	6.46	6.56	7.17	6.59	6.84	6.44	6.79	6.54
S. Conductivity (umhos/cm)	1551	1799	1744	2130	640	1607	1590	1378	1648
Total Organic Carbon (ppm)	10.6	29.5	---	---	---	16.6	---	4.22	4.34
Dissolved Organic Carbon (ppm)	8.07	---	---	---	---	---	---	---	---
Biogeochemical Parameters									
Carbon Dioxide (mg/L)	180	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---
Methane (ug/L)	7700	---	---	---	---	---	---	---	---
Ethane (ng/L)	5600	---	---	---	---	---	---	---	---
Ethene (ng/L)	200	---	---	---	---	---	---	---	---
Sulfide (mg/L)	0.038	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	>6.6	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	55800	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	28.4	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	GP-103-R 01/10/2003	GP-103-R 05/28/2003	GP-103-R 09/10/2003	GP-103-R 12/3/2003	GP-103-R 3/23/2004	GP-103-R 6/15/2004	GP-103-R 9/7/2004	GP-103-R 1/27/2005	GP-103-R 4/19/2005	GP-103-R 7/27/2005	GP-103-R 11/10/2005	GP-103-R 2/16/2006	GP-103-R 4/18/2006
Chlorinated VOCs (ug/L)													
Trichloroethene	**971 D**	**467 D**	**17**	**7.21**	4.71	3.03	4.73	2	1.76	1.86	2.46	0.94	1.14
cis-1,2-Dichloroethene	**111**	**173**	**40.2**	**5.83**	3.59	0.583	2.36	1.6	0.507	6.23	1.41	0.682	**17.7**
trans-1,2-Dichloroethene	0.622	0.866	ND	ND	ND	ND	ND	ND	ND	0.65	ND	ND	0.5
Vinyl Chloride	**2.79**	1.16	**17.1**	1.43	1.14	ND	ND	ND	ND	0.695	ND	1.24	**25.1**
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	1.35	1.86	4.41	2.99	1.92	4.03	2.02	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**14.1**	**5.64**	0.435	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	0.422	1.3	2.1	2.29	1.39	3.13	1.48	2.49	4.00	1.08	2.82	2.46	0.411
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters													
Dissolved Oxygen (mg/L)	0.21	0.21	0.53	0.88	0.44	1.12	0.71	0.11	0.3	0.28	0.12	0.1	0.19
ORP (mV)	-217	-44	-205.7	-251.1	-233	151.2	-143.2	-180.3	-99.6	-117.7	-117.7	-148.9	-118.3
pH (SU)	6.21	7.04	7.07	6.91	6.88	6.77	6.78	6.86	6.85	7.07	6.91	6.89	6.9
S. Conductivity (umhos/cm)	1026	1414	1480	1260	1198	1765	1383	1015	1414	1832	1634	1566	1460
Total Organic Carbon (ppm)	2.93	6.29	17.9	8.96	13	2.02	4.23	3.59	2.02	12	13.4	9.26	4.32
Dissolved Organic Carbon (ppm)	2.63	5.79	12.5	8.94	8.92	1.88	3.46	---	2.02	6.99	5.84	6.56	---
Biogeochemical Parameters													
Carbon Dioxide (mg/L)	40	60	---	79	---	67	---	60	58	---	65	68	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	200	2900	---	15000	---	3500	---	13000	6500	---	6900	5500	---
Ethane (ng/L)	220	100	---	68	---	15	---	640	140	---	8600	14000	---
Ethene (ng/L)	290	1200	---	4400	---	400	---	1100	180	---	2000	29000	---
Sulfide (mg/L)	0.02	0.007	---	0.04	---	0.03	---	0.02	0.05	---	0.001	0.007	---
Ferrous Iron (mg/L)	>3.30	0.22	---	2.4	---	3.1	---	2.35	>3.30	---	>3.3	2.69	---
Dissolved Iron (ug/L)	3390	190	---	17900	---	14200	---	11100	12000	---	18000	24300	---
Total Iron (ug/L)	3740	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	5570	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	5820	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	300	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	263	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	0.502	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	48.8	34.4	---	35.6	---	60.4	---	63	65	---	57.2	48	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	GP-103-R 7/26/2006	GP-103-R 10/26/2006	GP-103-R 3/2/2007	GP-103-R 04/24/2007	GP-103-R 07/25/2007	GP-103-R 10/03/2007	GP-103-R 01/16/2008	GP-103-R 04/16/2008	GP-103-R 07/23/2008
Chlorinated VOCs (ug/L)									
Trichloroethene	1.53	2	**6.51**	2.3	4.47	2.67	1.74	0.739	0.539
cis-1,2-Dichloroethene	0.509	ND	ND	ND	ND	ND	0.606	0.527	0.923
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	1.26
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	0.901	ND	0.981	4.94	ND	ND	ND	ND
Tetrachloroethene	ND	ND	0.629	ND	1.07	ND	0.505	ND	ND
1,1-Dichloroethane	**5.01**	**5.99**	ND	1.01	4.43	**6.7**	1.44	ND	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters									
Dissolved Oxygen (mg/L)	0.9	0.24	4.36	0.2	1.67	0.2	---	0.53	2.32
ORP (mV)	-65.3	-112.9	-12.3	-58.8	28.2	-98.6	-139	-106.2	-110.6
pH (SU)	6.68	6.78	6.68	6.85	6.66	6.81	6.28	6.44	6.79
S. Conductivity (umhos/cm)	1355	1113	932	1387	572	1475	1716	1515	1432
Total Organic Carbon (ppm)	6.56	4.29	---	---	---	28.4	---	2.63	3.8
Dissolved Organic Carbon (ppm)	3.01	---	---	---	---	---	---	---	---
Biogeochemical Parameters									
Carbon Dioxide (mg/L)	39	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---
Methane (ug/L)	810	---	---	---	---	---	---	---	---
Ethane (ng/L)	2900	---	---	---	---	---	---	---	---
Ethene (ng/L)	230	---	---	---	---	---	---	---	---
Sulfide (mg/L)	0.005	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	3.22	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	14700	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	80.8	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	GP-104-R 01/10/2003	GP-104-R 05/28/2003	GP-104-R 09/10/2003	GP-104-R 12/3/2003	GP-104-R 3/23/2004	GP-104-R 6/15/2004	GP-104-R 9/7/2004	GP-104-R 1/27/2005	GP-104-R 4/19/2005	GP-104-R 7/27/2005	GP-104-R 11/10/2005	GP-104-R 2/16/2006	GP-104-R 4/19/2006	GP-104-R 7/26/2006
Chlorinated VOCs (ug/L)														
Trichloroethene	**23.8**	**8.4**	**8.36**	**9.03**	4.78	4.09	**7.45**	3.12	1.27	1.98	0.738	0.912	0.772	1.48
cis-1,2-Dichloroethene	**39.2**	**42.2**	**27.2**	**35.9**	**17.2**	**6.03**	**16.9**	**7.02**	2.04	0.906	0.825	1.3	1.71	3.59
trans-1,2-Dichloroethene	ND	0.6	ND	0.496	ND	ND	0.814	0.476	ND	ND	0.828	1.29	0.478	1.26
Vinyl Chloride	0.859	1.84	1.33	1.66	ND	ND	ND	ND	ND	0.527	ND	ND	ND	0.5
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	3.35	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	1.65	0.569	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	2.41	2.8	1.33	1.74	2.59	3.36	1.11	3.2	1.56	1.6	1.8	1.77	1.57	1.39
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters														
Dissolved Oxygen (mg/L)	0.32	0.38	0.71	0.87	0.42	0.77	1.02	0.04	---	0.73	0.32	0.09	0.24	---
ORP (mV)	-69.2	-126	-316.6	-207.8	-131.4	-135.4	-165.4	-234.3	-155.6	-66.8	-143.5	-192.9	-137.8	-101.5
pH (SU)	6.67	7.1	6.66	6.82	6.91	6.52	6.65	6.82	7.32	6.26	6.62	7.04	6.94	6.7
S. Conductivity (umhos/cm)	905	1770	1744	1775	1651	1939	2255	1652	1321	1429	1879	1992	1211	1917
Total Organic Carbon (ppm)	5.09	7.41	12.2	9.14	6.18	9.23	16.3	7.23	5.92	9.89	12.8	10.3	8.44	6.84
Dissolved Organic Carbon (ppm)	3	6.64	8.55	8.86	4.84	8.94	12.7	---	5.44	5.43	11	8.98	---	6.17
Biogeochemical Parameters														
Carbon Dioxide (mg/L)	61	97	---	180	---	210	---	140	61	---	150	130	---	94
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	1800	17000	---	19000	---	18000	---	9700	14000	---	13000	2400	---	3900
Ethane (ng/L)	30	14	---	1900	---	950	---	1500	1400	---	2800	680	---	4200
Ethene (ng/L)	57	2200	---	1100	---	450	---	740	110	---	220	4200	---	150
Sulfide (mg/L)	0.05	0.012	---	0.09	---	0.08	---	0.05	0.02	---	0.006	0.009	---	0.007
Ferrous Iron (mg/L)	0.42	2.71	---	2.73	---	2.44	---	>3.30	1.32	---	>3.3	>6.6	---	>6.6
Dissolved Iron (ug/L)	160	16200	---	22200	---	67100	---	53800	31700	---	73100	37000	---	33700
Total Iron (ug/L)	259	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	10100	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	10200	---	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	315	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	153	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	60.8	30.4	---	29.8	---	32	---	52	51.5	---	141	147	---	56

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	GP-104-R 10/26/2006	GP-104-R 1/30/2007	GP-104-R 3/2/2007	GP-104-R 04/24/2007	GP-104-R 07/25/2007	GP-104-R 10/03/2007	GP-104-R 01/16/2008	GP-104-R 04/16/2008	GP-104-R 07/23/2008
Chlorinated VOCs (ug/L)									
Trichloroethene	2.53	**89.1**	**53.3**	**134**	**23.9**	**6.42**	2.29	0.669	ND
cis-1,2-Dichloroethene	3.9	**6.04**	3.52	3.74	1.35	2	1.12	1.68	0.849
trans-1,2-Dichloroethene	3.33	0.772	0.749	ND	ND	1.92	ND	ND	ND
Vinyl Chloride	0.992	ND	0.647	ND	ND	0.577	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	1.75	0.785	3.92	ND	ND	ND	ND	ND
Tetrachloroethene	ND	4.2	2.92	**7.57**	1.6	ND	0.597	ND	ND
1,1-Dichloroethane	1.55	1.9	1.04	0.44	1.41	1.52	0.572	1.22	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters									
Dissolved Oxygen (mg/L)	0.32	---	0.26	0.38	0.4	---	0.61	0.81	0.84
ORP (mV)	-130.0	-67.2	-47.2	41.2	-10.9	-90.8	-139.7	-151	-125.4
pH (SU)	6.70	7.07	6.98	7.08	6.98	7.6	6.99	6.67	7.01
S. Conductivity (umhos/cm)	1912	1649	1968	1799	1072	1471	1776	2132	1869
Total Organic Carbon (ppm)	7.88	---	---	---	---	5.83	---	17.3	7.49
Dissolved Organic Carbon (ppm)	---	---	---	---	---	---	---	---	---
Biogeochemical Parameters									
Carbon Dioxide (mg/L)	---	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---
Methane (ug/L)	---	---	---	---	---	---	---	---	---
Ethane (ng/L)	---	---	---	---	---	---	---	---	---
Ethene (ng/L)	---	---	---	---	---	---	---	---	---
Sulfide (mg/L)	---	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	---	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	---	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	---	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

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Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	MW-13 01/16/2003	MW-13 05/27/2003	MW-13 09/10/2003	MW-13 12/02/2003	MW-13 3/22/2004	MW-13 6/15/2004	MW-13 9/7/2004	MW-13 4/18/2005	MW-13 7/28/2005	MW-13 11/10/2005	MW-13 2/15/2006	MW-13 4/18/2006	MW-13 7/25/2006
Chlorinated VOCs (ug/L)													
Trichloroethene	**196**	**224 D**	**121**	**38.9**	**14.7**	**7.87**	**7.78**	4.78	2.56	2.75	1.68	1.59	2.11
cis-1,2-Dichloroethene	**75.7**	**44.3**	**23**	**10.5**	**5.09**	2.61	1.93	0.963	0.759	1.1	0.967	0.974	1.70
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	**3.12**	1.01	0.78	0.986	0.591	ND	ND	ND	ND	ND	ND	ND	0.949
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	4.51	3.25	2.19	1.94	1.85	1.27	1.15	0.771	ND	ND	ND	ND	ND
Tetrachloroethene	**5.44**	3.5	2.49	1	0.485	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	1.92	1.73	1.21	1.44	1.53	1.2	1.2	4.26	2.18	1.99	2.04	2.11	1.99
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters													
Dissolved Oxygen (mg/L)	0.92	0.59	0.68	0.9	0.45	2.08	1.45	0.27	0.22	0.21	0.14	0.22	0.99
ORP (mV)	200.8	160	64.2	27.6	137.7	407.7	130.9	42.7	-53.9	-64	-100.6	-50	184.5
pH (SU)	6.46	6.67	6.29	6.79	6.8	6.07	6.62	6.31	6.87	6.5	6.76	6.79	---
S. Conductivity (umhos/cm)	1162	1467	1496	1576	1467	1485	1467	1470	1450	1493	1308	1275	1195
Total Organic Carbon (ppm)	3.65	3.41	11.7	3.76	7.56	5.25	7.59	6.4	9.25	6.05	9.61	4.32	3.33
Dissolved Organic Carbon (ppm)	1.97	2.54	4.2	3.4	5.57	4.81	4.87	4.02	5.55	5.98	4.78	---	2.59
Biogeochemical Parameters													
Carbon Dioxide (mg/L)	85	110	---	130	---	120	---	95	---	92	81	---	61
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	110	270	---	1600	---	9600	---	6100	---	1000	710	---	270
Ethane (ng/L)	270	660	---	1100	---	1000	---	620	---	1000	1700	---	2100
Ethene (ng/L)	160	300	---	200	---	230	---	110	---	110	180	---	82
Sulfide (mg/L)	0.07	0.152	---	0.65	---	0.52	---	0.22	---	0.424	0.087	---	0.05
Ferrous Iron (mg/L)	0.21	0.07	---	1.65	---	0.08	---	1.67	---	6.14	3.15	---	2.74
Dissolved Iron (ug/L)	ND	ND	---	ND	---	ND	---	2480	---	7470	8450	---	ND
Total Iron (ug/L)	595	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	111	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	176	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	272	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	255	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	2.57	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	ND	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	43.4	41.2	---	33.4	---	24.4	---	40	---	45	54	---	74.4

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

ARCADIS

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID:	MW-13	MW-13	MW-13	MW-13R	MW-13R	MW-13R	MW-13R
Date Sampled:	10/25/2006	1/30/2007	04/23/2007	10/03/2007	01/15/2008	04/16/2008	07/24/2008
Chlorinated VOCs (ug/L)							
Trichloroethene	2.49	1.58	1.68	2.99	3.87	0.989	1.7
cis-1,2-Dichloroethene	1.20	0.42	ND	0.435	0.509	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.677	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	0.582	ND	ND
1,1-Dichloroethane	2.81	2.07	ND	1.08	2.37	1.23	0.796
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND
Field Parameters							
Dissolved Oxygen (mg/L)	0.28	---	0.38	0.13	1.22	0.45	0.68
ORP (mV)	-70.2	-71	-24.2	160.8	147.8	187	218.9
pH (SU)	6.64	6.89	6.69	6.57	6.65	6.26	6.42
S. Conductivity (umhos/cm)	1243	1048	1074	1707	1888	1955	2943
Total Organic Carbon (ppm)	4.11	---	---	2.51	---	1.99	1.64
Dissolved Organic Carbon (ppm)	---	---	---	---	---	---	---
Biogeochemical Parameters							
Carbon Dioxide (mg/L)	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---
Methane (ug/L)	---	---	---	---	---	---	---
Ethane (ng/L)	---	---	---	---	---	---	---
Ethene (ng/L)	---	---	---	---	---	---	---
Sulfide (mg/L)	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---
Sulfate (mg/L)	74.4	74.4	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID:	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S	MW-HP-2S
Date Sampled:	08/11/2004	04/26/2005	07/26/2005	11/08/2005	02/13/2006	04/17/2006	07/27/2006	10/23/2006	01/29/2007	04/23/2007	07/24/2007	10/01/2007	01/14/2008	04/15/2008	07/23/2008
Chlorinated VOCs (ug/L)															
Trichloroethene	4	1.9	**6.56**	**5.13**	1.51	1.51	1.16	3.05	1.35	1.2	1.66	2.3	4.52	2.42	2.24
cis-1,2-Dichloroethene	**5**	1.1	2.24	2.64	0.404	0.843	1.86	2.07	0.462	ND	0.437	1.95	3.39	0.903	1.5
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	0.511	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**24**	**20**	**7.21**	**7.32**	**24.3**	**15.9**	**8.14**	**18.1**	**18.9**	**17.7**	**11.2**	**8.28**	**22.6**	**30**	**16.8**
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters															
Dissolved Oxygen (mg/L)	---	---	0.49	0.14	0.14	0.38	---	0.27	0.57	0.27	0.41	0.14	0.56	0.23	2.47
ORP (mV)	---	---	330.8	86.5	155.1	369.5	530.7	-14.5	15.8	-67.5	10	207.3	160.4	262.4	144.6
pH (SU)	---	---	5.19	6.72	7.03	6.91	---	6.75	7.15	6.89	6.91	6.69	6.85	6.79	6.83
S. Conductivity (umhos/cm)	---	---	737	926	1430	1269	1367	1237	1109	1277	1109	1163	1264	1324	1438
Total Organic Carbon (ppm)	---	---	8.41	12	13.5	1.73	12	2.02	---	---	---	2.72	---	1.61	1.96
Dissolved Organic Carbon (ppm)	---	---	1.69	2.22	1.89		2.53	---	---	---	---	---	---	---	---
Biogeochemical Parameters															
Carbon Dioxide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethane (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethene (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

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Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	MW-HP-2D 08/11/2004	MW-HP-2D 04/26/2005	MW-HP-2D 07/26/2005	MW-HP-2D 11/08/2005	MW-HP-2D 02/13/2006	MW-HP-2D 04/17/2006	MW-HP-2D 07/27/2006	MW-HP-2D 10/23/2006	MW-HP-2D 01/29/2007	MW-HP-2D 04/23/2007	MW-HP-2D 07/24/2007	MW-HP-2D 10/01/2007	MW-HP-2D 01/14/2008	MW-HP-2D 04/15/2008	MW-HP-2D 07/23/2008
Chlorinated VOCs (ug/L)															
Trichloroethene	1	0.98	1.16	1.12	1.02	0.762	0.752	0.914	0.825	0.76	ND	0.907	1.04	1.41	1.06
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.923
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**23**	**19**	**30**	**22.8**	**26.3**	**16.3**	**10.3**	**19.1**	**14.1**	**13.1**	**8.94**	**14.3**	**16.9**	**21.1**	**19.5**
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters															
Dissolved Oxygen (mg/L)	---	---	3.94	1.75	3.3	3.45	---	2.7	3.02	1.24	0.13	5.07	4.1	3.7	2.69
ORP (mV)	---	---	470.6	220.8	155.3	383.8	735.9	579.2	134	138.5	247.1	30.5	117.8	162	340.7
pH (SU)	---	---	4.21	6.89	7.07	6.99	---	6.97	6.94	7	7.01	6.83	7.1	7.03	6.94
S. Conductivity (umhos/cm)	---	---	1295	1270	1328	1255	1286	1256	1119	1263	1045	1372	1270	1208	1344
Total Organic Carbon (ppm)	---	---	3.74	11	12.9	1.33	9.44	1.15	---	---	---	1.52	---	1.02	1.23
Dissolved Organic Carbon (ppm)	---	---	ND	1.45	ND	---	1.4	---	---	---	---	---	---	---	---
Biogeochemical Parameters															
Carbon Dioxide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethane (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethene (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

--- Not Analyzed

ND Not Detected

Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID:	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL	OS-MW-3PL
Date Sampled:	08/11/2004	04/26/2005	07/26/2005	11/08/2005	02/14/2006	04/17/2006	07/27/2006	10/24/2006	01/29/2007	04/23/2007	07/26/2007	10/02/2007	01/14/2008	04/15/2008	07/24/2008
Chlorinated VOCs (ug/L)															
Trichloroethene	ND	0.77	0.95	ND	ND	0.897	ND	ND	ND	ND	0.717	ND	0.408	0.479	ND
cis-1,2-Dichloroethene	ND	**6.9**	1.84	ND	0.738	1.00	0.700	1.61	2.16	**5.26**	1.84	1.16	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.719	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane(EDC)	ND	1.8	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters															
Dissolved Oxygen (mg/L)	---	---	0.27	1.69	0.15	0.31	3.07	0.29	0.39	2.45	1.8	4.79	4	2.11	0.76
ORP (mV)	---	---	316.4	79.6	204	301.6	506.7	341.2	156	-40.5	113.9	-32.1	153	190.2	-21.4
pH (SU)	---	---	5.61	6.51	6.85	6.86	---	6.82	6.73	6.8	6.75	7.06	6.83	6.64	6.85
S. Conductivity (umhos/cm)	---	---	744	638	1546	1637	1735	1563	1350	1306	1066	1380	1124	1315	1504
Total Organic Carbon (ppm)	---	---	11.2	15.8	29.6	7.11	8.16	6.2	---	---	---	6.92	---	7.69	8.03
Dissolved Organic Carbon (ppm)	---	---	2.35	1.84	8.28	---	5.61	---	---	---	---	---	---	---	---
Biogeochemical Parameters															
Carbon Dioxide (mg/L)	---	---								---	---	---	---	---	---
Nitrogen (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Methane (ug/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Ethane (ng/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Ethene (ng/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Sulfide (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Ferrous Iron (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Dissolved Iron (ug/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Total Iron (ug/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Chloride (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Nitrate (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Nitrite (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---
Sulfate (mg/L)	---	---	--	--	--	--	--	--	--	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	OS-MW-2 08/11/2004	OS-MW-2 04/26/2005	OS-MW-2 07/27/2005	OS-MW-2 11/09/2005	OS-MW-2 02/13/2006	OS-MW-2 04/18/2006	OS-MW-2 07/28/2006	OS-MW-2 10/24/2006	OS-MW-2 01/30/2007	OS-MW-2 04/23/2007	OS-MW-2 07/26/2007	OS-MW-2 10/03/2007	OS-MW-2 01/14/2008	OS-MW-2 04/16/2008	OS-MW-2 07/24/2008
Chlorinated VOCs (ug/L)															
Trichloroethene	**13**	**9.4**	**8.86**	**9.88**	3.67	3.17	**5.51**	**6.38**	2.71	2.13	4.65	2.64	3.43	3.24	**5.73**
cis-1,2-Dichloroethene	**10**	**6.8**	3.79	4.8	2.45	3.99	2.91	3.15	3.81	3.41	1.69	1.6	2.49	1.23	1.68
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**7**	3.9	**8.3**	**8.85**	**9.61**	**9.21**	**5.05**	4.22	3.69	3.03	**5.69**	**6.63**	4.41	**8.01**	**10.3**
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane(EDC)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters															
Dissolved Oxygen (mg/L)	---	---	1.1	1.17	1.05	1.36	0.13	0.72	0.83	0.59	2.27	0.16	1.12	3.85	1.79
ORP (mV)	---	---	107.5	126.2	123	268.9	653.8	294.6	180.3	-62.8	390	201	153.2	173.6	128.4
pH (SU)	---	---	5.79	6.88	6.94	6.95	---	6.77	6.83	6.84	5.61	6.89	6.9	6.77	6.85
S. Conductivity (umhos/cm)	---	---	1888	1903	1670	1595	1767	1737	1482	1686	790	1353	1574	1520	1573
Total Organic Carbon (ppm)	---	---	6.72	11	12.8	1.88	8.93	2.59	---	---	---	2.17	---	1.98	1.71
Dissolved Organic Carbon (ppm)	---	---	1.85	2.5	1.57	---	1.56	---	---	---	---	---	---	---	---
Biogeochemical Parameters															
Carbon Dioxide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethane (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethene (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

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Table 3. Summary of Historical Volatile Organic Compounds Detected in Groundwater, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

Sample ID: Date Sampled:	OS-MW-1 08/11/2004	OS-MW-1 04/26/2005	OS-MW-1 07/28/2005	OS-MW-1 11/10/2005	OS-MW-1 02/14/2006	OS-MW-1 04/18/2006	OS-MW-1 07/28/2006	OS-MW-1 10/23/2006	OS-MW-1 01/30/2007	OS-MW-1 04/23/2007	OS-MW-1 07/26/2007	OS-MW-1 10/03/2007	OS-MW-1 01/14/2008	OS-MW-1 04/15/2008	OS-MW-1 07/24/2008
Chlorinated VOCs (ug/L)															
Trichloroethene	3	4.8	2.41	2.59	2.51	2.51	2.01	1.22	1.52	3.39	2.68	1.15	0.528	1.33	1.94
cis-1,2-Dichloroethene	**6**	**5.9**	4.15	**6.27**	4.36	**5.75**	4.02	3.45	2.69	1.36	1.39	1.78	1.36	2.48	1.9
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	**2.6**	**2.41**	**3.32**	**2.61**	**3.47**	1.68	ND	1.38	1.87	ND	1.93	1.88
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	**8**	**7.8**	**6.41**	4.62	**7.37**	3.94	4.38	2.14	2.53	1.5	1.45	0.975	1.03	0.66	2.52
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.73	3.17	ND
1,2-Dichloroethane(EDC)	ND	0.42	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Field Parameters															
Dissolved Oxygen (mg/L)	---	---	0.68	0.37	0.12	0.29	0.35	0.26	0.27	0.52	0.93	---	0.12	0.46	1.19
ORP (mV)	---	---	-33.6	-71.7	-133.2	-90.7	-13.8	-127.9	-103.5	-44.7	-43.8	-109.6	-125.3	-88	-92.6
pH (SU)	---	---	6.29	6.78	6.95	6.77	5.33	6.90	7.10	6.55	6.36	7.55	6.7	6.87	6.79
S. Conductivity (umhos/cm)	---	---	1394	1378	1307	1436	1418	1407	1262	3381	828	1182	1470	1288	1510
Total Organic Carbon (ppm)	---	---	7.14	6.47	8.93	2.01	3.67	3.05	---	---	---	2.13	---	1.99	2.07
Dissolved Organic Carbon (ppm)	---	---	1.65	2.33	ND	---	1.42	---	---	---	---	---	---	---	---
Biogeochemical Parameters															
Carbon Dioxide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrogen (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Methane (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethane (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ethene (ng/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfide (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Ferrous Iron (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Iron (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Dissolved Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Total Manganese (ug/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Alkalinity (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Chloride (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Nitrite (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
Sulfate (mg/L)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

--- Not Analyzed
ND Not Detected
Bold concentration exceeded NYSDEC Groundwater Quality Standards

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-5	1/7/2003	1/16/2003	1/28/2003	2/10/2003	2/24/2003	3/12/2003	3/24/2003	4/8/2003	4/23/2003	5/8/2003	5/28/2003	6/4/2003	6/17/2003	6/30/2003	7/15/2003	7/28/2003	8/12/2003	8/26/2003	9/8/2003
Field Parameters																			
DO (mg/L)	7.86	--	--	--	0.72	--	--	--	0.16	--	0.21	--	--	--	0.46	--	0.42	--	0.23
REDOX (mV)	248.1	--	--	--	-421	--	-202.3	--	-403	--	-23.1	--	-137	--	-327	--	-311	--	-405
pH	6.74	--	--	--	5.06	--	5.3	--	5.56	--	5.45	--	4.78	--	4.84	--	4.64	--	3.74
Conductivity (mS/cm)	1.01	--	--	--	2.115	--	1.489	--	1.574	--	1.497	--	2.625	--	3.032	--	3.623	--	3.841
TOC (mg/L)	1.44	--	--	--	2150	--	940	--	396	--	319	--	2730	--	2270	--	5590	--	40300
DOC (mg/L)	1.41	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	NI	200	200	200	NI	175	NI	165	NI	320	NI	320	NI	160	NI	200	NI	160	NI

IW-5	10/7/2003	10/22/2003	11/3/2003	11/20/2003	12/1/2003	12/18/2003	12/29/2003	1/30/2004	2/12/2004	2/25/2004	3/9/2004	3/24/2004	4/6/2004	4/20/2004	5/17/2004	6/1/2004	6/14/2004	7/14/2004	7/26/2004
Field Parameters																			
DO (mg/L)	0.37	--	--	--	0.13	--	--	--	--	--	--	--	--	--	--	--	0.28	0.73	--
REDOX (mV)	-107.8	--	-9	--	-111.3	--	-66.1	-38.7	--	-60.9	--	20.3	--	-99.1	-85.4	--	6.8	-143.5	--
pH	5.00	--	4.06	--	4.25	--	3.96	5.19	--	4.28	--	4.04	--	3.89	4.6	--	3.87	4.21	--
Conductivity (mS/cm)	1.219	--	6.365	--	4.818	--	7.325	2.473	--	6.03	--	8.57	--	10.34	4.557	--	8.05	4.211	--
TOC (mg/L)	645	--	17200	--	9020	--	18200	1480	--	19100	--	25100	--	34300	5710	--	19900	6160	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	10%	NI	10%	NI	NI	10%	NI	10%	NI	20%	NI	NI	10%	NI	NI	10%
Total Volume (gallons)	NI	160	NI	160	NI	160	NI	NI	160	NI	160	NI	160	NI	NI	160	NI	NI	160

IW-5	8/11/2004	9/9/2004	9/21/2004	1/31/2005	2/16/2006	3/9/2006	4/17/2006	5/10/2006	6/20/2006	7/11/2006	8/22/2006	9/18/2006	10/23/2006	11/15/2006	12/27/2006	1/16/2007	3/27/2007	5/8/2007	5/30/2007
Field Parameters																			
DO (mg/L)	--	0.27	--	--	--	--	--	--	0.24	--	0.21	--	0.97	--	0.63	--	--	--	--
REDOX (mV)	-29.1	-58.8	--	--	-113.3	--	-32.7	--	-38.5	--	20.3	--	13.1	--	-97.2	--	--	-55.1	--
pH	3.41	4.11	--	--	6.49	--	5.00	--	5.69	--	4.69	--	4.53	--	4.6	--	--	4.73	--
Conductivity (mS/cm)	10	4.63	--	--	1.457	--	2.290	--	1.237	--	2.701	--	4.626	--	4.889	--	--	2.976	--
TOC (mg/L)	25400	9000	--	--	8.14	--	1860	--	10.3	--	1740	--	5260	--	7540	--	--	2680	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	NI	10%	10%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%	5%	NI	5%
Total Volume (gallons)	NI	NI	175	470	NI	900	NI	966	NI	750	NI	1054	NI	954	NI	1095	1290	NI	1005

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-5	7/11/2007	7/31/2007	9/5/2007	10/5/2007	11/7/2007	12/4/2007	1/16/2008	2/27/2008	4/1/2008	4/28/2008	6/4/2008	7/1/2008	8/7/2008	8/27/2008
Field Parameters														
DO (mg/L)	0.09	--	--	--	0.23	--	--	--	1.48	--	1.37	--	1.4	--
REDOX (mV)	-22	--	79.4	--	12.8	--	-65.4	--	-39.2	--	105.8	--	7.2	--
pH	3.87	--	4.32	--	4.26	--	4.21	--	4.59	--	4.55	--	4.45	--
Conductivity (mS/cm)	5.112	--	9.295	--	6.039	--	4.557	--	5.648	--	4.131	--	9.043	--
TOC (mg/L)	11600	--	19300	--	12300	--	7500	--	4890	--	6860	--	11900	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	NI	1055	NI	893	NI	1708	NI	897.86	NI	1090	NI	1507	NI	1248

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-6	1/7/2003	1/17/2003	1/29/2003	2/10/2003	2/24/2003	3/12/2003	3/24/2003	4/8/2003	5/8/2003	6/4/2003	6/17/2003	6/30/2003	7/28/2003	8/26/2003	9/8/2003	9/23/2003	10/7/2003	10/22/2003
Field Parameters																		
DO (mg/L)	6.02	--	--	--	0.53	--	1.4	--	--	--	0.49	--	--	--	0.55	--	0.38	--
REDOX (mV)	238.6	--	--	--	-93.2	--	23.4	--	--	--	-357.2	--	--	--	-106.5	--	-108.4	--
pH	7.3	--	--	--	5.96	--	5.47	--	--	--	5.48	--	--	--	4.00	--	4.69	--
Conductivity (mS/cm)	0.638	--	--	--	1.43	--	2.17	--	--	--	2.381	--	--	--	1.914	--	2.64	--
TOC (mg/L)	--	--	--	--	1330	--	2520	--	--	--	2980	--	--	--	1930	--	3730	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	10%	10%	NI	10%	10%	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	175	NI	165	160	160	NI	210	200	160	NI	160	NI	320

IW-6	11/20/2003	12/1/2003	12/18/2003	1/14/2004	2/12/2004	2/25/2004	3/9/2004	3/24/2004	4/6/2004	5/5/2004	6/1/2004	6/14/2004	6/30/2004	7/14/2004	7/26/2004	8/24/2004	9/9/2004	9/21/2004
Field Parameters																		
DO (mg/L)	--	0.78	--	--	--	0.31	--	0.87	--	--	--	0.77	--	0.29	--	--	0.43	--
REDOX (mV)	--	-6.3	--	--	--	-52.9	--	-437.9	--	--	--	-30	--	-264.1	--	--	-70.5	--
pH	--	5	--	--	--	4.81	--	4.67	--	--	--	4.29	--	4.4	--	--	4.02	--
Conductivity (mS/cm)	--	2.396	--	--	--	3.478	--	5.266	--	--	--	9.524	--	8.364	--	--	9.036	--
TOC (mg/L)	--	2570	--	--	--	4310	--	9680	--	--	--	24700	--	18800	--	--	18800	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	10%	10%	NI	10%	NI	20%	10%	10%	NI	10%	NI	10%	10%	NI	10%
Total Volume (gallons)	160	NI	320	320	320	NI	320	NI	320	330	320	NI	160	NI	195	160	NI	145

IW-6	1/31/2005	2/16/2006	3/9/2006	4/17/2006	5/10/2006	6/21/2006	7/11/2006	8/22/2006	9/19/2006	10/23/2006	11/15/2006	12/27/2006	1/16/2007	3/27/2007	5/8/2007	5/30/2007	7/11/2007	7/31/2007
Field Parameters																		
DO (mg/L)	--	--	--	1.49	--	0.17	--	0.32	--	1.1	--	0.49	--	--	--	--	0.52	--
REDOX (mV)	--	-111.4	--	-86.6	--	-77.5	--	3.7	--	0.3	--	-85	--	--	-77.1	--	-60.4	--
pH	--	6.33	--	4.96	--	6.18	--	4.88	--	4.69	--	4.63	--	--	5.07	--	4.38	--
Conductivity (mS/cm)	--	1.451	--	5	--	1.456	--	3.32	--	4.874	--	6.759	--	--	4.125	--	6.583	--
TOC (mg/L)	--	39.6	--	4670	--	97.8	--	2080	--	3740	--	10200	--	--	2700	--	12100	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%	5%	NI	5%	NI	5%
Total Volume (gallons)	475	NI	900	NI	926	NI	750	NI	889	NI	954	NI	1095	1290	NI	1000	NI	1077

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-6	9/5/2007	10/5/2007	11/7/2007	12/4/2007	1/17/2008	2/27/2008	4/1/2008	4/28/2008	6/4/2008	7/1/2008	8/7/2008	8/27/2008
Field Parameters												
DO (mg/L)	0.15	--	0.16	--	--	--	--	--	0.17	--	--	--
REDOX (mV)	-9.5	--	-2062	--	-36.6	--	-119.7	--	92.5	--	6.2	--
pH	3.83	--	4.36	--	4.56	--	5.1	--	4.75	--	4.09	--
Conductivity (mS/cm)	7.709	--	6.133	--	4.344	--	5.537	--	3.651	--	7.715	--
TOC (mg/L)	19900	--	10400	--	6320	--	3590	--	4150	--	22300	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	NI	899	NI	1743	NI	897.83	NI	1185	NI	1459	NI	1248

Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-HP-8S	1/7/2003	1/17/2003	1/29/2003	2/10/2003	2/24/2003	3/12/2003	3/24/2003	4/8/2003	4/23/2003	5/8/2003	5/28/2003	6/4/2003	6/17/2003	6/30/2003	7/15/2003	7/28/2003	8/12/2003	9/8/2003
Field Parameters																		
DO (mg/L)	7.84	--	--	--	0.81	--	0.86	--	0.37	--	0.5	--	0.65	--	0.43	--	0.38	0.33
REDOX (mV)	243.7	--	--	--	-69.1	--	-196	--	-189.7	--	32	--	-174.5	--	--	--	-47.3	-172
pH	6.99	--	--	--	5.6	--	5.85	--	4.58	--	4.86	--	4.5	--	4.65	--	4.06	4.28
Conductivity (mS/cm)	0.543	--	--	--	1.083	--	1.525	--	2.6	--	3.49	--	5.841	--	6.777	--	5.342	2.306
TOC (mg/L)	3.1	--	--	--	680	--	1390	--	5090	--	5600	--	18600	--	27200	--	14100	1560
DOC (mg/L)	2.98	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	NI
Total Volume (gallons)	NI	200	200	200	NI	175	NI	155	NI	160	NI	160	NI	85	NI	55	NI	NI

MW-HP-8S	12/1/2003	3/24/2004	6/2/2004	6/14/2004	6/30/2004	7/15/2004	8/11/2004	8/24/2004	9/9/2004	9/21/2004	2/1/2005	2/16/2006	3/10/2006	4/17/2006	5/10/2006	6/20/2006	7/12/2006	8/22/2006
Field Parameters																		
DO (mg/L)	0.83	0.45	--	0.13	--	0.28	0.33	--	0.22	--	--	--	--	1.19	--	0.27	--	0.27
REDOX (mV)	-37.6	-160.1	--	-38.2	--	-200	-106.9	--	-133.2	--	--	-116.7	--	-86.6	--	99.5	--	30.8
pH	6.26	6.67	--	5.15	--	4.38	5.21	--	4.42	--	--	6.49	--	5.66	--	4.48	--	4.64
Conductivity (mS/cm)	2.396	2.261	--	4.705	--	7.859	4.373	--	4.805	--	--	1.146	--	2.326	--	3.070	--	5.196
TOC (mg/L)	499	119	--	4500	--	17000	3310	--	9860	--	--	15.6	--	888	--	1960	--	4870
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	NI	10%	NI	10%	NI	NI	10%	NI	10%	10%	NI	10%	NI	5%	NI	5%	NI
Total Volume (gallons)	NI	NI	160	NI	160	NI	NI	172	NI	160	465	NI	250	NI	970	NI	515	NI

MW-HP-8S	9/19/2006	10/23/2006	11/15/2006	12/27/2006	1/16/2007	3/27/2007	5/8/2007	5/30/2007	7/11/2007	7/31/2007	9/5/2007	10/5/2007	11/7/2007	12/7/2007	1/17/2008	2/27/2008	4/1/2008	4/28/2008
Field Parameters																		
DO (mg/L)	--	0.57	--	0.51	--	--	--	--	0.6	--	--	--	0.17	--	--	--	0.08	--
REDOX (mV)	--	11.9	--	-59.7	--	--	-44.6	--	-58.2	--	25	--	-131.1	--	-176.8	--	-156.3	--
pH	--	4.63	--	4.76	--	--	5.22	--	4.48	--	4.47	--	4.43	--	6.41	--	5.98	--
Conductivity (mS/cm)	--	3.849	--	3.300	--	--	3.827	--	6.528	--	7.895	--	7.296	--	4.76	--	2.893	--
TOC (mg/L)	--	2650	--	6400	--	--	2000	--	8430	--	9620	--	11600	--	2290	--	636	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	5%	NI	5%	NI	5%	5%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	889	NI	952	NI	1095	1250	NI	1000	NI	1101	NI	897	NI	977	NI	900	NI	1251

-- Not Recorded

Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-HP-8S	6/4/2008	7/1/2008	8/7/2008	8/27/2008
Field Parameters				
DO (mg/L)	0.12	--	1.1	--
REDOX (mV)	-117	--	47.4	--
pH	5.72	--	--	--
Conductivity (mS/cm)	2.903	--	6.793	--
TOC (mg/L)	1050	--	7100	--
DOC (mg/L)	--	--	--	--
Molasses Concentration	NI	5%	NI	5%
Total Volume (gallons)	NI	1537	NI	1330

Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-1	2/17/2006	3/10/2006	4/17/2006	5/11/2006	6/20/2006	7/12/2006	8/22/2006	9/18/2006	10/23/2006	11/15/2006	12/27/2006	1/16/2007	3/27/2007	5/8/2007	5/30/2007	7/11/2007	7/31/2007	9/5/2007
Field Parameters																		
DO (mg/L)	1.7	--	1.43	--	0.25	--	0.29	--	1.65	--	0.68	--	--	--	--	0.74	--	0.31
REDOX (mV)	138.9	--	25.7	--	-89.0	--	-15.2	--	-4.9	--	-108.2	--	--	-33.6	--	-30.7	--	-10.6
pH	6.99	--	5.46	--	5.46	--	5.6	--	5.16	--	5.02	--	--	5.24	--	4.59	--	4.44
Conductivity (mS/cm)	0.727	--	1.88	--	2.190	--	2.676	--	2.739	--	4.616	--	--	3.674	--	4.903	--	7.27
TOC (mg/L)	2.86	--	1650	--	1170	--	860	--	1370	--	4180	--	--	2290	--	5870	--	15100
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%	5%	NI	5%	NI	5%	NI
Total Volume (gallons)	NI	750	NI	960	NI	920	NI	1054	NI	954	NI	1095	1315	NI	1210	NI	1095	NI

MW-1	10/5/2007	11/7/2007	12/4/2007	1/17/2008	2/27/2008	4/1/2008	4/28/2008	6/4/2008	7/1/2008	8/7/2008	8/27/2008
Field Parameters											
DO (mg/L)	--	0.1	--	--	--	0.27	--	0.13	--	1.69	--
REDOX (mV)	--	-36.8	--	-22.8	--	-31	--	-178.3	--	28.7	--
pH	--	4.32	--	4.17	--	4.18	--	4.25	--	4.59	--
Conductivity (mS/cm)	--	5.287	--	6.349	--	9.313	--	5454	--	2.983	--
TOC (mg/L)	--	9260	--	15800	--	1100	--	7440	--	2990	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	5%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	895	NI	680	NI	900	NI	1285	NI	1018	NI	1248

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-11	1/14/2003	1/17/2003	1/27/2003	2/11/2003	2/24/2003	3/13/2003	3/26/2003	4/8/2003	4/22/2003	5/8/2003	5/29/2003	6/4/2003	6/18/2003	6/30/2003	7/15/2003	7/28/2003	8/12/2003	8/26/2003	9/11/2003
Field Parameters																			
DO (mg/L)	7.75	--	--	--	0.63	--	1.7	--	0.58	--	0.52	--	0.84	--	0.84	--	0.45	--	0.39
REDOX (mV)	181.7	--	--	--	-138.9	--	46.7	--	-164.1	--	82.6	--	-51.4	--	-144.2	--	-456	--	-233
pH	6.9	--	--	--	4.72	--	4.22	--	4.55	--	4.59	--	4.05	--	4.21	--	4.32	--	3.61
Conductivity (mS/cm)	1.108	--	--	--	1.577	--	3.268	--	2.91	--	2.008	--	2.706	--	3.279	--	1.378	--	2.057
TOC (mg/L)	--	--	--	--	1670	--	4040	--	3210	--	812	--	3360	--	3840	--	2070	--	4050
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	NI	200	200	200	NI	165	NI	160	NI	160	NI	160	NI	160	NI	160	NI	160	NI

MW-11	9/23/2003	10/7/2003	10/22/2003	11/3/2003	11/20/2003	12/5/2003	12/16/2003	12/30/2003	1/21/2004	1/29/2004	2/11/2004	2/25/2004	3/9/2004	3/25/2004	4/6/2004	5/5/2004	6/1/2004	6/17/2004	6/30/2004
Field Parameters																			
DO (mg/L)	--	0.28	--	--	--	0.42	--	0.72	--	--	--	--	--	0.58	--	--	--	0.36	--
REDOX (mV)	--	-106.4	--	73.1	--	-152.7	--	-214.0	--	-49.1	--	-508.7	--	-136.2	--	--	--	16.6	--
pH	--	4.45	--	4.26	--	4.4	--	4.34	--	4.19	--	4.47	--	4.64	--	--	--	4.06	--
Conductivity (mS/cm)	--	1.670	--	2.668	--	2.163	--	2.747	--	3.576	--	2.144	--	2.818	--	--	--	5.866	--
TOC (mg/L)	--	1900	--	3710	--	2740	--	2580	--	6120	--	2340	--	2690	--	--	--	11800	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	10%	10%	NI	10%
Total Volume (gallons)	160	NI	420	NI	320	NI	320	NI	315	NI	320	NI	320	NI	320	310	320	NI	160

MW-11	7/15/2004	8/12/2004	8/24/2004	9/8/2004	2/1/2005	2/17/2006	3/8/2006	4/18/2006	5/8/2006	6/21/2006	7/11/2006	8/23/2006	9/18/2006	10/24/2006	11/15/2006	12/28/2006	1/17/2007
Field Parameters																	
DO (mg/L)	0.45	--	--	0.23	--	0.56	--	1.32	--	0.08	--	0.2	--	1.45	--	0.67	--
REDOX (mV)	-76.4	-26.5	--	-11.6	--	-103.4	--	-43	--	45.8	--	45.8	--	34.6	--	-19.7	--
pH	3.94	4.47	--	3.76	--	6.46	--	4.77	--	5.01	--	4.68	--	4.60	--	4.45	--
Conductivity (mS/cm)	6.931	2.035	--	4.417	--	1.647	--	2.838	--	2.199	--	2.393	--	2.721	--	3.734	--
TOC (mg/L)	17000	1300	--	11900	--	7.75	--	2050	--	970	--	1510	--	2060	--	4580	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	NI	10%	NI	10%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	NI	NI	150	NI	455	NI	900	NI	969	NI	1098	NI	954	NI	857	NI	1100

-- Not Recorded

Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-10	1/14/2003	1/21/2003	1/28/2003	2/11/2003	2/25/2003	3/13/2003	3/26/2003	4/8/2003	4/11/2003	4/22/2003	5/8/2003	5/29/2003	6/4/2003	6/18/2003	6/30/2003	7/28/2003	8/26/2003	9/11/2003
Field Parameters																		
DO (mg/L)	2	--	--	--	0.5	--	1.62	--	--	0.49	--	0.45	--	0.58	--	--	--	0.37
REDOX (mV)	16.7	--	--	--	-27.1	--	-83	--	--	-186.7	--	-56.4	--	-83	--	--	--	-473
pH	4.96	--	--	--	4.38	--	5.02	--	--	4.04	--	5.15	--	5.87	--	--	--	4.11
Conductivity (mS/cm)	0.761	--	--	--	3.03	--	3.235	--	--	10.692	--	2.377	--	1.995	--	--	--	4.071
TOC (mg/L)	2.5	--	--	--	4500	--	3160	--	--	43600	--	1340	--	2020	--	--	--	9770
DOC (mg/L)	2.42	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	10%	NI	NI	NI	10%	NI	10%	10%	10%	NI
Total Volume (gallons)	NI	200	200	200	NI	175	NI	160	50	NI	NI	NI	160	NI	160	160	160	NI

MW-10	10/22/2003	11/3/2003	11/20/2003	12/5/2003	12/17/2003	12/30/2003	1/29/2004	2/11/2004	2/26/2004	3/9/2004	3/25/2004	4/6/2004	4/21/2004	5/18/2004	6/1/2004	6/17/2004	6/30/2004	7/15/2004
Field Parameters																		
DO (mg/L)	--	0.59	--	0.54	--	0.54	--	--	0.27	--	0.58	--	0.19	0.38	--	0.44	--	0.28
REDOX (mV)	--	43.4	--	-82.5	--	-67.1	-15.7	--	39	--	-15.2	--	-96.6	-45.2	--	2.4	--	-78.7
pH	--	4.31	--	4.31	--	4.44	4.5	--	4.76	--	4.24	--	3.96	5.57	--	4.55	--	4.49
Conductivity (mS/cm)	--	7.804	--	6.752	--	7.42	6.108	--	6.534	--	8.61	--	10.386	3.96	--	4.659	--	6.146
TOC (mg/L)	--	30500	--	34400	--	20200	12300	--	17600	--	32300	--	37400	4980	--	4790	--	9480
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	NI	10%	NI	NI	10%	NI	10%	NI	10%	NI	NI	10%	NI	10%	NI
Total Volume (gallons)	160	NI	160	NI	160	NI	NI	160	NI	160	NI	160	NI	NI	160	NI	160	NI

MW-10	7/26/2004	8/24/2004	9/8/2004	9/21/2004	2/1/2005	2/17/2006	3/8/2006	4/18/2006	5/9/2006	6/21/2006	7/11/2006	8/23/2006	9/18/2006	10/24/2006	11/16/2006	12/28/2006	1/17/2007
Field Parameters																	
DO (mg/L)	--	--	0.2	--	--	0.97	--	1.15	--	0.49	--	0.25	--	1.10	--	0.54	--
REDOX (mV)	--	--	-106.5	--	--	-138.7	--	-53.4	--	24.9	--	-38.7	--	3.0	--	-64	--
pH	--	--	5.12	--	--	6.72	--	4.16	--	5.54	--	5.84	--	4.94	--	4.82	--
Conductivity (mS/cm)	--	--	3.087	--	--	2.331	--	8.417	--	2.749	--	2.851	--	3.053	--	5.071	--
TOC (mg/L)	--	--	2820	--	--	103	--	13500	--	1350	--	861	--	2750	--	5810	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	10%	NI	10%	10%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	135	160	NI	160	460	NI	855	NI	961	NI	1020	NI	930	NI	957	NI	1100

-- Not Recorded

Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-12	1/15/2003	1/17/2003	1/28/2003	2/11/2003	2/25/2003	3/13/2003	3/26/2003	4/8/2003	4/23/2003	5/8/2003	5/29/2003	6/4/2003	6/18/2003	6/30/2003	7/28/2003	8/26/2003	9/11/2003	10/7/2003
Field Parameters																		
DO (mg/L)	0.32	--	--	--	2.44	--	2.11	--	0.29	--	0.32	--	0.79	--	--	--	0.4	0.3
REDOX (mV)	53.2	--	--	--	-63.2	--	-237.1	--	-297.4	--	-86.5	--	-384	--	--	--	-209	-55
pH	4.88	--	--	--	5.1	--	5.72	--	5.19	--	5.24	--	5.12	--	--	--	3.83	4.59
Conductivity (mS/cm)	0.892	--	--	--	1.74	--	2.033	--	2.085	--	2.159	--	4.635	--	--	--	5.770	3.026
TOC (mg/L)	--	--	--	--	1520	--	923	--	930	--	837	--	5570	--	--	--	16300	2460
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	10%	10%	NI	NI
Total Volume (gallons)	NI	200	200	200	NI	165	NI	160	NI	160	NI	160	NI	160	160	160	NI	NI

MW-12	10/22/2003	11/3/2003	12/5/2003	12/17/2003	12/30/2003	1/29/2004	2/11/2004	2/26/2004	3/25/2004	4/6/2004	4/21/2004	5/18/2004	6/17/2004	6/30/2004	7/15/2004	8/12/2004	9/8/2004	9/21/2004
Field Parameters																		
DO (mg/L)	--	--	0.44	--	0.60	--	--	0.31	--	--	0.15	0.6	0.38	--	0.18	--	0.77	--
REDOX (mV)	--	60.3	-111.6	--	-101.2	-5.4	--	-94.7	-164.9	--	-114.1	-129.2	4.4	--	-101.4	-89.8	-6.3	--
pH	--	3.93	4.74	--	3.90	4.69	--	3.98	4.34	--	3.78	3.83	5.2	--	3.74	3.87	4.25	--
Conductivity (mS/cm)	--	8.397	3.459	--	9.482	4.482	--	6.65	4.225	--	10.302	6.576	4.16	--	10.043	9.404	7.894	--
TOC (mg/L)	--	28200	3170	--	27200	4760	--	20000	6840	--	36700	11700	3420	--	34000	24300	12800	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	NI	10%	NI	NI	10%	NI	NI	10%	NI	NI	NI	10%	NI	NI	NI	10%
Total Volume (gallons)	160	NI	NI	160	NI	NI	160	NI	NI	160	NI	NI	NI	160	NI	NI	NI	160

MW-12	2/1/2005	2/17/2006	3/9/2006	4/18/2006	5/8/2006	6/21/2006	7/11/2006	8/23/2006	9/18/2006	10/24/2006	11/16/2006	12/28/2006	1/17/2007
Field Parameters													
DO (mg/L)	--	0.16	--	--	--	0.23	--	0.18	--	0.95	--	0.89	--
REDOX (mV)	--	-35.7	--	-72.4	--	74.7	--	28.8	--	32.3	--	-57.6	--
pH	--	4.9	--	3.96	--	4.19	--	4.56	--	4.27	--	4.5	--
Conductivity (mS/cm)	--	5.039	--	11.592	--	7.965	--	7.582	--	5.083	--	5.736	--
TOC (mg/L)	--	4340	--	37000	--	15200	--	15100	--	9080	--	9900	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	470	NI	900	NI	968	NI	1112	NI	954	NI	855	NI	1100

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-2	1/7/2003	1/17/2003	1/28/2003	2/10/2003	2/26/2003	3/13/2003	3/25/2003	4/11/2003	5/8/2003	6/4/2003	6/18/2003	6/30/2003	7/15/2003	7/28/2003	8/12/2003	8/26/2003	9/11/2003	9/23/2003
Field Parameters																		
DO (mg/L)	0.91	--	--	--	0.49	--	0.3	--	--	--	0.51	--	0.85	--	0.31	--	0.42	--
REDOX (mV)	154.3	--	--	--	-260	--	37.6	--	--	--	-151	--	-227	--	-109.4	--	-234	--
pH	7.18	--	--	--	6.58	--	5.84	--	--	--	6.77	--	4.72	--	5.59	--	4.00	--
Conductivity (mS/cm)	647	--	--	--	657	--	1630	--	--	--	668	--	6095	--	482	--	2091	--
TOC (mg/L)	9.91	--	--	--	192	--	1150	--	--	--	98.1	--	8690	--	222	--	2060	--
DOC (mg/L)	9.61	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	167	NI	200	145	160	NI	320	NI	160	NI	160	NI	160

MW-2	10/7/2003	10/22/2003	11/21/2003	12/4/2003	12/17/2003	12/29/2003	1/21/2004	1/29/2004	2/11/2004	3/9/2004	3/24/2004	4/6/2004	5/5/2004	6/1/2004	6/17/2004	6/30/2004	7/26/2004	8/25/2004
Field Parameters																		
DO (mg/L)	0.61	--	--	0.43	--	0.78	--	0.48	--	--	0.65	--	--	--	0.36	--	--	--
REDOX (mV)	-132.7	--	--	-137.7	--	-157.8	--	-149.7	--	--	-439.4	--	--	--	16.2	--	--	--
pH	4.94	--	--	5.61	--	5.81	--	5.17	--	--	5.16	--	--	--	5.27	--	--	--
Conductivity (mS/cm)	1193	--	--	3020	--	1860	--	4402	--	--	2.657	--	--	--	2.726	--	--	--
TOC (mg/L)	673	--	--	1910	--	967	--	4760	--	--	2250	--	--	--	1780	--	--	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	NI	10%	NI	10%	NI	10%	10%	NI	10%	10%	10%	NI	10%	10%	20%
Total Volume (gallons)	NI	320	320	NI	320	NI	320	NI	320	320	NI	320	320	320	NI	320	320	320

MW-2	9/9/2004	9/22/2004	2/2/2005	2/17/2006	3/7/2006	4/18/2006	5/9/2006	6/21/2006	7/11/2006	8/23/2006	9/18/2006	10/24/2006	11/15/2006	12/27/2006	1/16/2007
Field Parameters															
DO (mg/L)	0.92	--	--	0.25	--	1.21	--	0.25	--	0.18	--	0.69	--	0.4	--
REDOX (mV)	-231.8	--	--	100.8	--	-12.1	--	63.0	--	-81	--	-142.5	--	-136.5	--
pH	6.01	--	--	6.88	--	4.86	--	4.85	--	6.13	--	6.22	--	5.53	--
Conductivity (mS/cm)	1.189	--	--	0.287	--	4.542	--	3.709	--	2.602	--	1.504	--	1.808	--
TOC (mg/L)	529	--	--	4.76	--	5030	--	2880	--	901	--	341	--	1080	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	20%	10%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	NI	320	460	NI	903	NI	965	NI	1020	NI	930	NI	952	NI	1010

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-8	1/8/2003	1/20/2003	1/29/2003	2/11/2003	2/24/2003	3/13/2003	3/26/2003	4/10/2003	4/22/2003	5/8/2003	5/29/2003	6/5/2003	6/18/2003	7/1/2003	7/15/2003	7/28/2003	8/12/2003	8/26/2003	9/11/2003
Field Parameters																			
DO (mg/L)	6.2	--	--	--	0.58	--	1.57	--	0.24	--	0.5	--	0.6	--	0.45	--	0.47	--	0.63
REDOX (mV)	80.8	--	--	--	-112.1	--	-180	--	-453.4	--	-93.8	--	-354	--	-285.8	--	-496	--	-75.5
pH	5.52	--	--	--	4.52	--	4.64	--	4.33	--	5.37	--	4.65	--	4.52	--	4.74	--	4.08
Conductivity (mS/cm)	1.046	--	--	--	1.871	--	1.72	--	1.905	--	1.824	--	2.065	--	1.881	--	1.856	--	1.652
TOC (mg/L)	0	--	--	--	1660	--	801	--	866	--	521	--	1600	--	1060	--	157	--	1690
DOC (mg/L)	0	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	NI	200	200	200	NI	160	NI	160	NI	160	NI	160	NI	160	NI	160	NI	160	NI

IW-8	9/24/2003	10/7/2003	10/22/2003	11/4/2003	11/21/2003	12/5/2003	12/18/2003	12/30/2003	1/22/2004	1/29/2004	2/12/2004	2/26/2004	3/9/2004	3/25/2004	4/6/2004	4/21/2004	5/18/2004	6/2/2004	6/17/2004
Field Parameters																			
DO (mg/L)	--	0.42	--	0.71	--	0.24	--	0.82	--	--	--	0.65	--	0.75	--	0.21	0.47	--	0.36
REDOX (mV)	--	-65.3	--	19.1	--	-123.7	--	-62.3	--	-60.9	--	-1.8	--	-196.9	--	-36.1	-157.4	--	49.5
pH	--	3.94	--	3.89	--	3.86	--	3.93	--	3.77	--	4.05	--	4.08	--	3.82	4.61	--	3.77
Conductivity (mS/cm)	--	3.481	--	3.298	--	2.879	--	3.989	--	2.992	--	3.292	--	2.785	--	4.595	1.941	--	2.856
TOC (mg/L)	--	6190	--	5230	--	4340	--	7510	--	4680	--	4230	--	3030	--	7550	1100	--	3490
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	NI	10%	NI
Total Volume (gallons)	160	NI	160	NI	160	NI	160	NI	160	NI	160	NI	160	NI	160	NI	NI	160	NI

IW-8	7/15/2004	7/26/2004	8/12/2004	9/8/2004	9/22/2004	2/4/2005	2/16/2006	3/6/2006	4/18/2006	5/11/2006	6/21/2006	7/12/2006	8/23/2006	9/19/2006	10/24/2006	11/16/2006	12/28/2006	1/17/2007
Field Parameters																		
DO (mg/L)	0.23	--	--	0.16	--	--	--	--	1.57	--	0.17	--	0.13	--	0.17	--	0.56	--
REDOX (mV)	-151.1	--	-70.9	-148.6	--	--	-134.4	--	-57.3	--	-11.1	--	1.4	--	-57.4	--	-112.5	--
pH	4.49	--	3.74	4.610	--	--	6.05	--	4.39	--	4.98	--	5.35	--	4.72	--	5.3	--
Conductivity (mS/cm)	2.345	--	5.107	2.29	--	--	1.542	--	2.26	--	1.870	--	1.617	--	1.505	--	1.486	--
TOC (mg/L)	1250	--	8420	1900	--	--	19.9	--	861	--	581	--	87.7	--	435	--	190	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	NI	10%	12.5%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	NI	160	NI	NI	160	475	NI	933	NI	969	NI	825	NI	895	NI	957	NI	1084

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-9	1/8/2003	1/20/2003	1/29/2003	2/12/2003	2/24/2003	3/13/2003	3/26/2003	4/10/2003	4/22/2003	5/8/2003	5/29/2003	6/5/2003	6/18/2003	7/1/2003	7/15/2003	7/28/2003	8/12/2003	8/26/2003	9/11/2003
Field Parameters																			
DO (mg/L)	4.9	--	--	--	0.95	--	1.4	--	0.3	--	0.47	--	0.57	--	0.43	--	0.38	--	0.72
REDOX (mV)	231.8	--	--	--	-34.7	--	-120	--	-258.1	--	-174.7	--	-239.9	--	-507.4	--	-125	--	-194.9
pH	6.72	--	--	--	5.98	--	6.22	--	6.41	--	6.53	--	5.96	--	5.92	--	6.21	--	5.86
Conductivity (mS/cm)	0.616	--	--	--	0.871	--	0.975	--	1.115	--	1.308	--	1.282	--	1.467	--	1.396	--	1.035
TOC (mg/L)	--	--	--	--	55	--	22.2	--	39.1	--	28.8	--	259	--	352	--	321	--	728
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	NI	200	200	200	NI	160	NI	160	NI	320	NI	320	NI	310	NI	320	NI	320	NI

IW-9	9/24/2003	10/7/2003	10/21/2003	11/4/2003	11/21/2003	12/5/2003	12/18/2003	12/30/2003	1/22/2004	1/29/2004	2/11/2004	2/26/2004	3/9/2004	3/25/2004	4/7/2004	4/21/2004	5/6/2004	5/18/2004	6/2/2004
Field Parameters																			
DO (mg/L)	--	0.41	--	--	--	0.13	--	0.11	--	--	--	--	--	0.88	--	0.21	--	0.52	--
REDOX (mV)	--	-206.3	--	-57.1	--	-261.8	--	-138.1	--	22.9	--	-6.3	--	16	--	-78.3	--	-108.2	--
pH	--	5.67	--	5.3	--	4.86	--	4.54	--	4.2	--	4.32	--	4.14	--	3.84	--	3.95	--
Conductivity (mS/cm)	--	1.924	--	1.917	--	2.29	--	2.986	--	4.183	--	2.708	--	4.344	--	8.699	--	4.914	--
TOC (mg/L)	--	846	--	1520	--	2490	--	4050	--	8060	--	3150	--	6910	--	18100	--	9260	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	10%	NI	10%
Total Volume (gallons)	320	NI	320	NI	320	NI	320	NI	310	NI	310	NI	320	NI	320	NI	210	NI	160

IW-9	6/17/2004	6/30/2004	7/15/2004	8/12/2004	8/24/2004	9/8/2004	2/4/2005	2/16/2006	3/6/2006	4/18/2006	5/12/2006	6/21/2006	7/12/2006	8/23/2006	9/19/2006	10/24/2006	11/16/2006	12/28/2006
Field Parameters																		
DO (mg/L)	0.48	--	0.29	--	--	0.19	--	1.54	--	1.55	--	0.19	--	0.26	--	0.78	--	0.49
REDOX (mV)	-23.2	--	-75.8	-54.4	--	-76.3	--	-194	--	-119.9	--	-65.6	--	-88.3	--	-80.0	--	-118.2
pH	3.91	--	3.69	4.380	--	3.84	--	6.67	--	5.93	--	5.88	--	6.33	--	5.19	--	5.58
Conductivity (mS/cm)	5.515	--	7.106	6	--	5.322	--	2.860	--	1.550	--	2.018	--	1.645	--	1.858	--	1.691
TOC (mg/L)	10200	--	12300	7610	--	15400	--	181	--	308	--	570	--	112	--	780	--	432
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	NI	10%	NI	10%	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI
Total Volume (gallons)	NI	160	NI	NI	160	NI	475	NI	888	NI	965	NI	825	NI	900	NI	957	NI

IW-9 damaged, not accessible during the 1/16-1/17 injection event

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-10	1/8/2003	1/20/2003	1/30/2003	2/12/2003	2/24/2003	3/13/2003	3/26/2003	4/10/2003	4/22/2003	5/8/2003	5/29/2003	6/5/2003	6/17/2003	7/1/2003	7/28/2003	8/26/2003	9/11/2003	10/22/2003
Field Parameters																		
DO (mg/L)	1.37	--	--	--	0.7	--	1.45	--	0.22	--	0.5	--	0.66	--	--	--	0.84	--
REDOX (mV)	231.6	--	--	--	-154.3	--	-74	--	-477.4	--	-143.4	--	-253.6	--	--	--	-195.9	--
pH	6.72	--	--	--	5.17	--	5.82	--	5.66	--	5.9	--	5.43	--	--	--	4.95	--
Conductivity (mS/cm)	0.971	--	--	--	3.486	--	1.81	--	2.221	--	3.715	--	5.542	--	--	--	8.131	--
TOC (mg/L)	3.2	--	--	--	3660	--	615	--	852	--	1700	--	5670	--	--	--	12700	--
DOC (mg/L)	3.1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration		10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	10%	10%	NI	10%
Total Volume (gallons)		200	200	200	NI	145	NI	155	NI	320	NI	320	NI	160	160	160	NI	160

IW-10	11/21/2003	12/5/2003	12/18/2003	12/30/2003	1/22/2004	2/12/2004	3/9/2004	3/25/2004	4/6/2004	5/6/2004	6/2/2004	6/17/2004	6/30/2004	7/26/2004	8/24/2004	9/8/2004	9/22/2004	2/4/2005
Field Parameters																		
DO (mg/L)	--	0.11	--	0.21	--	--	--	0.85	--	--	--	0.36	--	--	--	0.77	--	--
REDOX (mV)	--	-252.5	--	-146.7	--	--	--	-129	--	--	--	-64.2	--	--	--	-117.1	--	--
pH	--	4.37	--	4.70	--	--	--	4.35	--	--	--	4.41	--	--	--	4.35	--	--
Conductivity (mS/cm)	--	8.444	--	11.454	--	--	--	10.951	--	--	--	10.404	--	--	--	9.459	--	--
TOC (mg/L)	--	17200	--	16800	--	--	--	21100	--	--	--	20100	--	--	--	18900	--	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	NI	10%	10%	10%	NI	10%	10%	10%	NI	10%	10%	10%	NI	10%	10%
Total Volume (gallons)	160	NI	160	NI	155	160	160	NI	160	160	160	NI	160	160	160	NI	160	475

IW-10	2/16/2006	3/7/2006	4/18/2006	5/12/2006	6/21/2006	7/12/2006	8/23/2006	9/19/2006	10/24/2006	11/16/2006	12/28/2006
Field Parameters											
DO (mg/L)	1.36	--	1.22	--	0.16	--	0.23	--	0.18	--	0.58
REDOX (mV)	-154.7	--	-30.9	--	-24.7	--	-115.4	--	-105.4	--	-186.3
pH	6.7	--	5.59	--	5.22	--	6.43	--	5.18	--	5.77
Conductivity (mS/cm)	3.170	--	14.273	--	7.410	--	5.595	--	7.783	--	6.270
TOC (mg/L)	215	--	17500	--	7800	--	1320	--	4920	--	2700
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI
Total Volume (gallons)	NI	930	NI	968	NI	840	NI	750	NI	957	NI

IW-10 damaged, not accessible during the 1/16-1/17 injection event

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-11	1/15/2003	1/27/2003	1/30/2003	2/12/2003	2/26/2003	3/13/2003	3/25/2003	4/10/2003	4/23/2003	5/9/2003	5/28/2003	6/6/2003	6/18/2003	6/30/2003	7/16/2003	7/29/2003	8/13/2003	8/26/2003
Field Parameters																		
DO (mg/L)	0.33	--	--	--	0.65	0.55	--	--	0.17	--	0.37	--	0.6	--	0.67	--	0.3	--
REDOX (mV)	-42	--	--	--	-530.1	-468.5	-239	--	-490.1	--	-180	--	-473	--	-313.3	--	-411	--
pH	5.82	--	--	--	5.56	6.29	6.71	--	5.93	--	5.4	--	5.75	--	4.83	--	5.22	--
Conductivity (mS/cm)	1.223	--	--	--	3.23	1.234	1.9	--	1.763	--	2.175	--	4.610	--	1.416	--	5.081	--
TOC (mg/L)	--	--	--	--	4480	--	494	--	469	--	638	--	3360	--	1640	--	2210	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	167	NI	163	NI	315	NI	315	NI	320	NI	320	NI	315

IW-11	9/11/2003	9/23/2003	10/7/2003	10/22/2003	11/3/2003	11/20/2003	12/4/2003	12/17/2003	12/29/2003	1/29/2004	2/12/2004	2/25/2004	3/9/2004	3/23/2004	4/6/2004	4/20/2004	5/6/2004	5/18/2004
Field Parameters																		
DO (mg/L)	0.83	--	0.63	--	--	--	0.26	--	0.66	0.48	--	--	--	0.87	--	0.07	--	0.75
REDOX (mV)	-157.6	--	-146	--	26.8	--	-177.9	--	-92.8	-15.2	--	-68.2	--	-55.9	--	-108.6	--	-141.9
pH	4.23	--	4.48	--	4.1	--	4.42	--	4.3	4.97	--	4.36	--	4.28	--	4.20	--	4.17
Conductivity (mS/cm)	5.867	--	6.933	--	7.348	--	6.337	--	6.716	5.210	--	6.789	--	6.994	--	7.907	--	7.318
TOC (mg/L)	11500	--	13100	--	12700	--	9450	--	15600	4070	--	13200	--	13200	--	4030	--	13700
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	10%	NI	10%	NI	10%	NI	NI	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	NI	160	NI	160	NI	160	NI	160	NI	NI	160	NI	160	NI	160	NI	175	NI

IW-11	6/2/2004	6/17/2004	7/15/2004	7/26/2004	8/11/2004	9/9/2004	9/22/2004	2/3/2005	5/11/2006	6/20/2006	7/12/2006	8/22/2006	9/18/2006	10/23/2006	11/16/2006	12/27/2006	1/17/2007
Field Parameters																	
DO (mg/L)	--	0.51	0.18	--	--	0.15	--	--	--	0.17	--	1.03	--	0.69	--	0.4	--
REDOX (mV)	--	-5.7	-258	--	-40.8	-83.5	--	--	--	-24.7	--	-58.6	--	-118.6	--	-137.3	--
pH	--	3.63	5.18	--	3.77	4.680	--	--	--	4.90	--	6.07	--	6.20	--	5.13	--
Conductivity (mS/cm)	--	7.614	5.804	--	7.247	5.677	--	--	--	4.623	--	2.958	--	1.831	--	4.857	--
TOC (mg/L)	--	12400	4660	--	13400	7060	--	--	--	3710	--	579	--	356	--	4250	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	NI	10%	NI	NI	10%	10%	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	160	NI	NI	160	NI	NI	160	470	948	NI	840	NI	875	NI	957	NI	1030

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

GP-106R	1/9/2003	1/20/2003	1/30/2003	2/12/2003	2/26/2003	3/13/2003	3/25/2003	4/10/2003	4/23/2003	5/9/2003	5/28/2003	6/6/2003	6/18/2003	7/1/2003	7/15/2003	7/29/2003	8/13/2003	8/27/2003
Field Parameters																		
DO (mg/L)	5.78	--	--	--	0.45	--	0.8	--	0.1	--	0.33	--	0.6	--	0.58	--	0.38	--
REDOX (mV)	168.6	--	--	--	-42.2	--	-60	--	-476.6	--	-175	--	-302.2	--	-304.2	--	-122.2	--
pH	6.5	--	--	--	5.86	--	5.67	--	5.7	--	6.36	--	5.79	--	5.48	--	5.05	--
Conductivity (mS/cm)	0.731	--	--	--	1.124	--	1.22	--	1.301	--	1.68	--	1.903	--	2.687	--	2.739	--
TOC (mg/L)	1.8	--	--	--	210	--	163	--	260	--	262	--	618	--	1290	--	1750	--
DOC (mg/L)	1.67	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	140	NI	163	NI	160	NI	320	NI	310	NI	320	NI	315

GP-106R	9/9/2003	9/23/2003	10/8/2003	10/22/2003	11/20/2003	12/1/2003	12/17/2003	1/22/2004	2/12/2004	3/10/2004	3/26/2004	4/6/2004	5/6/2004	6/2/2004	6/16/2004	6/30/2004	7/14/2004	7/26/2004
Field Parameters																		
DO (mg/L)	0.39	--	0.24	--	--	0.11	--	--	--	--	0.72	--	--	--	0.24	--	0.2	--
REDOX (mV)	-93	--	-87.9	--	--	-130.6	--	--	--	--	-108.3	--	--	--	-15.2	--	-106.2	--
pH	4.08	--	4.75	--	--	5.41	--	--	--	--	4.80	--	--	--	3.82	--	4.06	--
Conductivity (mS/cm)	2.385	--	2.215	--	--	2.555	--	--	--	--	3.676	--	--	--	6.406	--	5.347	--
TOC (mg/L)	1450	--	1380	--	--	1400	--	--	--	--	3900	--	--	--	10800	--	4580	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	10%	10%	NI	10%	10%	10%	10%	NI	10%	10%	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	160	NI	320	320	NI	160	160	320	320	NI	320	315	320	NI	160	NI	165

GP-106R	8/11/2004	8/24/2004	9/10/2004	9/21/2004	2/4/2005	10/4/2007	11/8/2007	12/10/2007	1/17/2008	2/28/2008
Field Parameters										
DO (mg/L)	0.61	--	0.37	--	--	--	0.75	--	--	--
REDOX (mV)	-75.7	--	-61.7	--	--	--	-154.6	--	-258.5	--
pH	4.01	--	4.15	--	--	--	5.41	--	5.23	--
Conductivity (mS/cm)	5.589	--	4.931	--	--	--	3.31	--	2.305	--
TOC (mg/L)	8520	--	6550	--	--	--	2030	--	1330	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	10%	5%	5%	NI	5%	NI	5%
Total Volume (gallons)	NI	160	NI	160	235	851	NI	838.31	NI	1055

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-1	1/9/2003	1/20/2003	1/31/2003	2/13/2003	2/25/2003	3/14/2003	3/24/2003	4/10/2003	4/23/2003	5/9/2003	5/28/2003	6/4/2003	6/17/2003	6/30/2003	7/28/2003	8/26/2003	9/8/2003	9/23/2003
Field Parameters																		
DO (mg/L)	1.59	--	--	--	0.55	--	0.95	--	0.42	--	0.33	--	0.62	--	--	--	0.41	--
REDOX (mV)	36.9	--	--	--	-398	--	-245.7	--	-487.9	--	-30.7	--	-214	--	--	--	-112.5	--
pH	6.49	--	--	--	5.07	--	5.72	--	5.88	--	5.3	--	5.15	--	--	--	3.9	--
Conductivity (mS/cm)	1.006	--	--	--	1.886	--	2.035	--	1.894	--	2.432	--	1.803	--	--	--	3.591	--
TOC (mg/L)	--	--	--	--	1130	--	992	--	687	--	1340	--	1280	--	--	--	4930	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	10%	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	160	NI	155	NI	160	NI	320	NI	315	320	320	NI	160

IW-1	10/8/2003	10/22/2003	11/3/2003	11/20/2003	12/4/2003	12/18/2003	1/21/2004	1/30/2004	2/12/2004	2/25/2004	3/9/2004	3/26/2004	4/6/2004	5/6/2004	6/2/2004	6/16/2004	7/14/2004	7/26/2004
Field Parameters																		
DO (mg/L)	0.26	--	--	--	0.84	--	--	0.63	--	--	--	0.69	--	--	--	0.2	0.2	--
REDOX (mV)	-48	--	48.9	--	-157.6	--	--	18	--	-60.9	--	9.1	--	--	--	31.8	-257.7	--
pH	4.78	--	4.04	--	4.33	--	--	4.34	--	4.75	--	4.46	--	--	--	2.79	4.93	--
Conductivity (mS/cm)	2.643	--	5.009	--	5.007	--	--	3.189	--	0.768	--	3.797	--	--	--	5.676	1.703	--
TOC (mg/L)	2300	--	14600	--	7280	--	--	5950	--	807	--	4710	--	--	--	9620	1300	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	10%	NI	10%	10%	NI	10%	NI	10%	NI	10%	10%	10%	NI	NI	10%
Total Volume (gallons)	NI	320	NI	160	NI	160	160	NI	160	NI	160	NI	160	165	160	NI	NI	160

IW-1	8/11/2004	8/24/2004	9/10/2004	9/22/2004	2/3/2005	10/4/2007	11/7/2007	12/10/2007	1/18/2008	2/28/2008
Field Parameters										
DO (mg/L)	1.47	--	0.29	--	--	--	0.17	--	--	--
REDOX (mV)	26	--	-9.8	--	--	--	-250.7	--	-119.7	--
pH	4.34	--	4.43	--	--	--	6.04	--	5.87	--
Conductivity (mS/cm)	2.774	--	1.817	--	--	--	1.516	--	1.284	--
TOC (mg/L)	2840	--	2240	--	--	--	170	--	203	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	10%	10%	5%	NI	5%	NI	5%
Total Volume (gallons)	NI	160	NI	160	470	848	NI	714	NI	1010

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-2	1/9/2003	1/23/2003	1/31/2003	2/13/2003	2/25/2003	3/13/2003	3/24/2003	4/10/2003	5/8/2003	6/4/2003	6/17/2003	6/30/2003	7/28/2003	8/26/2003	9/9/2003	9/23/2003	10/8/2003	10/21/2003
Field Parameters																		
DO (mg/L)	0.33	--	--	--	0.65	--	0.7	--	--	--	0.66	--	--	--	0.44	--	0.35	--
REDOX (mV)	-210	--	--	--	-134.6	--	-335	--	--	--	-305.8	--	--	--	-115	--	-203.5	--
pH	5.94	--	--	--	4.87	--	6.76	--	--	--	5.4	--	--	--	3.4	--	5.77	--
Conductivity (mS/cm)	1.618	--	--	--	2.864	--	3.78	--	--	--	3.436	--	--	--	4.16	--	7.362	--
TOC (mg/L)	37.5	--	--	--	4260	--	2850	--	--	--	2530	--	--	--	5530	--	5830	--
DOC (mg/L)	8.28	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	10%	10%	NI	10%	10%	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	160	NI	155	160	155	NI	160	160	160	NI	160	NI	420

IW-2	11/20/2003	12/4/2003	12/17/2003	1/21/2004	2/12/2004	3/9/2004	3/26/2004	4/7/2004	5/6/2004	6/2/2004	6/16/2004	6/30/2004	7/26/2004	8/24/2004	9/10/2004	9/22/2004	2/2/2005	5/7/2007
Field Parameters																		
DO (mg/L)	--	0.74	--	--	--	--	0.71	--	--	--	0.18	--	--	--	--	--	--	--
REDOX (mV)	--	-15.1	--	--	--	--	-138.1	--	--	--	-59.9	--	--	--	-140.5	--	--	-132.4
pH	--	4.67	--	--	--	--	5.57	--	--	--	4.43	--	--	--	4.56	--	--	7.27
Conductivity (mS/cm)	--	8.519	--	--	--	--	12.04	--	--	--	14.606	--	--	--	14.01	--	--	4.117
TOC (mg/L)	--	10300	--	--	--	--	13500	--	--	--	8120	--	--	--	21700	--	--	52.8
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	10%	10%	10%	NI	10%	10%	10%	NI	10%	10%	10%	NI	10%	10%	NI
Total Volume (gallons)	160	NI	160	160	160	160	NI	160	160	160	NI	160	160	160	NI	160	475	NI

IW-2	5/30/2007	7/12/2007	8/1/2007	9/6/2007	10/4/2007	11/7/2007	12/10/2007	1/18/2008	2/28/2008
Field Parameters									
DO (mg/L)	--	0.09	--	0.52	--	0.14	--	--	--
REDOX (mV)	--	-172	--	-221.1	--	-220	--	-192	--
pH	--	5.59	--	6	--	5.87	--	6.7	--
Conductivity (mS/cm)	--	2.561	--	4.831	--	7.405	--	9.744	--
TOC (mg/L)	--	1030	--	1890	--	5810	--	2700	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--
Molasses Concentration	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	962	NI	950	NI	849	NI	622	NI	762

-- Not Recorded

Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-3	1/9/2003	1/23/2003	1/31/2003	2/13/2003	2/25/2003	3/13/2003	3/24/2003	4/10/2003	5/8/2003	6/4/2003	6/18/2003	7/1/2003	7/28/2003	8/27/2003	9/9/2003	10/21/2003	11/3/2003	11/21/2003
Field Parameters																		
DO (mg/L)	0.73	--	--	--	0.51	--	0.73	--	--	--	0.88	--	--	--	0.43	--	0.86	--
REDOX (mV)	-208.2	--	--	--	-138.5	--	-162.6	--	--	--	-269.8	--	--	--	-148	--	-63.1	--
pH	6.88	--	--	--	5.34	--	5.84	--	--	--	6.00	--	--	--	4.31	--	6.13	--
Conductivity (mS/cm)	1.556	--	--	--	8.676	--	7.83	--	--	--	8.691	--	--	--	9.482	--	12.764	--
TOC (mg/L)	--	--	--	--	13700	--	7180	--	--	--	6360	--	--	--	18200	--	7400	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--		--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	10%	10%	NI	10%	10%	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	160	NI	155	160	160	NI	160	160	160	NI	160	NI	160

IW-3	12/4/2003	12/17/2003	1/21/2004	2/12/2004	3/10/2004	3/26/2004	4/7/2004	5/6/2004	6/2/2004	6/16/2004	6/30/2004	7/26/2004	8/25/2004	9/10/2004	9/22/2004	2/2/2005	5/8/2007	5/30/2007
Field Parameters																		
DO (mg/L)	0.11	--	--	--	--	0.42	--	--	--	0.2	--	--	--	0.39	--	--	--	--
REDOX (mV)	-352.9	--	--	--	--	-243	--	--	--	-183.4	--	--	--	-191	--	--	-194.6	--
pH	6.8	--	--	--	--	6.80	--	--	--	5.20	--	--	--	3.75	--	--	7.24	--
Conductivity (mS/cm)	11.428	--	--	--	--	13.343	--	--	--	12.264	--	--	--	8.583	--	--	5.800	--
TOC (mg/L)	4780	--	--	--	--	3560	--	--	--	1980	--	--	--	37000	--	--	106	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	10%	NI	10%	10%	10%	NI	10%	10%	20%	NI	10%	10%	NI	5%
Total Volume (gallons)	NI	160	160	160	160	NI	160	160	320	NI	320	320	335	NI	160	475	NI	473

IW-3	7/12/2007	8/1/2007	9/6/2007	10/5/2007	11/7/2007	12/10/2007	1/18/2008	2/27/2008	2/28/2008
Field Parameters									
DO (mg/L)	0.33	--	0.14	--	0.09	--	--	--	--
REDOX (mV)	-165.9	--	-204.7	--	-196.2	--	-168.9	--	--
pH	6.7	--	6.78	--	5.7	--	6.87	--	--
Conductivity (mS/cm)	7.803	--	8.256	--	8.142	--	8.709	--	--
TOC (mg/L)	3040	--	595	--	6410	--	2100	--	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	5%	NI	5%	NI	5%	NI	5%	5%
Total Volume (gallons)	NI	996	NI	816	NI	642	NI	763	250

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-4	1/9/2003	1/24/2003	1/31/2003	2/13/2003	2/25/2003	3/13/2003	3/24/2003	4/10/2003	4/23/2003	5/8/2003	6/5/2003	6/19/2003	7/1/2003	7/16/2003	7/28/2003	8/13/2003	8/27/2003	9/9/2003
Field Parameters																		
DO (mg/L)	0.36	--	--	--	0.5	--	0.85	--	0.34	--	--	0.52	--	0.48	--	0.35	--	0.39
REDOX (mV)	-183.8	--	--	--	-274.2	--	-140	--	-294.7	--	--	-311.3	--	-288.1	--	-200	--	-338.8
pH	6.08	--	--	--	6.32	--	6.63	--	6.1	--	--	6.5	--	6.62	--	6.22	--	6.2
Conductivity (mS/cm)	2.045	--	--	--	2.394	--	4.43	--	4.678	--	--	3.498	--	2.675	--	3.148	--	2.955
TOC (mg/L)	5.72	--	--	--	6290	--	1440	--	1910	--	--	914	--	297	--	260	--	513
DOC (mg/L)	5.34	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	NI	200	200	200	NI	160	NI	155	NI	155	150	NI	320	NI	315	NI	320	NI

IW-4	9/24/2003	10/8/2003	10/21/2003	11/4/2003	11/21/2003	12/4/2003	12/18/2003	12/29/2003	1/22/2004	1/30/2004	2/11/2004	2/25/2004	3/9/2004	3/26/2004	4/7/2004	4/20/2004	5/5/2004	5/17/2004
Field Parameters																		
DO (mg/L)	--	0.4	--	--	--	0.42	--	0.62	--	0.72	--	0.21	--	0.63	--	0.08	--	0.6
REDOX (mV)	--	-228.3	--	-129.9	--	-170.8	--	-231.6	--	-228.9	--	-148.1	--	-205.6	--	-254.9	--	-234.7
pH	--	6.52	--	5.87	--	6.37	--	7.04	--	6.07	--	6.26	--	6.21	--	5.82	--	6.51
Conductivity (mS/cm)	--	2.815	--	2.839	--	2.426	--	5.916	--	2.041	--	2.569	--	5.086	--	7.528	--	12.108
TOC (mg/L)	--	248	--	914	--	161	--	449	--	577	--	340	--	3850	--	4030	--	4440
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI
Total Volume (gallons)	320	NI	320	NI	320	NI	320	NI	320	NI	320	NI	320	NI	320	NI	320	NI

IW-4	6/2/2004	6/18/2004	6/30/2004	7/27/2004	8/25/2004	9/10/2004	9/22/2004	2/2/2005	5/8/2007	5/30/2007	7/11/2007	7/31/2007	9/6/2007	10/5/2007	11/7/2007	12/10/2007	1/18/2008	2/27/2008
Field Parameters																		
DO (mg/L)	--	0.66	--	--	--	0.32	--	--	--	--	0.94	--	0.05	--	0.3	--	--	--
REDOX (mV)	--	-55.8	--	--	--	-99.6	--	--	-140	--	-181.2	--	-154.2	--	-227.5	--	-149.3	--
pH	--	5.63	--	--	--	4.24	--	--	6.55	--	5.46	--	5.91	--	6.49	--	6.28	--
Conductivity (mS/cm)	--	7.344	--	--	--	7.857	--	--	2.243	--	1.731	--	2.599	--	3.072	--	3.287	--
TOC (mg/L)	--	5170	--	--	--	11900	--	--	209	--	245	--	230	--	264	--	941	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	20%	NI	20%	20%	20%	NI	20%	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI	5%
Total Volume (gallons)	340	NI	240	320	315	NI	320	475	NI	1013	NI	921	NI	893	NI	73	NI	920

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-12	1/10/2003	1/22/2003	1/27/2003	2/5/2003	2/14/2003	2/25/2003	3/14/2003	3/25/2003	4/10/2003	4/22/2003	5/9/2003	5/28/2003	6/6/2003	6/19/2003	6/30/2003	7/16/2003	7/29/2003	8/13/2003
Field Parameters																		
DO (mg/L)	3.55	--	--	--	--	0.66	--	1.55	--	1.03	--	0.46	--	0.71	--	0.66	--	0.33
REDOX (mV)	-100.2	--	--	--	--	-0.8	--	-160	--	-355.2	--	-30.5	--	-214	--	-200	--	-401
pH	5.9	--	--	--	--	5.07	--	5.8	--	4.93	--	5.44	--	5.32	--	5.45	--	5.07
Conductivity (mS/cm)	0.785	--	--	--	--	1.326	--	1.675	--	2.074	--	1.865	--	1.671	--	1.968	--	2.634
TOC (mg/L)	5	--	--	--	--	855	--	966	--	949	--	705	--	1030	--	1020	--	2480
DOC (mg/L)	4.76	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	NI	100	200	200	200	NI	160	NI	155	NI	160	NI	160	NI	320	NI	315	NI

IW-12	8/27/2003	9/10/2003	9/23/2003	10/8/2003	10/21/2003	11/4/2003	11/20/2003	12/3/2003	12/17/2003	12/30/2003	1/21/2004	1/30/2004	2/12/2004	2/26/2004	3/10/2004	3/23/2004	4/7/2004	4/21/2004
Field Parameters																		
DO (mg/L)	--	0.81	--	0.3	--	--	--	0.14	--	0.20	--	0.8	--	--	--	0.45	--	0.11
REDOX (mV)	--	-233.9	--	-140.7	--	-39.8	--	-53.4	--	-292.3	--	-75.4	--	-332	--	-26.1	--	-106.7
pH	--	4.53	--	4.43	--	4.28	--	4.06	--	4.24	--	4.01	--	3.96	--	4.00	--	3.82
Conductivity (mS/cm)	--	3.828	--	2.649	--	2.264	--	2.458	--	1.900	--	3.11	--	4.027	--	4.066	--	3.966
TOC (mg/L)	--	5280	--	4090	--	2350	--	3370	--	1540	--	6700	--	6410	--	6870	--	4990
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI
Total Volume (gallons)	320	NI	160	NI	150	NI	160	NI	160	NI	155	NI	160	NI	160	NI	160	NI

IW-12	5/18/2004	6/2/2004	6/18/2004	7/15/2004	7/26/2004	8/12/2004	9/9/2004	9/22/2004	2/4/2005	5/7/2007	5/30/2007	7/12/2007	8/1/2007	9/6/2007	10/4/2007	11/8/2007	12/10/2007	1/16/2008
Field Parameters																		
DO (mg/L)	0.56	--	0.58	0.19	--	--	0.16	--	--	--	--	0.05	--	--	--	0.07	--	--
REDOX (mV)	-125.4	--	39.4	-69.9	--	-21.8	-113.2	--	--	-116.8	--	-135.8	--	35.1	--	-112	--	-72.2
pH	4.32	--	3.63	4.25	--	3.79	4.42	--	--	5.96	--	4.62	--	4.51	--	4.66	--	4.59
Conductivity (mS/cm)	2.575	--	5.679	2.843	--	4.612	2.912	--	--	1.492	--	1.774	--	3.252	--	4.724	--	2.841
TOC (mg/L)	1950	--	10900	1810	--	9430	2460	--	--	208	--	1580	--	2530	--	6570	--	2440
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	NI	10%	NI	NI	10%	12.5%	NI	5%	NI	5%	NI	5%	NI	5%	NI
Total Volume (gallons)	NI	160	NI	NI	160	NI	NI	156	240	NI	962	NI	836	NI	858	NI	1067	NI

-- Not Recorded

Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-13	1/10/2003	1/22/2003	1/27/2003	2/5/2003	2/25/2003	3/14/2003	3/25/2003	4/10/2003	4/22/2003	5/9/2003	5/28/2003	6/6/2003	6/19/2003	7/1/2003	7/16/2003	7/29/2003	8/27/2003	9/10/2003
Field Parameters																		
DO (mg/L)	3.78	--	--	--	0.27	--	0.75	--	0.3	--	0.21	--	0.48	--	0.55	--	--	0.85
REDOX (mV)	-13.3	--	--	--	-163.4	--	-140	--	-253.4	--	-65	--	-224	--	-394.2	--	--	-126
pH	6.74	--	--	--	5.91	--	6.1	--	5.72	--	5.62	--	5.34	--	5.26	--	--	4.74
Conductivity (mS/cm)	0.572	--	--	--	1.136	--	1.377	--	1.2	--	1.229	--	2.65	--	3.087	--	--	3.429
TOC (mg/L)	--	--	--	--	428	--	630	--	532	--	412	--	1650	--	2190	--	--	6260
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	10%	NI
Total Volume (gallons)	NI	70	200	200	NI	160	NI	155	NI	320	NI	320	NI	320	NI	320	320	NI

IW-13	9/23/2003	10/8/2003	10/21/2003	11/20/2003	12/3/2003	12/17/2003	12/30/2003	1/21/2004	1/30/2004	2/12/2004	2/26/2004	3/10/2004	3/23/2004	4/7/2004	4/21/2004	5/18/2004	6/1/2004	6/18/2004
Field Parameters																		
DO (mg/L)	--	0.26	--	--	0.41	--	0.50	--	0.6	--	0.43	--	0.72	--	0.27	0.47	--	0.62
REDOX (mV)	--	-49.5	--	--	-21.9	--	-112.6	--	27.9	--	-84.3	--	-30.3	--	-115.4	-188.3	--	-10.6
pH	--	4.66	--	--	3.99	--	4.77	--	3.95	--	4.35	--	3.88	--	3.81	4.4	--	3.87
Conductivity (mS/cm)	--	2.722	--	--	4.851	--	3.729	--	5.631	--	4.751	--	8.569	--	7.57	2.185	--	6.729
TOC (mg/L)	--	3450	--	--	10000	--	3460	--	16700	--	6950	--	31800	--	15600	1370	--	13500
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	NI	10%	NI
Total Volume (gallons)	160	NI	320	320	NI	160	NI	320	NI	160	NI	320	NI	190	NI	NI	160	NI

IW-13	7/15/2004	7/26/2004	8/12/2004	9/9/2004	9/22/2004	2/3/2005	5/7/2007	5/30/2007	7/12/2007	8/1/2007	9/6/2007	10/4/2007	11/8/2007	12/10/2007	1/18/2008
Field Parameters															
DO (mg/L)	0.3	--	--	0.24	--		--	--	0.2	--	0.34	--	0.15	--	--
REDOX (mV)	-122.9	--	-102.1	-50.9	--	--	-127.6	--	-104.4	--	20.7	--	-88.6	--	-15
pH	4.69	--	3.65	4.66	--	--	6.32	--	4.38	--	4.59	--	4.52	--	4.49
Conductivity (mS/cm)	2.467	--	7	2.083	--	--	1.825	--	1.334	--	4.634	--	6.491	--	3.259
TOC (mg/L)	2310	--	21900	2450	--	--	140	--	2090	--	5000	--	13600	--	3100
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	NI	10%	10%	NI	5%	NI	5%	NI	5%	NI	NI**	NI
Total Volume (gallons)	NI	160	NI	NI	157	470	NI	962	NI	994	NI	849	NI	NI**	NI

** - Line clogged, no injection

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-14	1/15/2003	1/23/2003	2/5/2003	2/14/2003	2/26/2003	3/13/2003	3/14/2003	3/25/2003	4/10/2003	5/9/2003	6/6/2003	6/19/2003	7/1/2003	7/28/2003	8/27/2003	9/9/2003	10/21/2003	11/20/2003
Field Parameters																		
DO (mg/L)	2.71	--	--	--	0.62	0.27	--	0.56	--	--	--	0.79	--	--	--	0.4	--	--
REDOX (mV)	206.1	--	--	--	-72.3	-627.3	--	-201.1	--	--	--	-260	--	--	--	-148	--	--
pH	7.14	--	--	--	5.35	5.97	--	5.71	--	--	--	5.23	--	--	--	5.13	--	--
Conductivity (mS/cm)	1.371	--	--	--	4.617	4.625	--	4.062	--	--	--	8.586	--	--	--	6.378	--	--
TOC (mg/L)	5.32	--	--	--	7280	--	--	4120	--	--	--	12100	--	--	--	12400	--	--
DOC (mg/L)	4.7	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	NI	10%	NI	10%	10%	10%	NI	10%	10%	10%	NI	10%	10%
Total Volume (gallons)	NI	130	200	200	NI	NI	160	NI	155	160	160	NI	160	160	160	NI	160	160

IW-14	12/3/2003	12/17/2003	12/29/2003	1/22/2004	1/30/2004	2/12/2004	3/10/2004	3/23/2004	4/7/2004	4/21/2004	5/6/2004	5/18/2004	6/18/2004	6/30/2004	7/15/2004	8/11/2004	8/24/2004	9/9/2004
Field Parameters																		
DO (mg/L)	0.47	--	0.89	--	--	--	--	0.83	--	0.33	--	0.74	0.62	--	0.29	0.37	--	0.2
REDOX (mV)	-39	--	-53	--	-57.8	--	--	-114.8	--	-173.9	--	-202.6	-51.6	--	-137.2	-150.7	--	-82.5
pH	4.19	--	4.31	--	5.15	--	--	4.20	--	4.10	--	3.27	4.46	--	4.03	4.91	--	4.02
Conductivity (mS/cm)	6.779	--	6.609	--	5.892	--	--	9.679	--	9.827	--	9.685	7.414	--	8.845	9.559	--	6.865
TOC (mg/L)	11800	--	10800	--	6410	--	--	21000	--	16700	--	21600	9810	--	18300	12000	--	18100
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	NI	10%	NI	10%	10%	NI	10%	NI	10%	NI	NI	10%	NI	NI	10%	NI
Total Volume (gallons)	NI	160	NI	150	NI	160	160	NI	190	NI	160	NI	NI	160	NI	NI	160	NI

IW-14	2/3/2005	5/7/2007	5/30/2007	7/12/2007	8/1/2007	9/6/2007	10/4/2007	11/8/2007	12/10/2007	1/18/2008
Field Parameters										
DO (mg/L)	--	--	--	0.56	--	--	--	0.58	--	--
REDOX (mV)	--	156.2	--	-203.3	--	-143	--	-146.1	--	-191.4
pH	--	7.27	--	5.11	--	4.65	--	4.73	--	5.24
Conductivity (mS/cm)	--	3.975	--	6.105	--	5.399	--	6.515	--	4.769
TOC (mg/L)	--	61.7	--	4610	--	4070	--	8250	--	5230
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	5%	NI	5%	NI	5%	NI	5%	NI
Total Volume (gallons)	475	NI	962	NI	960	NI	763	NI	1066	NI

-- Not Recorded

IW-15	1/15/2003	1/23/2003	2/3/2003	2/18/2003	2/27/2003	3/14/2003	3/25/2003	4/11/2003	5/9/2003	6/6/2003	6/19/2003	7/2/2003	7/16/2003	7/28/2003	8/27/2003	9/9/2003	9/23/2003	10/21/2003
Field Parameters																		
DO (mg/L)	1.88	--	--	--	0.94	--	--	--	--	--	--	--	0.43	--	--	--	--	--
REDOX (mV)	-86.2	--	--	--	-500	--	-128.3	--	--	--	-170	--	-343.9	--	--	-290	--	--
pH	5.08	--	--	--	4.95	--	5.24	--	--	--	4.98	--	5.17	--	--	6.04	--	--
Conductivity (mS/cm)	0.701	--	--	--	1.859	--	2.651	--	--	--	2.813	--	4.037	--	--	3.868	--	--
TOC (mg/L)	1.39	--	--	--	1900	--	2190	--	--	--	2350	--	6340	--	--	4880	--	--
DOC (mg/L)	1.35	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	10%	10%	NI	10%	NI	10%	10%	NI	5:01	10%
Total Volume (gallons)	NI	200	200	200	NI	160	NI	155	165	160	NI	160	NI	200	140	NI	80	160

IW-15	11/20/2003	12/1/2003	12/16/2003	1/21/2004	2/11/2004	3/10/2004	3/24/2004	4/7/2004	5/5/2004	6/1/2004	6/15/2004	6/30/2004	7/27/2004	8/24/2004	9/10/2004	9/22/2004	1/18/2005	2/28/2008
Field Parameters																		
DO (mg/L)	--	0.15	--	--	--	--	--	--	--	--	0.33	--	--	--	0.79	--	--	--
REDOX (mV)	--	-7.9	--	--	--	--	23.4	--	--	--	19.1	--	--	--	-65.1	--	--	--
pH	--	4.97	--	--	--	--	5.00	--	--	--	4.64	--	--	--	4.72	--	--	--
Conductivity (mS/cm)	--	3.37	--	--	--	--	2.934	--	--	--	4.319	--	--	--	2.405	--	--	--
TOC (mg/L)	--	3990	--	--	--	--	2940	--	--	--	5040	--	--	--	3160	--	--	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	10%	NI	10%	10%	10%	10%	NI	10%	10%	10%	NI	20%	10%	10%	NI	20%	10%	5%
Total Volume (gallons)	160	NI	160	155	160	160	NI	160	175	160	NI	240	160	201	NI	160	450	849

-- Not Recorded

IW-15	4/1/2008
Field Parameters	
DO (mg/L)	0.06
REDOX (mV)	-275
pH	5.53
Conductivity (mS/cm)	4.248
TOC (mg/L)	571
DOC (mg/L)	--
Molasses Concentration	NI
Total Volume (gallons)	NI

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

MW-7S	1/15/2003	1/24/2003	2/3/2003	2/17/2003	2/27/2003	3/14/2003	3/25/2003	4/11/2003	4/23/2003	5/9/2003	5/27/2003	6/6/2003	6/19/2003	7/2/2003	7/16/2003	7/28/2003	8/12/2003	8/27/2003
Field Parameters																		
DO (mg/L)	5.8	--	--	--	0.56	--	0.25	--	0.1	--	0.21	--	0.5	--	0.23	--	0.37	--
REDOX (mV)	51.3	--	--	--	-348	--	-186.1	--	-260.2	--	-106	--	-259.7	--	-264.2	--	-164.4	--
pH	6.37	--	--	--	6.2	--	6.62	--	6.23	--	6.3	--	6.36	--	5.77	--	4.49	--
Conductivity (mS/cm)	0.884	--	--	--	0.740	--	0.759	--	0.922	--	0.798	--	0.940	--	1.203	--	1.636	--
TOC (mg/L)	1.68	--	--	--	173	--	99	--	151	--	636	--	169	--	822	--	88.2	--
DOC (mg/L)	1.59	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	160	NI	170	NI	320	NI	400	NI	320	NI	320	NI	320

MW-7S	9/9/2003	9/23/2003	10/8/2003	10/21/2003	11/4/2003	11/21/2003	12/1/2003	12/18/2003	12/29/2003	1/22/2004	1/30/2004	2/11/2004	2/25/2004	3/10/2004	3/24/2004	4/7/2004	5/5/2004	5/6/2004
Field Parameters																		
DO (mg/L)	0.40	--	0.66	--	0.63	--	0.68	--	0.74	--	0.68	--	0.44	--	0.56	--	--	--
REDOX (mV)	-269.1	--	-140.5	--	-95.2	--	20.3	--	-122.8	--	-35.3	--	-63.2	--	-186.2	--	--	--
pH	5.72	--	4.71	--	5.41	--	5.38	--	5.80	--	4.33	--	4.89	--	4.68	--	--	--
Conductivity (mS/cm)	1.666	--	1.53	--	1.977	--	2.15	--	1.435	--	3.87	--	2.366	--	2.262	--	--	--
TOC (mg/L)	540	--	704	--	1300	--	1150	--	442	--	10500	--	2430	--	2340	--	--	--
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	NI	20%	20%	20%
Total Volume (gallons)	NI	320	NI	320	NI	320	NI	320	NI	320	NI	320	NI	320	NI	320	320	160

MW-7S	6/1/2004	6/15/2004	6/30/2004	7/14/2004	7/27/2004	7/27/2004	8/12/2004	8/25/2004	9/10/2004	9/22/2004	2/3/2005	2/28/2008	4/1/2008
Field Parameters													
DO (mg/L)	--	0.23	--	0.25	--	--	--	--	--	--	--	--	0.23
REDOX (mV)	--	9	--	-59.7	--	--	-115.1	--	-113.4	--	--	--	-188.6
pH	--	3.62	--	4.86	--	--	5.11	--	5.67	--	--	--	6.36
Conductivity (mS/cm)	--	3.647	--	1.680	--	--	1.601	--	1.694	--	--	--	1.864
TOC (mg/L)	--	5120	--	339	--	--	791	--	776	--	--	--	69.4
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	20%	NI	10%	NI	20%	10%	NI	20%	NI	20%	10%	5%	NI
Total Volume (gallons)	320	NI	160	NI	160	240	NI	320	NI	320	485	929	NI

-- Not Recorded

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Table 4. Summary of Full-Scale Injection and Monitoring Parameters, Former Kings Electronics, Co., Inc. Site, Tuckahoe, New York

IW-16	1/15/2003	1/24/2003	2/3/2003	2/17/2003	2/26/2003	3/14/2003	3/25/2003	4/11/2003	4/23/2003	5/9/2003	5/28/2003	6/6/2003	6/19/2003	7/2/2003	7/16/2003	7/28/2003	8/12/2003	8/27/2003
Field Parameters																		
DO (mg/L)	--	--	--	--	0.7	--	0.32	--	0.19	--	0.2	--	0.67	--	0.5	--	0.34	--
REDOX (mV)	30.4	--	--	--	-556	--	-155	--	-310.5	--	-64	--	-163.3	--	-264.6	--	-142.6	--
pH	6.68	--	--	--	5.89	--	5.96	--	6.05	--	6.09	--	5.61	--	5.21	--	4.13	--
Conductivity (mS/cm)	0.897	--	--	--	2.058	--	1.770	--	1.378	--	2.557	--	4.090	--	5.780	--	1.636	--
TOC (mg/L)	1.93	--	--	--	182	--	208	--	174	--	459	--	2200	--	4990	--	664	--
DOC (mg/L)	1.78	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	10%	10%	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%	NI	10%
Total Volume (gallons)	NI	200	200	200	NI	160	NI	155	NI	165	NI	380	NI	320	NI	320	NI	320

IW-16	9/9/2003	9/23/2003	10/8/2003	10/21/2003	11/20/2003	12/1/2003	12/16/2003	1/21/2004	2/11/2004	3/9/2004	3/24/2004	4/7/2004	5/5/2004	6/1/2004	6/18/2004	7/14/2004	7/27/2004	8/12/2004
Field Parameters																		
DO (mg/L)	0.34	--	0.34	--	--	0.82	--	--	--	--	0.63	--	--	--	0.54	0.22	--	--
REDOX (mV)	-270	--	-133.8	--	--	17.6	--	--	--	--	-10.6	--	--	--	-34	-176.1	--	-17.2
pH	6.04	--	4.72	--	--	4.77	--	--	--	--	4.70	--	--	--	3.58	5.36	--	3.60
Conductivity (mS/cm)	4.419	--	4.377	--	--	2.162	--	--	--	--	2.088	--	--	--	4.704	2.150	--	5.490
TOC (mg/L)	6140	--	5420	--	--	1250	--	--	--	--	1200	--	--	--	5240	675	--	7250
DOC (mg/L)	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Molasses Concentration	NI	20%	NI	10%	10%	NI	10%	10%	10%	10%	NI	10%	10%	10%	NI	NI	10%	NI
Total Volume (gallons)	NI	80	NI	160	160	NI	320	320	320	320	NI	320	305	320	NI	NI	80	NI

IW-16	9/10/2004	9/22/2004	2/4/2005	2/28/2008	4/1/2008
Field Parameters					
DO (mg/L)	--	--	--	--	--
REDOX (mV)	-148.5	--	--	--	-51.4
pH	5.27	--	--	--	5.33
Conductivity (mS/cm)	2.713	--	--	--	2.318
TOC (mg/L)	784	--	--	--	838
DOC (mg/L)	--	--	--	--	--
Molasses Concentration	NI	10%	10%	5%	NI
Total Volume (gallons)	NI	171	460	476	NI

-- Not Recorded

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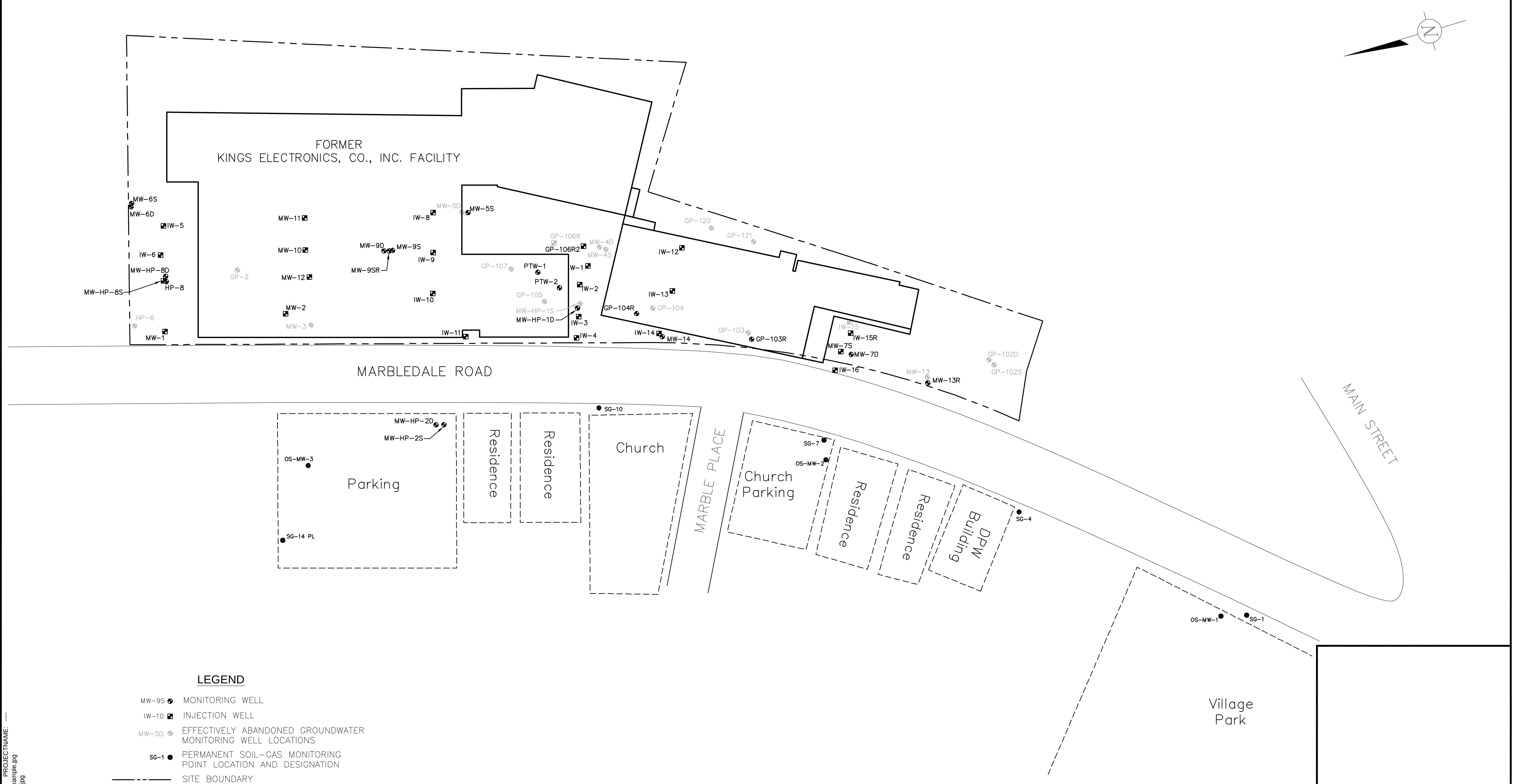
Table 5. Summary of Quarterly and Monthly Monitoring Schedules and Analytical Parameters, Former Kings Electronics Co., Inc. Site, Tuckahoe, New York

	Performance and Off-site Groundwater Monitoring from January 2003 through July 2008		
Monitoring Period	Monthly[1]	Quarterly	
Monitoring Parameters	Total Organic Carbon Field Parameters[2] Water Level	Water Level[3]	Volatile Organic Compounds Biogeochemical Parameters[4] Field Parameters[2]
Monitoring/ Injection Wells	<u>Injection Wells</u> IW-1 IW-2 IW-3 IW-4 IW-5 IW-6 IW-8 IW-9 IW-10 IW-11 IW-12 IW-13 IW-14 IW-15 IW-16 MW-1 MW-2 MW-7S MW-HP-8S MW-10 MW-11 MW-12 GP-106R2	<u>Monitoring Wells</u> MW-HP-1S MW-HP-2S MW-1 MW-4S MW-5S MW-6S MW-HP-8S MW-9S MW-13R GP-102S GP-103R GP-104R GP-105 GP-120 GP-121 PTW-1 PTW-2 MW-HP-1D MW-HP-2D MW-3 MW-4D MW-5D MW-6D MW-7D MW-HP-8D MW-9D GP-102D OS-MW-1 OS-MW-2 OS-MW-3PL	<u>Monitoring Wells</u> MW-HP-2S MW-HP-2D MW-6S MW-9S MW-9D MW-13R PTW-2 GP-103 GP-104 OS-MW-1 OS-MW-2 OS-MW-3PL

1 Samples collected prior to injection events and only **at active injection wells**, frequency ranged from monthly to bimonthly.
2 Field parameters include pH, specific conductivity, temperature, dissolved oxygen, and redox potential.
3 Water-level measurements collected only **at existing monitoring wells**.
4 Biogeochemical parameters include total organic carbon, ethene, ethane, methane, carbon dioxide sulfide, sulfate, ferrous iron, and dissolved iron **at existing moinitoring wells**. Biogeochemical sampling was conducted semi-annually and was terminated after July 2006. The baseline sampling event in January 2003 included biogeochemical parameters plus total and dissolved manganese, nitrate, nitrite and alkalinity.



LEGEND

- MW-9S — MONITORING WELL
- IW-10 — INJECTION WELL
- MW-5D — EFFECTIVELY ABANDONED GROUNDWATER MONITORING WELL LOCATIONS
- SG-1 — PERMANENT SOIL-GAS MONITORING POINT LOCATION AND DESIGNATION
- SITE BOUNDARY

SOURCE(S): PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001, AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978.

SITE BOUNDARY BASED ON SITE PLAN PROVIDED BY GABRIEL E. SENOR, P.C. TITLED "SURVEY OF LOT 2 AS SHOWN ON SUBDIVISION MAP PREPARED FOR KINGS ELECTRONICS CO., INC., DRAWING NO. S-1, SEPTEMBER 21, 2000".

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Project Mgr. MM
Designed by ER
Drawn by JG
Checked by PL

ARCADIS
ARCADIS OF NEW YORK, INC.

Professional Engineer
MOH MOHIUDDIN

P.E.'s Number	State	Date Signed
074527	NY	12/19/08

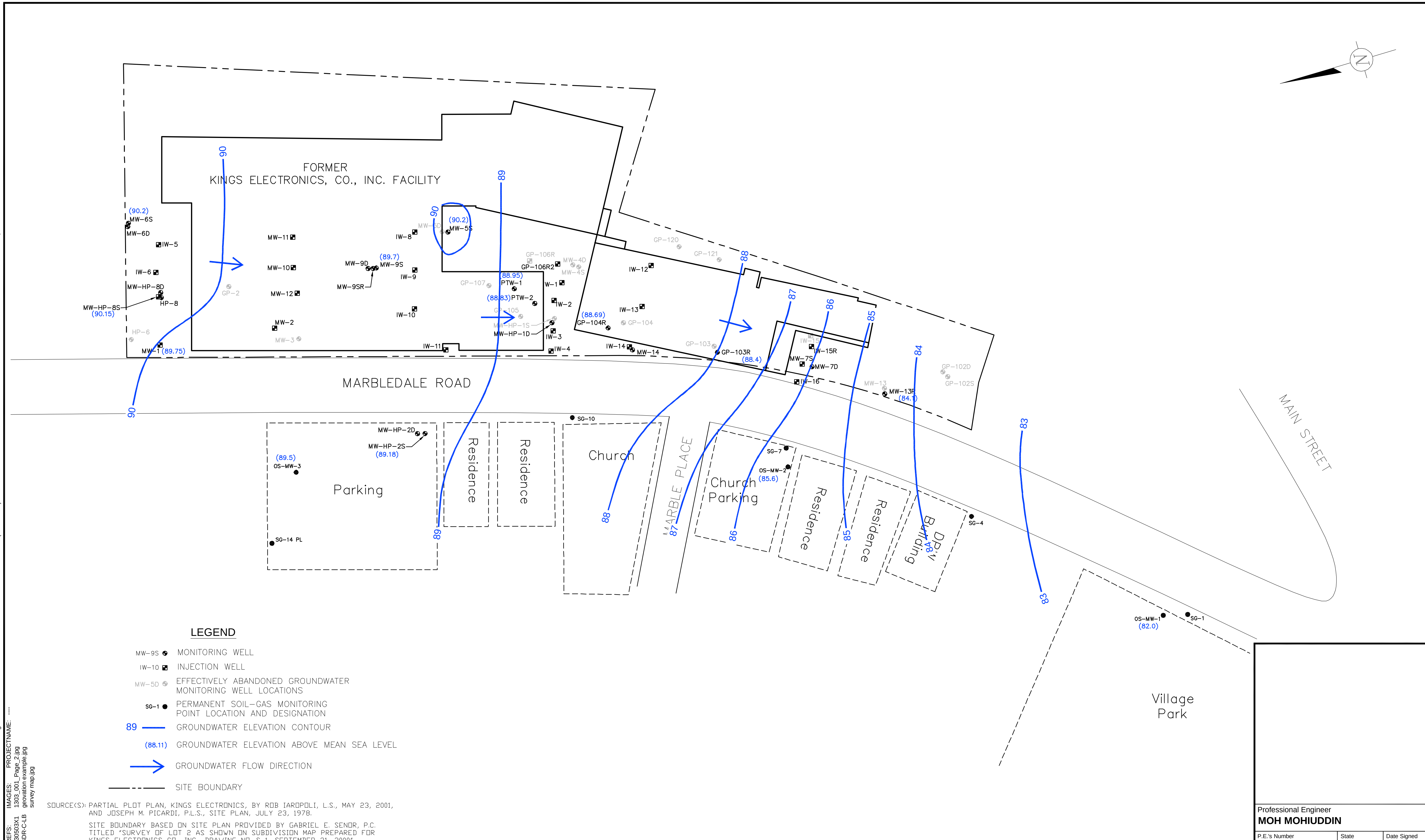
FORMER KINGS ELECTRONICS SITE • TUCKAHOE, NEW YORK
FINAL ENGINEERING REPORT

SITE PLAN

ENVIRONMENTAL

ARCADIS Project No. NJ000423.0005.00001
Date 12/19/08
ARCADIS
RARITAN PLAZA III
105 FIELDCREST AVE, SUITE 305
EDISON, NJ 08837
TEL. 732.225.5061

1



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Professional Engineer
MOH MOHIUDDIN

P.E.'s Number	State	Date Signed
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FORMER KINGS ELECTRONICS SITE • TUCKAHOE, NEW YORK
FINAL ENGINEERING REPORT

GROUNDWATER CONTOUR MAP
JULY 2008 - SHALLOW OVERBURDEN

ENVIRONMENTAL

ARCADIS Project No. NJ000423.0005.00001
Date 12/19/08
ARCADIS
RARITAN PLAZA III
105 FIELDCREST AVE, SUITE 305
EDISON, NJ 08837
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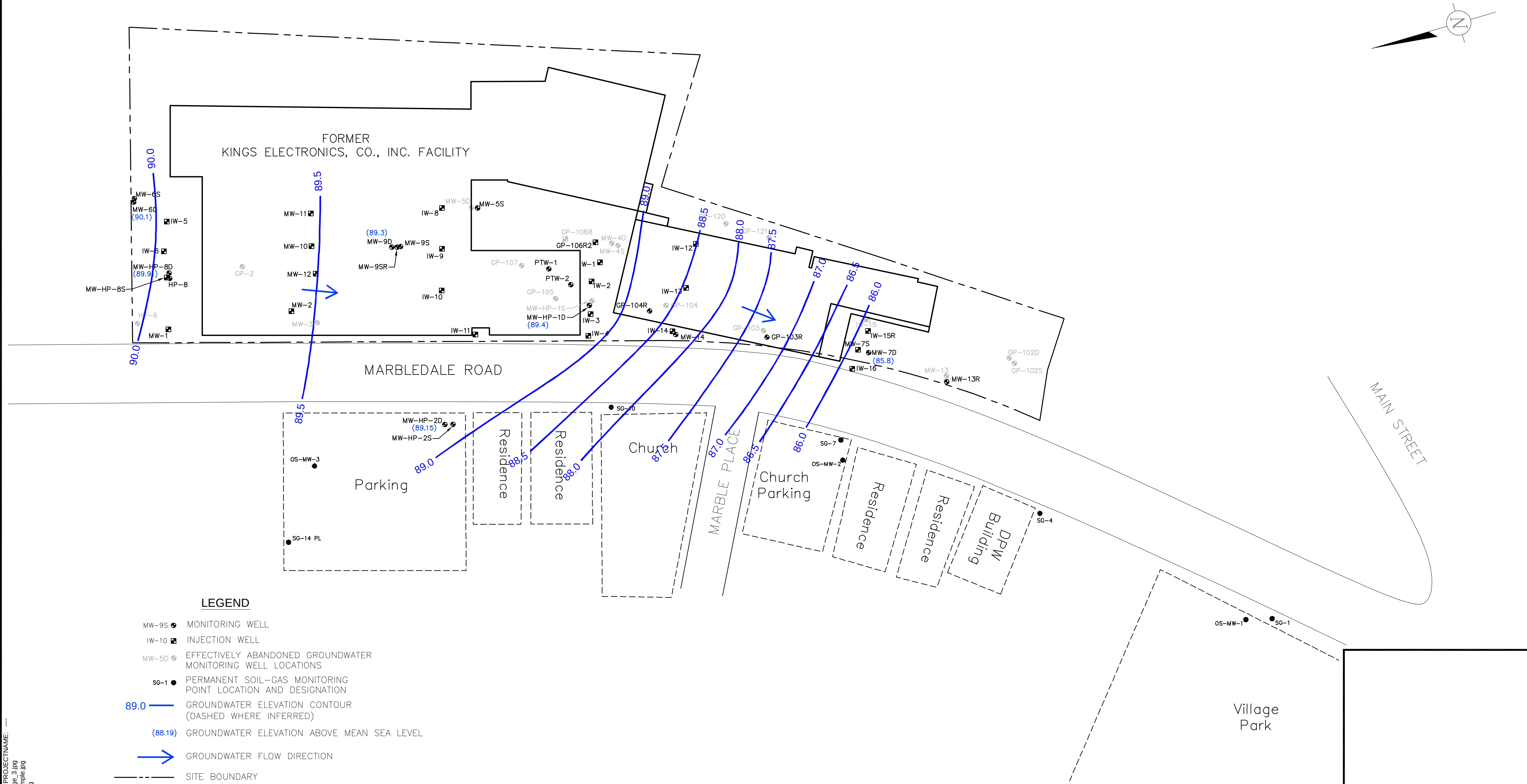
2A



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0 60' 120'
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Drawn by JG
Checked by PL

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FORMER KINGS ELECTRONICS SITE • TUCKAHOE, NEW YORK
FINAL ENGINEERING REPORT

GROUNDWATER CONTOUR MAP JULY 2008 - DEEP OVERBURDEN

ENVIRONMENTAL

Professional Engineer
MOH MOHIUDDIN
P.E.'s Number 074527 | State NY | Date Signed 12/19/08

ARCADIS Project No. NJ000423.0005.00001
Date 12/19/08
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2B

CITY: MAHWAH DIV/GROUP: ENVCAD DB: JG LD: ER PIC: MM PM: MM TM: ER LYR:ON=*;OFF=*REF*
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MW-6S							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/24/2008
VOCs (ug/L)							
Trichloroethene	53.1	66.5	44.2	20.6	31	46.8	38.8
cis-1,2-Dichloroethene	0.588	0.528	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	11.4	15.9	16.1	4.56	3.91	8.56	7.62
Tetrachloroethene	6	8.44	6.84	3.32	3.97	4.93	4.66
1,1-Dichloroethane	0.694	1.03	ND	ND	ND	ND	ND

MW-9D							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/22/2008
VOCs (ug/L)							
Trichloroethene	ND	ND	ND	0.452	ND	ND	ND
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	5.6	5.4	2.32	2.6	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	0.699	ND	ND
1,1-Dichloroethane	ND	ND	0.626	ND	ND	ND	ND

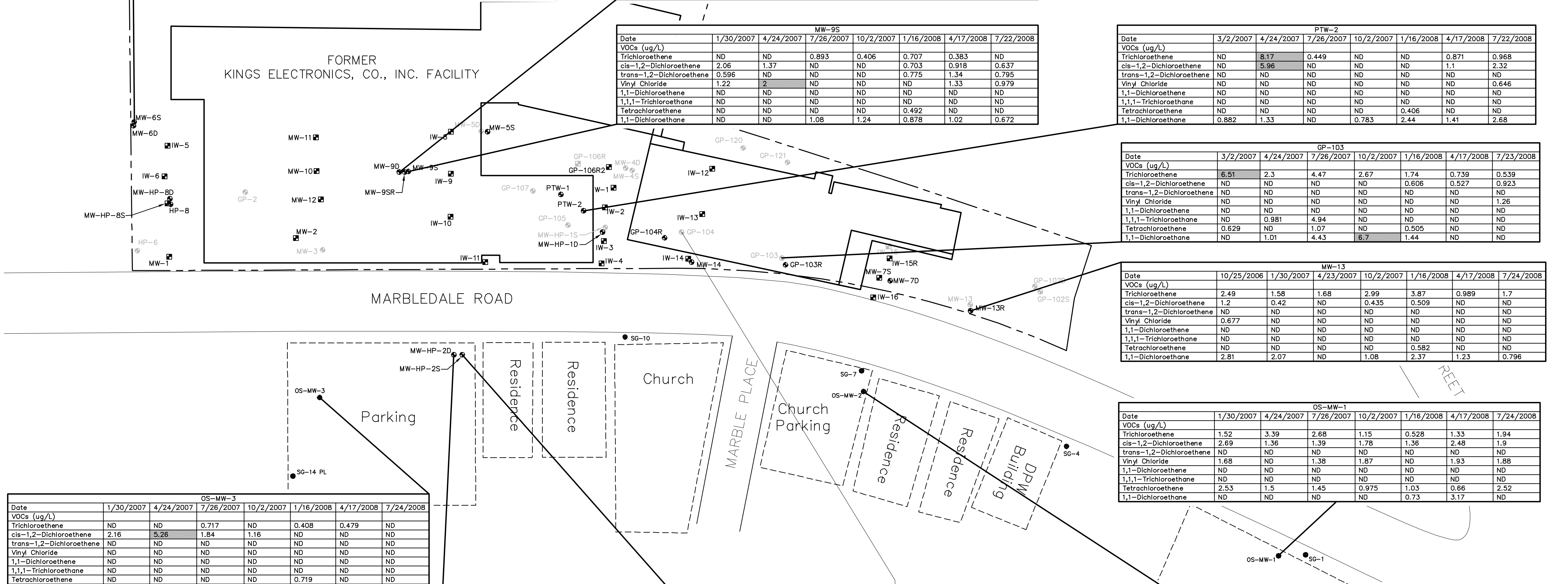
MW-9S							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/22/2008
VOCs (ug/L)							
Trichloroethene	ND	ND	0.893	0.406	0.707	0.383	ND
cis-1,2-Dichloroethene	2.06	1.37	ND	ND	0.703	0.918	0.637
trans-1,2-Dichloroethene	0.596	ND	ND	ND	0.775	1.34	0.795
Vinyl Chloride	1.22	2	ND	ND	ND	1.33	0.979
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	0.492	ND	ND
1,1-Dichloroethane	ND	ND	1.08	1.24	0.878	1.02	0.672

PTW-2							
Date	3/2/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/22/2008
VOCs (ug/L)							
Trichloroethene	ND	8.17	0.449	ND	ND	0.871	0.968
cis-1,2-Dichloroethene	ND	5.96	ND	ND	ND	1.1	2.32
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	0.646
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	0.406	ND	ND
1,1-Dichloroethane	0.882	1.33	ND	0.783	2.44	1.41	2.68

GP-103							
Date	3/2/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/23/2008
VOCs (ug/L)							
Trichloroethene	6.51	2.3	4.47	2.67	1.74	0.739	0.539
cis-1,2-Dichloroethene	ND	ND	ND	ND	0.606	0.527	0.923
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	1.26
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	0.981	4.94	ND	ND	ND	ND
Tetrachloroethene	0.629	ND	1.07	ND	0.505	ND	ND
1,1-Dichloroethane	ND	1.01	4.43	6.7	1.44	ND	ND

MW-13							
Date	10/25/2006	1/30/2007	4/23/2007	10/2/2007	1/16/2008	4/17/2008	7/24/2008
VOCs (ug/L)							
Trichloroethene	2.49	1.58	1.68	2.99	3.87	0.989	1.7
cis-1,2-Dichloroethene	1.2	0.42	ND	0.435	0.509	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	0.677	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	0.582	ND	ND
1,1-Dichloroethane	2.81	2.07	ND	1.08	2.37	1.23	0.796

OS-MW-1							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/24/2008
VOCs (ug/L)							
Trichloroethene	1.52	3.39	2.68	1.15	0.528	1.33	1.94
cis-1,2-Dichloroethene	2.69	1.36	1.39	1.78	1.36	2.48	1.9
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	1.68	ND	1.38	1.87	ND	1.93	1.88
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	2.53	1.5	1.45	0.975	1.03	0.66	2.52
1,1-Dichloroethane	ND	ND	ND	ND	0.73	3.17	ND



OS-MW-3							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/24/2008
VOCs (ug/L)							
Trichloroethene	ND	ND	0.717	ND	0.408	0.479	ND
cis-1,2-Dichloroethene	2.16	5.26	1.84	1.16	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	ND	ND	ND	ND	0.719	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND

MW-HP-2S							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/23/2008
VOCs (ug/L)							
Trichloroethene	1.35	1.2	1.66	2.3	4.52	2.42	2.24
cis-1,2-Dichloroethene	0.462	ND	0.437	1.95	3.39	0.903	1.5
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	18.9	17.7	11.2	8.28	22.6	30	16.8
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND

OS-MW-2							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/24/2008
VOCs (ug/L)							
Trichloroethene	2.71	2.13	4.65	2.64	3.43	3.24	5.73
cis-1,2-Dichloroethene	3.81	3.41	1.69	1.6	2.49	1.23	1.68
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	3.69	3.03	5.69	6.63	4.41	8.01	10.3
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND

MW-HP-2D							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/23/2008
VOCs (ug/L)							
Trichloroethene	0.825	0.76	ND	0.907	1.04	1.41	1.06
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene	14.1	13.1	8.94	14.3	16.9	21.1	19.5
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND

GP-104							
Date	1/30/2007	4/24/2007	7/26/2007	10/2/2007	1/16/2008	4/17/2008	7/22/2008
VOCs (ug/L)							
Trichloroethene	89.1	134	23.9	6.42	2.29	0.669	ND
cis-1,2-Dichloroethene	6.04	3.74	1.35	2	1.12	1.68	0.849
trans-1,2-Dichloroethene	0.772	ND	ND	1.92	ND	ND	ND
Vinyl Chloride	ND	ND	ND	0.577	ND	ND	ND
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	1.75	3.92	ND	ND	ND	ND	ND
Tetrachloroethene	4.2	7.57	1.6	ND	0.597	ND	ND
1,1-Dichloroethane	1.9	0.44	1.41	1.52	0.572	1.22	ND

LEGEND

MW-9S MONITORING WELL

IW-10 INJECTION WELL

MW-5D EFFECTIVELY ABANDONED GROUNDWATER MONITORING WELL LOCATIONS

SG-1 PERMANENT SOIL-GAS MONITORING POINT LOCATION AND DESIGNATION

CONCENTRATION EXCEEDED NYSDEC GROUNDWATER QUALITY STANDARDS

SITE BOUNDARY

SOURCE(S):

PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001, AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978.

SITE BOUNDARY BASED ON SITE PLAN PROVIDED BY GABRIEL E. SENOR, P.C. TITLED "SURVEY OF LOT 2 AS SHOWN ON SUBDIVISION MAP PREPARED FOR KINGS ELECTRONICS CO., INC., DRAWING NO. S-1, SEPTEMBER 21, 2000".

XREFS: 4230503X1 X8DR-C-LB IMAGES: geovation example.jpg survey map.jpg PROJECTNAME: ----

CITY: MAHWAH DIV/GROUP: ENVCAD DB: JG LD: ER PIC: MM PM: MM TM: ER LYR:ON=*;OFF=*REF*
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No.	Date	Revisions	By	Ckd

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Project Mgr. MM
Designed by ER
Drawn by JG
Checked by PL

ARCADIS

ARCADIS OF NEW YORK, INC.

FORMER KINGS ELECTRONICS SITE • TUCKAHOE, NEW YORK

FINAL ENGINEERING REPORT

SUMMARY OF CVOCs IN GROUNDWATER JANUARY 2007 - JULY 2008

ENVIRONMENTAL

Professional Engineer
MOH MOHIUDDIN

P.E.'s Number	State	Date Signed
074527	NY	12/19/08

ARCADIS Project No. NJ000423.0005.00001

Date 12/19/08

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3

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Appendix A

Survey Map

SOURCE(S):
SURVEY BASED ON SITE PLAN PROVIDED BY GABRIEL E. SENOR, P.C. TITLED "SURVEY OF LOT 2 AS SHOWN ON SUBDIVISION MAP PREPARED FOR KINGS ELECTRONICS CO., INC., DRAWING NO. S-1, SEPTEMBER 21, 2000".

FORMER KINGS ELECTRONICS SITE
TUCKAHOE, NEW YORK
APPENDIX A

SURVEY MAP

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FIGURE
A1

CITY:MAHWAH DIV/GROUP:ENVIRONMENTAL DB:J.GONZALEZ LD:(Opt) PIC:(Opt) PM:M.MOHIUDDIN TM:E.RODRIGUEZ LYR:(Opt)ON=*;OFF=*REF* PLOTSTYLETABLE: ARCADIS.CTB PLOTTED: 9/17/2008 10:55 AM BY: GONZALEZ, JAMES
G:\Drafting\Kings\NJ000423\0005\0003\Appendix A\423053AA1.dwg LAYOUT: A1 SAVED: 9/17/2008 10:51 AM ACADVER: 17.1S (LMS TECH) PAGESETUP: ---
XREFS: IMAGES: survey map.jpg PROJECTNAME: ---

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Appendix B

Revised On-Site Remedial Action
Work Plan (ARCADIS 2002)

Included on enclosed CD

Revised On-Site Remedial Action Work Plan

Kings Electronics Co., Inc. Site, Tuckahoe, New York

ARCADIS

Infrastructure, buildings, environment, communications

PREPARED FOR

Kings Electronics Co., Inc.

ARCADIS

Revised On-Site Remedial Action Work Plan

Kings Electronics Co., Inc. Site
Tuckahoe, New York

Prepared for:
Kings Electronics Co., Inc.

Prepared by:
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Our Ref.:
NJ000423.0002.00004

Date:
3 July 2002

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Tables

Figures

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Appendices

1. Introduction

ARCADIS G&M has prepared this Revised On-Site Remedial Action Work Plan (RAWP) on behalf of Kings Electronics Co., Inc. The On-Site Remedial Action Work Plan was submitted to the New York State Department of Environmental Conservation (NYSDEC) on October 25, 2001. This revised RAWP incorporates changes resulting from questions and comments from the NYSDEC and the NYS Department of Health (DOH). The former Kings Electronics Co., Inc. facility (Site) is located at 40 Marbledale Road in Tuckahoe, New York. A remedial investigation of soil and on-site groundwater has been completed pursuant to the Voluntary Cleanup Program (VCP) (Appendix A) entered into by Kings Electronics Co., Inc. and the NYSDEC (Effective Date: 23 June 1999). The off-site groundwater investigation will continue as part the amended Site Investigation Work Plan.

This RAWP provides a description of the site operational history and previous environmental investigations conducted by others. Based on previous groundwater and soil investigations conducted by the Cody Ehlers Group (CEG) and Leggette, Brashears, and Graham, Inc. (LBG), the constituents of concern at the Site have been determined to be chlorinated volatile organic compounds (CVOCs). The investigative reports submitted by previous consultants are summarized in Table 1.

The concentrations of CVOCs in groundwater exceed the standards, cleanup, and guidance (SCGs) values set forth by NYSDEC in the Division of Water Technical and Operational Guidance Series (TOGS 1.1.1). A remedy for groundwater is warranted to address this concern and is proposed in this document. Concentrations of CVOCs in soil have been detected above the SCGs set forth by the NYSDEC in the Technical and Administrative Guidance Memorandum (TAGM) 4046. The soil in the area where CVOCs exceed the SCGs appears to be limited in extent and additional sampling and characterization of this area is proposed (see Appendix B). Therefore, a remedy for soil is not warranted.

To determine the effectiveness of the proposed remedial action for groundwater (enhanced in-situ bioremediation), a 10-month pilot test was completed. The scope and results of the pilot test are summarized in Subsection 4.2.

Based on the successful results of the pilot test, ARCADIS G&M recommends a full-scale enhanced in-situ bioremediation system be designed and implemented at the Site. The full-scale remedial system for the Site is discussed in Subsection 4.3.

1.1 Objective

The goal of the remedial action is to remediate groundwater to concentrations below the SCGs (Table 2). Remediation of groundwater will be accomplished through the use of in-situ bioremediation technology. Through use of this technology, the source constituent (trichloroethene) will be naturally degraded to inert degradation products. The appropriateness and success of this technology has been demonstrated during the pilot test for the Site (Section 4).

2. Physical Setting

The Site consists of administrative and manufacturing buildings (no longer in use), a paved parking area and alleyway, and paved loading/unloading dock areas. The property occupies approximately 1.8 acres and is located in a mixed area consisting of light industrial, commercial, and residential uses. The original facility building, located in the northern portion of the property, was initially used as an icehouse in the mid 1900's. This building was modified and extended, and additional structures were built until almost all of the property had been developed. Manufacturing operations by Kings Electronics Co., Inc. were initiated in 1951 and ceased in 1998.

The topography of the Site area slopes gently southward with high bedrock ridges to the east and west (Figure 1). The two ridges trend in a north-south direction. The ground surface elevation at the site is approximately 100 feet above mean sea level (ft msl). The ground surface at the site is relatively flat, with a slight sloping grade to the south. Immediately east of the Site, the eastern bedrock ridge rises approximately 100 feet.

2.1 Geology

Regionally, the bedrock geology is composed of the Yonkers Gneiss and Fordham Gneiss (Precambrian), Lowerre Quartzite and Inwood Marble (Cambrian-Ordovician), and Manhattan Schist (Ordovician). All of these rocks have undergone at least two phases of deformation in the Paleozoic.

Locally, the Site is underlain by fill material consisting of sand, silt, gravel, bricks, marble fragments, and boulders. Prior to the development of the Site, the area historically operated as a marble quarry. Following cessation of quarrying operations, the area was backfilled using non-native fill material, to the existing elevation. The thickness of the fill material varies from 0 to 12 feet.

An unconsolidated sand and silt unit, fining downward, underlies the fill material. A silty clay layer, between 0.25 and 8.5 feet thick, has also been encountered in the unconsolidated unit (LBG 2000). The depth to the silty clay layer ranges between 7 and 10 feet bgs (LBG 2000). The silty clay layer does not appear to be continuous beneath the Site, as it has not been encountered in all soil borings.

Bedrock is generally encountered between 5 and 55 feet beneath the Site. The bedrock for this area is typically composed of Manhattan Formation Schist, Inwood Marble, and Fordham Gneiss (Hall 1968). The presence of either Manhattan Schist or Fordham Gneiss has been confirmed in an on-site deep production well during a downhole television inspection conducted by Leggette, Brashears, & Graham, Inc (LBG 2000).

2.2 Hydrogeology

Groundwater beneath the Site occurs in both the unconsolidated sand and silt, and bedrock. Depth to groundwater in the unconsolidated unit is between 9 and 12 feet below ground surface (bgs). Groundwater flow in the unconsolidated unit is generally to the south, southwest and follows topography, which slopes gently to the south (Figures 2 and 3).

Hydraulic conductivity values in the unconsolidated unit average approximately 6 to 7 feet per day (ft/day). Horizontal seepage velocities for groundwater present in the unconsolidated sediments at the site range from 0.2 to 0.5 ft/day, with the lower values indicative of the northern portion of the site and gradually increasing to the south.

An artesian bedrock production well exists onsite demonstrating an upward gradient in bedrock groundwater. The total depth of this well is reportedly 550 feet below grade. Based on a downhole television inspection of the open borehole (66' to 550' below grade), the bedrock formation is believed to be either Manhattan Schist or Fordham Gneiss (LBG 2000).

Groundwater in the area is not used as a public drinking water source. Part 5 of the New York State Sanitary Code prohibits the installation of residential and other private water supply wells in areas served by a public water supply system.

3. Site History

Prior to development of the former Kings Electronics Co., Inc. facility, the area operated as a marble quarry until the 1900's. Following cessation of quarrying operations, the quarried areas were backfilled with non-native material (e.g., soil, bricks, marble fragments) to the existing elevation.

In the mid 1900's the northern portion of the property was developed and operated as an icehouse. Wood planks and cork that served as floor insulation have been found in some areas beneath the existing concrete floor of the original building (CEG 1999). The remainder of the property was also developed in the early 1900's by T.D. Wadelton & Sons (woodwork and furniture manufacturer). Sometime between 1931 and 1952, the property was redeveloped by the O.D. Chemical Corporation.

The former Kings Electronics Co., Inc. facility was active after 1951 and manufacturing operations included wastewater pretreatment, electroplating, degreasing, machining, assembly, and other production processes. Manufacturing operations ceased in 1998 and all manufacturing and related process equipment, materials, and wastes were dismantled and/or removed that year.

3.1 Investigation History

The environmental investigation of the Site was initiated in 1995 when a preliminary assessment was conducted by Norfolk Environmental. The purpose of the assessment was to conduct an on-site inspection and identify areas of the facility where chemicals had been stored or used, and where wastes were generated and stored prior to off-site disposal. Former Site manufacturing operations included electroplating, machining, degreasing, and other operations that produced electronic component fittings and parts. The results of the assessment prompted the phased investigation outlined below.

- **July 1995,** Soil and Preliminary Groundwater Investigation – Collection and analysis of soil and groundwater to address the possible presence of CVOCs, plating line wastes, and transformer oils. Focused on the northern portion of the property where the majority of manufacturing operations took place.

- **July 1997,** Groundwater Investigation – Collection and analysis of groundwater samples to facilitate the horizontal and vertical characterization of CVOCs in groundwater beneath and adjacent to the facility. The overburden soil and shallow bedrock stratigraphy was also characterized as part of this scope of work.

- **July, August, and September 1998,** Soil and Groundwater Investigation – The horizontal and vertical extent of CVOCs in groundwater was further delineated. Facility soils were also evaluated to determine if on-site soils contained CVOCs at concentrations that could be a source to these constituents in groundwater.

- **November 1998,** Soil Investigation – Collection and analysis of soil samples from beneath the floor of the facility building in and around the former degreaser area to delineate the horizontal and vertical extent of CVOCs in soil.

- **April 1999,** Soil Removal – Removal of chlorinated organic compound source material.

- **June 2000,** Groundwater Investigation – Collection and analysis of groundwater samples to evaluate degradation-potential and slug testing to determine hydraulic conductivity. Deep bedrock supply well also investigated.

As discussed previously, TCE present in the onsite groundwater has been determined to be the diagnostic site constituent of concern (COC). Other CVOCs present in the onsite groundwater are generally the degradation products of TCE. The original source of TCE in the onsite groundwater is the former degreaser, located in the northernmost facility building (CEG 1999). On 5 April 1999 through 9 April 1999 and 13 April 1999, approximately 135 tons of concrete, gravel, and soil were removed from the former degreaser area, thus removing the bulk of the source material (CEG 1999). Geovation Consultants, Inc. has continued with the soil investigation, which is summarized in Appendix B.

In addition to the onsite groundwater conditions, impacts to groundwater have been confirmed at the Mobil gasoline station immediately downgradient and adjacent to the Kings site. The property was originally developed as an automobile service station by the Gulf Oil Corporation in 1957. The three-bay services station utilized three 3,000-gallon gasoline underground storage tanks (USTs), one 1,000-gallon fuel oil UST and one 550-gallon waste oil UST. The facility was transferred to the Mobil Oil Corporation in 1975. The history of UST maintenance and replacement reviewed in the files of the NYSDEC and Westchester County Health Department is incomplete.

The files do confirm that the following three spill numbers are associated with the facility;

Spill No. 9008485 (11-02-90) - faulty fuel oil fuel line.

Spill No. 908890 (11-09-90) - gasoline.. "site investigation" by Groundwater Technology Inc.

Spill No. 9102786 (06-29-91) - NYSDEC Notice of tightness test failure.

The investigation history reviewed was not complete, but the site was granted a No Further Action (NFA) by the NYSDEC on August 21, 1995. According to the file documents, although up to 467 ppb of total benzene, toluene, ethylbenzene and xylenes and 54 ppb methyl tertiary butyl ether remained in groundwater at the time, the granting of the NFA was granted because of the "fact that there are no sensitive receptors located downgradient of the property" and that the nearest sensitive receptor was reported as "the Bronx River located approximately 1,500 feet west of the site."

ARCADIS G&M has continued with both the groundwater investigation and evaluation of degradation potential of CVOCs at the Kings site through an in-situ bioremediation pilot test. The following is a summary of soil and groundwater quality. The results of the in-situ bioremediation pilot test are summarized in Section 4.

3.2 Groundwater Quality

Groundwater beneath the Site has been investigated and monitored since 1995. Based on previous investigations, TCE has been determined to be the diagnostic COC at the site. The TCE is typically associated with degreasing. The highest concentrations of total CVOCs in groundwater were detected in the upper unconsolidated unit (10 to 20 feet bgs). Concentrations of trichloroethene (TCE) in groundwater ranged from not detected to 28,000 parts per billion (ppb). Current and historical concentrations of CVOCs are summarized in Table 3.

Concentrations of CVOCs detected in the lower unconsolidated unit generally decrease by two to three orders of magnitude, demonstrating that the downward migration of CVOCs is limited, possibly attributable to decreased hydraulic conductivity at depth associated with the fining downward sequence observed for the unconsolidated unit. The most recent concentrations of CVOCs detected in the shallow and deep overburden groundwater are presented on Figures 4 and 5.

3.3 Soil Quality

Based on previous sampling activities, soil beneath the former degreaser was determined to be the source of the TCE detected in groundwater beneath the site (CEG 1999). In April 1999, soil removal activities were conducted beneath the location of the former degreaser, thus removing the majority of impacted soils. Based on CEG's June 1999 Soil Removal Summary Report, approximately 85% of the total TCE mass has been removed. Geovation Consultants, Inc. has continued with the soil investigation at the Site. The results of their investigation are summarized in Appendix B.

4. Remedial Action

The remedial action for groundwater will be accomplished using an enhanced in-situ microbiological process that has been termed enhanced reductive dechlorination (ERD). The in-situ biodegradation of CVOCs is a well-documented process and site-specific data suggests that the source TCE has been attenuating naturally in groundwater at the site. ARCADIS G&M plans on enhancing this natural degradation process by introducing a carbohydrate substrate (i.e., in the form of a molasses and water solution), thus providing an organic carbon source for microbes already present in the aquifer. This will create an in-situ reactive zone (IRZ), which is the zone within the aquifer of degradation enhancement. ARCADIS G&M has been using IRZs for groundwater remediation since 1993. Over 100 IRZs have been employed in the United States, and the majority of these remediation projects involved the treatment of chlorinated solvents such as TCE and perchloroethene. These sites encompassed both State and Federal regulatory programs.

During the pilot test, standard food grade black strap molasses was used as the carbohydrate substrate (discussed in Section 4.2) and was generally mixed with water at ratios of either 10:1 or 20:1 (water to molasses) to create the injection solution. Molasses will also be used as the carbohydrate substrate for the full-scale remedial action. Indigenous heterotrophic microorganisms readily degrade the carbohydrates introduced into the groundwater. This metabolic degradation process utilizes available dissolved oxygen contained in groundwater, as well as other alternative electron acceptors, and as a result drives the system to a more anaerobic and reduced state.

The bacterial community present in the aquifer prior to carbohydrate addition adapts to the changed biogeochemical aquifer conditions. In the enhanced subsurface environment, the bacterial population adjusts: facultative species begin to use alternative electron acceptors in the absence of oxygen and populations of obligately anaerobic species dominate. A bacterial community capable of fermenting carbohydrate sugars develops. Fermentation end products like volatile fatty acids and alcohols are further degraded to carbon dioxide, water and hydrogen is consumed as part of the reductive dechlorination process.

Hydrolysis and fermentation of carbohydrate ultimately result in the production of acetate and hydrogen, which serve as the most desirable sources of energy for bacteria using sulfate and carbon dioxide (CO_2) as electron acceptors. Methanogens use CO_2 as an electron acceptor and are the most noted metabolic group of obligatory anaerobic bacteria responsible for reductive dechlorination – which is the transformation of CVOCs into less chlorinated intermediates and finally to ethene, CO_2, and water.

4.1 Remedial Action Objective

The remedial action goal is to remediate groundwater to concentrations below the SCGs using enhanced in-situ bioremediation technology. This will be accomplished through ERD of CVOCs.

This remedial action was selected with consideration of the factors outlined in Section 1.10 Part 375 Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York. The factors, and the basis for consideration are the following:

(1) *Standards, criteria and guidance.* The remedial action conforms to standards and criteria that are generally applicable, consistently applied, and officially promulgated.

(2) *Overall protectiveness of public health and the environment.* The remedial action is designed to bring site conditions into compliance with NY State guidance and regulations, and is therefore protective of public health and the environment.

(3) *Short-term effectiveness*. The remedial action, as demonstrated in the pilot test, results in relatively quick destruction of the CVOCs and as such is an effective short-term remedy.

(4) *Long-term effectiveness*. The remedial action is designed to bring the site conditions into compliance with the NY State guidance and regulations, and is therefore an effective long-term remedy.

(5) *Reduction of toxicity, mobility, and volume with treatment*. The remedial action is designed to permanently destroy the CVOCs, in place. As such it is the most preferable remedial technology in the hierarchy included in the code.

(6) *Feasibility*. As demonstrated by the pilot test, the remedial action is the most appropriate technology for the target CVOCs in the site setting, and as such is feasible.

(7) *Community Acceptance*. The remedial action is timely and unintrusive, and because it is designed to result in the complete

destruction of the CVOCs, it is expected to be very acceptable to the community.

4.2 In-Situ Bioremediation Pilot Test

A 10-month in-situ bioremediation pilot test was conducted to evaluate the effectiveness of ERD of CVOCs in groundwater beneath the site and also to furnish design information for use in the larger full-scale approach. The pilot test was conducted from September 2000 to July 2001 and included 22 substrate injections and 22 performance monitoring events. The scope and results of the pilot test are summarized in the following sections.

4.2.1 Pilot Test Scope

The pilot test scope consisted of the establishment of an IRZ in the unconsolidated aquifer through regularly scheduled substrate injections. The formation of the IRZ was tracked by conducting multiple performance monitoring events. Prior to initiating the pilot test, two baseline rounds of groundwater sampling were conducted to evaluate the physical and chemical characteristics of the groundwater environment beneath the site. The first round was conducted during July 5 through 7, 2000 and included wells/monitoring points MW-HP-1S, MW-HP-1D, MW-2S, MW-4S, MW-7S, MW-HP-8S, GP-102S, GP-103, and GP-107 (refer to Figure 6 for well locations). Based on the results of the first baseline monitoring event, monitoring wells PTW-1 and PTW-2 were installed for the purpose of monitoring groundwater downgradient of the carbohydrate injection well. The second sampling round was conducted during September 14 and 15, 2000 and included wells/monitoring points PTW-1, PTW-2, GP-104, GP-105, and GP-106. In addition, during month 8 of the pilot test, wells IW-1 through IW-4 were installed to further define the area of influence of the pilot test IRZ. Following the installation of IW-1 through IW-4, an interim monitoring event was conducted during May 3 and 4, 2001 and included wells/monitoring points MW-HP-1S, PTW-1, PTW-2, IW-1 through IW-4, GP-104, and GP-105. The analytical and field parameter results are summarized on Table 4.

Monitoring point GP-107 was selected as the substrate injection point because it is located in an area which has historically shown elevated concentrations of TCE and is also located in close proximity to several existing monitoring points in downgradient and sidegradient directions. The upper portion of the overburden unit was targeted because this is where the highest TCE concentrations were detected. The substrate injections were performed on a biweekly schedule to maintain the IRZ once established. The concentration of the substrate used for the first three injections was 20:1 (water to molasses) and its volume was approximately 100 gallons. Following the third injection the ratio was adjusted to 10:1 and the volume was kept at 100 gallons. After the tenth injection, the ratio remained at 10:1 and the volume was increased to 200 gallons for the remainder of the pilot test.

Substrate injections were performed using a centrifugal pump. The water and molasses were mixed using the pump and a stirring rod in 55-gallon drums. Following a thorough mixing of the solution, it was injected under low pressure (approximately 2 to 12 pounds per square inch [psi]) into GP-107. Prior to each injection, field data was collected (such as pH) and groundwater samples were collected for analysis of total organic carbon (TOC) and dissolved organic carbon (DOC). The results from these analyses were continuously reviewed throughout the pilot program to adjust the reagent strength and volume to ensure that the injections would not initiate excessive fermentation processes, which can lower pH. Field parameter data, analytical results, and substrate volume and ratio data for the injection well are presented in Appendix C.

To confirm the establishment of the IRZ and to track its progress, performance monitoring of select wells was conducted on a biweekly schedule. Wells immediately downgradient and sidegradient of injection well GP-107 (PTW-1, PTW-2, MW-HP-1S) were monitored for field parameters (dissolved oxygen [DO], pH, specific conductivity, and oxidation-reduction potential [ORP]) prior to each substrate injection. The wells used for performance monitoring were PTW-1, PTW-2, GP-104, GP-105, GP-106, MW-HP-1S, and IW-1 through IW-4. Performance monitoring wells were also sampled for TOC/DOC to help evaluate the development and growth of the IRZ.

Wells within the IRZ or immediate area, were monitored for CVOCs and indicator parameters. The indicator parameters included ethane, ethene, carbon dioxide, methane, dissolved iron, ferrous iron, sulfate, and sulfide. Results for CVOCs, ethane, and ethene allowed for an evaluation of the degradation of site CVOCs. The remaining parameters aided in determining the area and strength of the IRZ. Results of the performance monitoring events are summarized in the following section.

4.2.2 Pilot Test Results

The results of the 10-month pilot test indicate that an IRZ has been established and that ERD is occurring within the IRZ. Concentrations of TCE have been significantly reduced within the pilot test study area while daughter products such as cis-1,2-DCE and ethene have increased. The analytical and field data are presented in Appendix C. Trend graphs for select wells within the IRZ, illustrating concentration trends throughout the duration of the pilot test, are included in Appendix D. The following sections summarize the pilot test results.

4.2.2.1 *Establishment of In-Situ Reactive Zone*

As discussed in Section 4.2.1, substrate injections were performed to create an IRZ for the purpose of treating TCE and other CVOCs. Reducing conditions were established at injection well GP-107 two weeks after the first substrate injection was performed. Total organic carbon concentrations reached 1,000 mg/L (the minimum TOC concentration target for injection points) approximately 1.5 months after the first injection. These conditions were maintained at the injection well throughout the pilot test.

Substrate injections in GP-107 ceased 1.5 months prior to the end of the pilot test and injections were initiated at location GP-105. The purpose of transferring injections to GP-105 was to expand the IRZ while awaiting approval for the full-scale system and to quantify how long a sufficient substrate concentration (e.g., 1,000 mg/L TOC) would remain at location GP-107. Substrate concentrations remained adequate at location GP-107 for a period of 2 months. This would indicate that maintenance dosing could be performed at a frequency of every 2 months once the IRZ is established.

Field data and analytical data (TOC and DOC) indicate that during the pilot test, the IRZ encompassed an area downgradient of GP-107 that included wells PTW-1, PTW-2, and MW-HP-1S at 1.5 months, 5 months, and 10 months after the first injection respectively. Evidence of conversion to a reducing groundwater environment was observed at locations PTW-2 and MW-HP-1S during the months of December and January. Sampling of monitoring wells in this portion of the IRZ during the snowmelt period occurring during late winter (2001) seemed to indicate a reversal from reducing conditions to more oxidizing conditions. It is believed that surface infiltration of rainfall and snowmelt, and possible leakage from a stormwater line that runs across the pilot test area near MW-HP-1S may have reoxygenated groundwater in the area. If this is the case, the effect was temporary and localized. Significant ERD was subsequently observed in the area.

Based on the results of the 10-month pilot test, the IRZ radius of influence (ROI) has been calculated to be approximately 15 feet at a location 50 feet downgradient of injection point GP-107. It is anticipated that the IRZ ROI will continue to increase as the IRZ progresses downgradient. The calculated ROI for the IRZ will assist in design of the full-scale bioremediation system.

4.2.2.2 Enhanced Reductive Dechlorination

The pilot test results indicate that ERD is occurring in groundwater beneath the site. Analytical results indicate that concentrations of TCE decreased in wells PTW-1, PTW-2, and MW-HP-1S while the daughter products (primarily cis-1,2-DCE and ethene) have increased (Appendices C and D). Based on the field data, TOC, and DOC results, the IRZ has encompassed these monitoring points and is believed to be the catalyst for the ERD of TCE. Additionally, the effects of the bioremediation occurring within the IRZ extend downgradient of the immediate pilot test area as evidenced by the reduced TCE concentrations and increased cis-1,2-DCE and ethene concentrations at downgradient location GP-104. Location GP-104 is approximately 90 feet downgradient of injection point GP-107. The following is a summary of the analytical results for wells PTW-1, PTW-2, MW-HP-1S, and GP-104.

Concentrations of TCE in PTW-1 (immediately downgradient of injection well GP-107) decreased from 3,100 ug/L detected in September 2000 (pre-pilot test) to 19 ug/L in July 2001 (post pilot test). The TCE concentrations began to decrease significantly in December 2000. Concentrations of cis-1,2-DCE increased from 1,500 ug/L (pre-pilot) to 2,400 ug/L (post-pilot). Vinyl chloride has not been detected as of the end of the pilot test but ethene concentrations (a daughter product of vinyl chloride) have increased from 94 nanograms per liter (ng/L) (pre-pilot) to 290 ng/L in December 2000. Following December 2000, ethene decreased to non-detectable concentrations. In addition to the reduction of TCE within the pilot test area, biogeochemical analysis and field parameter results support the conclusion that ERD is occurring. Field data collected at well PTW-1 indicate anaerobic and reducing conditions characterized by low dissolved oxygen and ORP concentrations. Biogeochemical indicators supporting ERD include sulfate and nitrate reduction, increased sulfide and nitrite, and increased organic carbon.

Additionally, increasing methane concentrations, coupled with strongly reducing conditions, indicate that methanogenesis is occurring. Reduced and depleted oxygen, nitrate, and sulfate concentrations (depleted electron acceptors) further support this conclusion. Methanogenic conditions have been repeatedly shown to be conducive to ERD processes during TCE bioremediation.

Concentrations of TCE detected in PTW-2 (downgradient of well PTW-1) decreased overall from 8,400 ug/L (pre-pilot) to 2,500 ug/L (post-pilot). Prior to the end of the pilot test, in May and June 2001, concentrations of TCE decreased to 380 and 480 ug/L respectively and subsequently increased to 2,500 ug/L. Concentrations of TCE are present upgradient of the study area, which could be contributing to the concentration rebound. Concentrations of cis-1,2-DCE have increased slightly (from 1,600 to 1,900 ug/L) during the pilot test with many concentration fluctuations. Concentrations of ethene have also illustrated an increasing trend.

Field data collected at well PTW-2 indicate anaerobic and reducing conditions characterized by low dissolved oxygen and ORP concentrations. Biogeochemical indicators supporting ERD include sulfate and nitrate reduction, increased nitrite, and increased organic carbon. Furthermore, it appears that methane concentrations are increasing, suggesting that the environment is approaching methanogenic conditions.

Concentrations of TCE in MW-HP-1S decreased from 9,200 ug/L (pre-pilot) to 2,700 ug/L (post-pilot). Concentrations of cis-1,2-DCE have fluctuated throughout the pilot test with no apparent trend. Ethene concentrations increased significantly near the end of the pilot test. Field data collected at well MW-HP-1S (downgradient of well PTW-2) indicate anaerobic and reducing conditions characterized by low dissolved oxygen and ORP concentrations. Biogeochemical indicators supporting ERD include decreasing sulfate, increasing sulfide, and an increase in organic carbon. Because the IRZ encompassed this location near the end of the pilot test (based on field measurements and organic carbon concentrations), only slight concentration changes were observed in sulfate and sulfide. It is anticipated that these trends will increase during the interim injection activities. Based on the trends observed at upgradient locations within the pilot test area, methanogenic conditions will occur as the IRZ continues to encompass the area.

Although the IRZ had not reached downgradient location GP-104 as of the end of the pilot test, TCE has decreased from 5,900 ug/L (pre-pilot) to 1,500 ug/L (post-pilot) and cis 1,2-DCE has increased from 1,000 ug/L (pre-pilot) to 2,700 ug/L (post-pilot) indicating that TCE is being degraded in the upgradient groundwater. Also, ethene and sulfide concentrations are increasing

In summary, the pilot test successfully demonstrated the establishment of an IRZ and the destruction of the target CVOCs. Additional evidence of ERD includes continued anaerobic and reducing conditions with sufficient organic carbon, increases in daughter product concentrations with the reduction of TCE, electron acceptor depletion (e.g., nitrate and sulfate), and increased reduced byproducts of electron acceptors such as nitrite and sulfide. These indicators suggest that the groundwater environment in the IRZ area has been transitioned to methanogenic conditions favorable for rapid and complete degradation of CVOCs. These conditions are expanding over the pilot test area, reducing significant amounts of TCE mass.

It is not uncommon when using ERD to degrade CVOCs to see a lag in the degradation step from cis-1,2-DCE to vinyl chloride. The continued flux of contaminant mass from the source area into the pilot area, as well as the transitory state of daughter products further complicates this step in a limited pilot test. If necessary, ARCADIS G&M will address reduction of cis-1,2-DCE by "seeding" the injection network (bioaugmentation) with purge water from a portion of the site where there is evidence of cis-1,2-DCE degradation (MW-2). The purge water would be used to mix the substrate solution for injection into the IRZ. However, because vinyl chloride, ethene, and ethane have been detected in groundwater at the site, it is likely that longer microbial acclimation (lag) is required for this site and the reduction of cis-1,2-DCE will occur. ARCADIS G&M has observed lag times as long as 15 months at other IRZ sites.

4.3 In-Situ Bioremediation Full Scale System

The full-scale in-situ bioremediation system has been conceptually designed based on the results of the pilot test as summarized in Sections 4.1 and 4.2. The system described in this work plan will address the remediation of CVOCs detected in on-site groundwater.

4.3.1 Full Scale System Scope

The full-scale remedial system will address on-site groundwater remediation through the use of enhanced in-situ bioremediation technology. An IRZ will be established in groundwater to promote ERD of CVOCs.

4.3.2 Full Scale System Design

A series of injection points will be installed onsite for the delivery of a substrate solution to create an IRZ. Injection points will be spaced across the width of the plume to form injection lines. The shallow overburden groundwater system (approximately 10 to 20 feet bgs) will be targeted for remediation. Injection points will be constructed with screens in this zone. Typical injection point construction details are provided on

Figure 8. ARCADIS G&M anticipates that a total of six treatment lines will be utilized for the full-scale system. Each treatment line will consist of approximately three to five injection points. Performance monitoring points will be located downgradient of each treatment line to evaluate IRZ development and document the results. Figure 8 shows the locations of the proposed injection lines and performance monitoring points.

Injection points will be spaced approximately 30 feet apart for each treatment line based on a 15 foot ROI determined during the pilot test. The distance between treatment lines will be approximately 90 feet. Because the injection lines will act as reactive zones, by treating groundwater as it flows across them, it is not necessary to saturate the whole footprint of the plume with a substrate solution. Therefore, injection lines spaced 90 feet apart extending across the width of the on-site plume will adequately address complete on-site remediation.

Substrate injections will be conducted approximately every 2 months once an IRZ is established at each injection point. It was demonstrated during the pilot test that a sufficient organic carbon load (greater than 1,000 mg/L TOC) will last for up to 2 months. Organic carbon concentrations and pH will be monitored regularly (refer to Section 4.5). The concentration of solution for each injection point will be 10:1 (water to molasses) and the volume will be 200 gallons per injection point. The concentration and volume for each injection may be adjusted based on actual field conditions identified during performance monitoring activities. Based on results of field monitoring activities, substrate injections may be further enhanced by a broader range of substrate options for optimizing site remediation including, but not limited to: pH buffering, additions of a broader suite of substrates (e.g.; Regenesis's Hydrogen Release Compound, cheese whey, etc.), or the addition of supplemental nutrients. Prior notice, as necessary, to NYSDEC and approval (by NYSDEC) prior to modifying substrate injections (i.e., other than concentration or volume modification of the Pilot Tested carbohydrate substrate) will be provided.

If, during the installation of the injection points, or any other investigatory activities, additional contamination is discovered, the area will be fully investigated. In accordance with the VCP agreement, the results of the investigation will be forwarded to the NYSDEC along with an appropriate plan for addressing the material.

4.4 Contingency Plan

Following the establishment of the full scale IRZ, the effectiveness will be gauged through regular performance monitoring as detailed in Section 4.5. The time-related cleanup goals, which were derived from the degradation trends observed during the pilot test, are presented in Table 5. An alternative method of remediation or Contingency Plan, will be implemented if the time-related goals in Table 5 are exceeded by 20% for 2 consecutive years. The Contingency Plan will be implemented after NYSDEC and NYSDOH approval.

4.5 Remedial Action Process and Performance Monitoring

To monitor the progress and effectiveness of the remedial action, process and performance monitoring will be conducted. Process monitoring will include groundwater sampling of injection points, while performance monitoring is focused on monitoring wells.

4.5.1 Groundwater Sampling

The injection wells and performance monitoring wells will be periodically sampled to track the progress of the IRZ and confirm the effectiveness of the remedial action. Once the IRZ is fully established, the injection well network and frequency will be varied to maintain ideal conditions. Injection wells (Table 6) will be sampled for TOC, DOC, and field parameters on a quarterly basis. This monitoring is conducted to ensure that a sufficient concentration of organic carbon is maintained (i.e., greater than 1,000) and that pH concentrations are kept above 4.5 (to avoid the creation of excessive fermentative conditions). Based on the results of the injection well process monitoring, the substrate volume, concentration and injection location and frequency may be adjusted to maintain optimal conditions.

Performance monitoring wells (Table 7), as indicated on Figure 7, will be sampled for VOCs, TOC, DOC, and field parameters on a quarterly basis. Additional monitoring wells, including wells yet to be installed, may be added to these quarterly monitoring events as needed.

During the first and third quarters, additional samples will be collected for biogeochemical analysis that will include ethene, ethane, methane, carbon dioxide, dissolved iron, ferrous iron, sulfate, and sulfide. Quarterly monitoring of performance monitoring wells will help to determine the effectiveness of the remedial action. The results of the monitoring will be summarized and reported to the NYSDEC on a quarterly basis.

4.6 Schedule

Following NYSDEC approval of the RAWP, ARCADIS G&M is prepared to initiate the remedial action plan. The schedule for full-scale implementation will be provided upon completion of system design.

5. Monitoring Program

It is anticipated that the remedial action, once implemented, will continue for an estimated 2 to 5 years. Following the conclusion of remedial activities, a Final Engineering Report will be submitted to NYSDEC summarizing the remedial action results. Following submission and approval of the Final Engineering Report, ARCADIS G&M anticipates that a quarterly groundwater monitoring program will be established for a minimum period of 2 years and will include the sampling of select wells for analysis of CVOCs. The results of the monitoring will be summarized and reported to the NYSDEC on a quarterly basis.

6. Quality Assurance/Quality Control Program

A Quality Assurance/Quality Control (QA/QC) Plan will detail the activities to be undertaken to ensure the quality of all data and data collection activities associated with the implementation and monitoring of the remedial action. The QA/QC will be submitted under separate cover.

7. Health & Safety Program

A Health & Safety Plan (HASP) will provide guidance to ensure the safety of all persons associated with the remedial actions at the Site. The HASP will detail the health and safety procedures to be undertaken for the specific work task to be performed during the remediation of the Site. The HASP will be submitted to the NYSDEC under separate cover.

8. Final Engineering Report

Following conclusion of the remedial action a Final Engineering Report will be prepared and submitted to NYSDEC for review and approval. The Final Engineering Report will summarize remedial activities, including the results of performance monitoring sampling, and will include a monitoring program for groundwater if required. A recommendation for site closure may be proposed based on the remedial action results.

9. References

The Cody Ehlers Group. 1999. Summary of Environmental Conditions, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, New York. February 23, 1999.

The Cody Ehlers Group. 1999. April 1999 Soil Removal Summary Report, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, New York. June 24, 1999.

Hall, Leo. M. 1968. Bedrock Geology in the Vicinity of White Plains, New York. University of Massachusetts, May 1968.

Leggette, Brashears & Graham, Inc. 2000. Summary of Remedial Investigative Findings, Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, Westchester County, New York. June 1, 2000.

TABLES

Table 1. Summary of Investigative Reports Submitted by Previous Consultants, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

Report	Consultant	Date Submitted
Summary of Environmental Conditions, Kings Electronics Co., Inc.	The Cody Ehlers Group	February 23, 1999
April 1999 Soil Removal Summary Report, Kings Electronics Co., Inc.	The Cody Ehlers Group	June 24, 1999
Summary of Remedial Investigative Findings, Kings Electronics, Co., Inc.	Leggette, Brashears & Graham, Inc.	June 1, 2000

Table 2. Standards, Cleanup, and Guidance Values for Select Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

Parameters (ug/L)	NYSDEC Standard (a)
Vinyl chloride	2
1,1-Dichloroethylene	5
cis-1,2-Dichloroethylene	5
trans-1,2-Dichloroethylene	5
Tetrachloroethylene	5
1,1,1-Trichloroethane	5
Trichloroethylene	5

ug/L Micrograms per liter, equivalent to parts per billion.
NYSDEC New York State Department of Environmental Conservation.
(a) Source: NYSDEC Division of Water Technical and Operational Guidance Series (TOGS) (1.1.1), Ambient Water Quality Standards and Guidance Values, June 1998.

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

	Well ID:	MW-1	MW-1	MW-1	MW-1	MW-2	MW-2	MW-2	MW-3
	Screened Interval (ft bls):	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	10 - 20	33 - 38
CONSTITUENT	Target Interval:	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Deep OB
(Units in ug/L)	Date:	6/20/1995	8/8/1997	7/29/1998	4/5/2000	7/29/1998	4/6/2000	7/12/2001	7/29/1998
Trichloroethene		11	74	24	58.9	260	90.8	9	2.3
cis-1,2-Dichloroethene		ND	15	7.6	5.4	270	56	7	1.2
trans-1,2-Dichloroethene		ND	ND	ND	ND	2.4	1.3	ND	ND
Vinyl Chloride		4.4	2	1.3	ND	160	16	2	ND
1,1-Dichloroethene		ND	3	1.9	ND	7.2	ND	ND	ND
1,1,1-Trichloroethane		32	62	23	109	ND	1.4	ND	ND
Tetrachloroethene		1.7	14	13	13.9	1.9	3.5	ND	5.9
1,1-Dichloroethane		ND	ND	ND	7.2	ND	0.97	NA	ND
1,2-Dichloroethane		ND	ND	ND	ND	ND	ND	NA	ND
1,1,2-Trichloroethane		ND	ND	ND	ND	ND	ND	NA	ND
Total 1,2-Dichloroethene		ND	ND	ND	0.93	ND	0.46	NA	ND

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: / Screened Interval (ft bls): / Target Interval: / Date:	MW-3		MW-4S		MW-4S		MW-4D		MW-4D		MW-5S		MW-5S		MW-5D	
	Screened Interval (ft bls):	33 - 38		10 - 20		10 - 20		10 - 20		10 - 20		10 - 20		10 - 20		22 - 27	
	Target Interval:	Deep OB		Shallow OB		Shallow OB		Deep OB		Deep OB		Shallow OB		Shallow OB		Deep OB	
	Date:	4/5/2000		7/29/1998		4/5/2000		7/29/1998		4/5/2000		7/29/1998		4/5/2000		7/29/1998	
Trichloroethene		1.4		190		4.6		44		3.8		10		23.3		24	
cis-1,2-Dichloroethene		ND		25		ND		11		ND		3.4		2.5		7.7	
trans-1,2-Dichloroethene		ND		ND		ND		ND		ND		ND		ND		ND	
Vinyl Chloride		ND		ND		ND		ND		ND		ND		ND		ND	
1,1-Dichloroethene		ND		1	J	ND		.8	J	ND		ND		ND		2.4	
1,1,1-Trichloroethane		ND		31		0.9		16		1.7		1.4		4.4		8.1	
Tetrachloroethene		1.5		6.4		1.1		3.3		ND		1.2		0.67		3.2	
1,1-Dichloroethane		ND		16		ND		10		ND		9.8		2.9		12	
1,2-Dichloroethane		ND		ND		ND		ND		ND		ND		ND		ND	
1,1,2-Trichloroethane		ND		ND		ND		ND		ND		ND		ND		ND	
Total 1,2-Dichloroethene		1.2		ND		ND		ND		ND		ND		ND		ND	

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

ARCADIS

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	MW-5D 22 - 27 Deep OB 4/5/2000	MW-6S 10 - 20 Shallow OB 7/29/1998	MW-6S 10 - 20 Shallow OB 4/5/2000	MW-6S 10 - 20 Shallow OB 8/9/2001	MW-6D 38.5 - 48.5 Deep OB 7/29/1998	MW-6D 38.5 - 48.5 Deep OB 4/5/2000	MW-7S 9 - 20 Shallow OB 7/29/1998		MW-7S 9 - 20 Shallow OB 4/6/2000
Trichloroethene		8	58	88.9	76	11	25.4	200		177
cis-1,2-Dichloroethene		1.9	2.3	0.94	ND	ND	ND	30		32
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND		ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	8.2		ND
1,1-Dichloroethene		ND	1.1	ND	ND	ND	ND	ND		ND
1,1,1-Trichloroethane		5.9	19	12.6	12	ND	2.8	1.9		4.7
Tetrachloroethene		0.83	4.1	9.3	7	1.2	2.7	2.4		1.9
1,1-Dichloroethane		6.8	NA	NA	NA	NA	ND	0.8	J	1.6
1,2-Dichloroethane		ND	NA	NA	NA	NA	ND	ND		ND
1,1,2-Trichloroethane		ND	NA	NA	NA	NA	ND	ND		ND
Total 1,2-Dichloroethene		ND	NA	NA	NA	NA	ND	ND		ND

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

ARCADIS

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID:	MW-7S	MW-7D	MW-7D	MW-7D	MW-9S		MW-9S	MW-9S	MW-9D	
	Screened Interval (ft bls):	9 - 20	24 - 34	24 - 34	24 - 34	10 - 20		10 - 20	10 - 20	29.5 - 39.5	
	Target Interval:	Shallow OB	Deep OB	Deep OB	Deep OB	Shallow OB		Shallow OB	Shallow OB	Deep OB	
	Date:	7/12/2001	7/29/1998	4/6/2000	7/12/2001	12/14/2000		5/16/2001	7/12/2001	12/14/2000	
Trichloroethene		21	140	133	22	19000		10000	9400	360	
cis-1,2-Dichloroethene		6	18	6.2	ND	1800		1200	840	7	J
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND		ND	ND	ND	
Vinyl Chloride		ND	ND	ND	ND	150	J	250	140	ND	
1,1-Dichloroethene		ND	ND	ND	ND	ND		ND	ND	ND	
1,1,1-Trichloroethane		ND	2.6	7.1	ND	ND		ND	ND	ND	
Tetrachloroethene		ND	1.3	1.4	ND	160	J	79	ND	10	J
1,1-Dichloroethane		NA	ND	0.93	NA	NA		NA	NA	NA	
1,2-Dichloroethane		NA	ND	ND	NA	NA		NA	NA	NA	
1,1,2-Trichloroethane		NA	ND	ND	NA	NA		NA	NA	NA	
Total 1,2-Dichloroethene		NA	ND	ND	NA	NA		NA	NA	NA	

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

	Well ID:	MW-9D	MW-9D	MW-10	MW-10	MW-11	MW-11	MW-12	MW-12
	Screened Interval (ft bls):	29.5 - 39.5	29.5 - 39.5	12.4 - 22.4	12.4 - 22.4	13 - 23	13 - 23	12.9 - 22.9	12.9 - 22.9
CONSTITUENT	Target Interval:	Deep OB	Deep OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB
(Units in ug/L)	Date:	5/16/2001	7/12/2001	5/16/2001	7/12/2001	5/16/2001	7/12/2001	5/16/2001	7/12/2001
Trichloroethene		190	420	320	230	66	49	960	630
cis-1,2-Dichloroethene		2	ND	160	110	5	6	510	550
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	10	33
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	4	10	2	ND	ND	ND
Tetrachloroethene		6	8	13	10	3	3	31	27
1,1-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
Total 1,2-Dichloroethene		NA	NA	NA	NA	NA	NA	NA	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	GP-102 S 10 - 20 Shallow OB 9/21/1998	GP-102-S 10 - 20 Shallow OB 4/6/2000	GP-102-S 10 - 20 Shallow OB 7/12/2001	GP-102 D 23.5 - 33.5 Deep OB 9/21/1998	GP-102-D 23.5 - 33.5 Deep OB 4/6/2000	GP-102-D 23.5 - 33.5 Deep OB 7/12/2001	GP-103 3 - 13 Shallow OB 9/21/1998	GP-103 Shallow OB 7/6/2000
Trichloroethene		2200	1390	300	460	75.9	52	340	330
cis-1,2-Dichloroethene		51	146	61	7.7	7.7	6	3.0	28
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	6.9	ND	3.9	0.85	ND	0.8	ND
Tetrachloroethene		12	11.8	ND	3.6	ND	NA	29	27
1,1-Dichloroethane		ND	ND	NA	1.3	ND	NA	ND	NA
1,2-Dichloroethane		ND	ND	NA	ND	ND	NA	ND	NA
1,1,2-Trichloroethane		ND	ND	NA	ND	ND	NA	ND	NA
Total 1,2-Dichloroethene		ND	ND	NA	ND	0.53	NA	ND	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

	Well ID:	GP-104	GP-104	GP-104	GP-104	GP-104	GP-105	GP-105	GP-105
	Screened Interval (ft bls):	3 - 13	3 - 13	3 - 13	3 - 13	3 - 13	5 - 15	5 - 15	5 - 15
CONSTITUENT	Target Interval:	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB
(Units in ug/L)	Date:	9/21/1998	9/14/2000	5/3/2001	7/13/2001	7/26/2001	9/21/1998	9/14/2000	5/3/2001
Trichloroethene		3500	5900	200	1500	1500	26000	9600	5100
cis-1,2-Dichloroethene		360	1000	46	2400	2700	590	1500	1400
trans-1,2-Dichloroethene		2.1	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		4.4	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		12	ND	6	ND	ND	ND	ND	ND
Tetrachloroethene		85	ND	5	ND	ND	ND	ND	60
1,1-Dichloroethane		3.7	NA	NA	NA	NA	ND	NA	NA
1,2-Dichloroethane		ND	NA	NA	NA	NA	ND	NA	NA
1,1,2-Trichloroethane		1.8	NA	NA	NA	NA	ND	NA	NA
Total 1,2-Dichloroethene		ND	NA	NA	NA	NA	ND	NA	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	GP-105 5 - 15 Shallow OB 5/31/2001	GP-105 5 - 15 Shallow OB 6/14/2001	GP-105 5 - 15 Shallow OB 6/27/2001	GP-106 10 - 20 Shallow OB 9/21/1998	GP-106 10 - 20 Shallow OB 9/14/2000	GP-107 7 - 17 Shallow OB 9/21/1998	GP-121 6 - 16 Shallow OB 9/21/1998	GP-121-W 6 - 16 Shallow OB 4/6/2000
Trichloroethene		5900	4200	3200	200	100	13000	0.6	ND
cis-1,2-Dichloroethene		2100	1400	1300	15	32	1300	ND	ND
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	0.9	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	9.9	9	ND	0.7	2
Tetrachloroethene		51	40	ND	4.6	3	120	ND	ND
1,1-Dichloroethane		NA	NA	NA	7.7	NA	ND	ND	ND
1,2-Dichloroethane		NA	NA	NA	ND	NA	ND	ND	ND
1,1,2-Trichloroethane		NA	NA	NA	ND	NA	ND	ND	ND
Total 1,2-Dichloroethene		NA	NA	NA	ND	NA	ND	ND	ND

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

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Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: / Screened Interval (ft bls): / Target Interval: / Date:	PTW-1 9 - 19 Shallow OB 9/15/2000	PTW-1 9 - 19 Shallow OB 10/16/2000	PTW-1 9 - 19 Shallow OB 12/13/2000	PTW-1 9 - 19 Shallow OB 2/8/2001	PTW-1 9 - 19 Shallow OB 2/22/2001	PTW-1 9 - 19 Shallow OB 3/22/2001	PTW-1 9 - 19 Shallow OB 5/3/2001	PTW-1 9 - 19 Shallow OB 5/31/2001
Trichloroethene		3100	3980	190	35	47	85	4	ND
cis-1,2-Dichloroethene		1500	2000	2000	640	660	450	580	1600
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	62.2	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	7	ND	ND	ND	ND	6
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene		ND	111	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
Total 1,2-Dichloroethene		NA	NA	NA	NA	NA	NA	NA	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	PTW-1	PTW-1	PTW-1	PTW-2	PTW-2	PTW-2	PTW-2	PTW-2
	Screened Interval (ft bls):	9 - 19	9 - 19	9 - 19	7 - 17	7 - 17	7 - 17	7 - 17	7 - 17
	Target Interval:	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB	Shallow OB
	Date:	6/14/2001	6/27/2001	7/25/2001	9/14/2000	2/22/2001	3/22/2001	5/3/2001	5/31/2001
Trichloroethene		ND	20	19	8400	4800	3100	380	1400
cis-1,2-Dichloroethene		1200	1600	2400	1600	810	1100	1200	2500
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	6	ND
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene		ND	ND	ND	61	55	40	8	23
1,1-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
Total 1,2-Dichloroethene		NA	NA	NA	NA	NA	NA	NA	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	PTW-2 7 - 17 Shallow OB 6/14/2001	PTW-2 7 - 17 Shallow OB 6/27/2001	PTW-2 7 - 17 Shallow OB 7/25/2001	IW-1 10 - 20 Shallow OB 5/3/2001	IW-1 10 - 20 Shallow OB 5/31/2001	IW-1 10 - 20 Shallow OB 6/27/2001	IW-1 10 - 20 Shallow OB 7/25/2001	IW-2 10 - 20 Shallow OB 5/3/2001
Trichloroethene		1200	480	2500	21	68	75	220	440
cis-1,2-Dichloroethene		1300	3500	1900	4	19	13	32	310
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	4	3	6	3	ND
Tetrachloroethene		22	ND	28	2	2	4	9	6
1,1-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
Total 1,2-Dichloroethene		NA	NA	NA	NA	NA	NA	NA	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	IW-2 10 - 20 Shallow OB 6/14/2001	IW-2 10 - 20 Shallow OB 7/13/2001	IW-2 10 - 20 Shallow OB 7/25/2001	IW-3 10 - 20 Shallow OB 5/3/2001	IW-3 10 - 20 Shallow OB 6/14/2001	IW-3 10 - 20 Shallow OB 7/13/2001	IW-3 10 - 20 Shallow OB 7/25/2001	IW-4 10 - 20 Shallow OB 5/4/2001
Trichloroethene		860	1500	1300	670	460	410	440	2400
cis-1,2-Dichloroethene		790	1300	1300	62	33	26	25	22
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	2	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethene		17	36	28	9	ND	ND	ND	ND
1,1-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,2-Dichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
1,1,2-Trichloroethane		NA	NA	NA	NA	NA	NA	NA	NA
Total 1,2-Dichloroethene		NA	NA	NA	NA	NA	NA	NA	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

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CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	IW-4	IW-4	IW-4	DSW-1	DSW-2	DSW-PT	GP-2	MW-HP-1S
	Screened Interval (ft bls):	10 - 20	10 - 20	10 - 20	515 - 550	417.5 - 422.5	66 - 550	---	9 - 19
	Target Interval:	Shallow OB	Shallow OB	Shallow OB	Deep BR-FR.	Deep BR-FR.	Deep BR-FR.	Shallow OB	Shallow OB
	Date:	5/31/2001	6/27/2001	7/25/2001	4/6/2000	4/10/2000	4/10/2000	6/20/1995	7/29/1998
Trichloroethene		6200	7200	9900	ND	ND	ND	340	16000
cis-1,2-Dichloroethene		53	41	ND	54.6	53.5	71.4	ND	1700
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	12
Vinyl Chloride		ND	ND	ND	12.3	12.6	21.1	ND	3.4
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	14
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	15	6.9
Tetrachloroethene		ND	ND	ND	ND	ND	ND	ND	49
1,1-Dichloroethane		NA	NA	NA	ND	ND	ND	ND	1.1
1,2-Dichloroethane		NA	NA	NA	ND	ND	ND	ND	ND
1,1,2-Trichloroethane		NA	NA	NA	ND	ND	ND	ND	2
Total 1,2-Dichloroethene		NA	NA	NA	166	166	186	ND	ND

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	MW-HP-1S 9 - 19 Shallow OB 4/6/2000	MW-HP-1S 9 - 19 Shallow OB 7/7/2000	MW-HP-1S 9 - 19 Shallow OB 3/22/2001	MW-HP-1S 9 - 19 Shallow OB 5/3/2001	MW-HP-1S 9 - 19 Shallow OB 6/14/2001	MW-HP-1S 9 - 19 Shallow OB 7/13/2001	MW-HP-1S 9 - 19 Shallow OB 7/25/2001	MW-HP-1D 30 - 40 Deep OB 7/29/1998
Trichloroethene		7740	9700	3800	3800	3900	3400	2700	840
cis-1,2-Dichloroethene		875	1300	580	920	1200	1300	880	7.2
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	ND	1
Tetrachloroethene		62.4	ND	34	38	34	ND	ND	18
1,1-Dichloroethane		ND	NA	NA	NA	NA	NA	NA	ND
1,2-Dichloroethane		ND	NA	NA	NA	NA	NA	NA	ND
1,1,2-Trichloroethane		ND	NA	NA	NA	NA	NA	NA	ND
Total 1,2-Dichloroethene		ND	NA	NA	NA	NA	NA	NA	ND

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: Screened Interval (ft bls): Target Interval: Date:	MW-HP-1D 30 - 40 Deep OB 4/6/2000	MW-HP-1D 30 - 40 Deep OB 7/12/2001	MW-HP-2S 10 - 20 Shallow OB 7/29/1998	MW-HP-2S 10 - 20 Shallow OB 4/6/2000	MW-HP-2S 10 - 20 Shallow OB 7/12/2001	MW-HP-2D 24 - 34 Deep OB 7/29/1998	MW-HP-2D 24 - 34 Deep OB 4/6/2000	MW-HP-2D 24 - 34 Deep OB 7/12/2001
Trichloroethene		150	84	5	9.1	7	3	3	2
cis-1,2-Dichloroethene		1.8	8	1.8	11.4	4	0.6 J	ND	ND
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane		0.43	ND	ND	1.6	ND	ND	ND	ND
Tetrachloroethene		2.3	5	36	13.4	34	48	58.9	59
1,1-Dichloroethane		ND	NA	ND	1	ND	ND	ND	NA
1,2-Dichloroethane		ND	NA	ND	ND	ND	ND	ND	NA
1,1,2-Trichloroethane		ND	NA	ND	ND	ND	ND	ND	NA
Total 1,2-Dichloroethene		ND	NA	ND	1.3	ND	ND	ND	NA

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

Table 3. Historical Concentrations of Chlorinated Volatile Organic Compounds in Groundwater, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

CONSTITUENT (Units in ug/L)	Well ID: / Screened Interval (ft bls): / Target Interval: / Date:	MW-HP-8S 10 - 20 Shallow OB 7/29/1998	MW-HP-8S 10 - 20 Shallow OB 4/6/2000	MW-HP-8S 10 - 20 Shallow OB 7/6/2000	MW-HP-8D 48 - 58 Deep OB 7/29/1998		MW-HP-8D 48 - 58 Deep OB 4/6/2000
Trichloroethene		8.1	28.2	28.2	0.9	J	19.9
cis-1,2-Dichloroethene		ND	4.8	4.8	ND		ND
trans-1,2-Dichloroethene		ND	ND	ND	ND		ND
Vinyl Chloride		ND	ND	ND	ND		ND
1,1-Dichloroethene		ND	ND	ND	ND		ND
1,1,1-Trichloroethane		ND	5.7	5.7	ND		ND
Tetrachloroethene		1.9	5.7	5.3	20		6.1
1,1-Dichloroethane		1.9	ND	NA	1.9		ND
1,2-Dichloroethane		ND	ND	NA	ND		ND
1,1,2-Trichloroethane		ND	ND	NA	ND		ND
Total 1,2-Dichloroethene		ND	0.35	NA	ND		0.8

ug/L	Micrograms per liter
ft bls	Feet below land surface
ND	Not detected
NA	Not analyzed
NS	Not sampled
---	Screened interval not known
OB	Overburden
BR-FR	Bedrock fracture

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Table 4. Summary of Baseline and Interim Baseline Groundwater Monitoring Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

	Baseline Data							
	Up-gradient	Mid-plume						
Well ID:	MW-8S	GP-107	PTW-1	PTW-2	GP-105	MW-HP-1S	MW-HP-1D	GP-104
Parameter Date:	7/5/2000	7/7/2000	9/15/2000	9/14/2000	9/14/2000	7/7/2000	7/7/2000	9/14/2000
Field Parameters								
DO (mg/L)	7	2.33	0.54	1.2	3.29	5.91	0.63	2.12
REDOX (mV)	137.6	129.3	70	56	191	106.5	122.1	182
pH (SU)	6.99	6.73	7.21	7.6	6.77	7.24	7.28	6.66
Conductivity (mS/cm)	0.664	0.663	1.03	1.08	0.98	0.624	0.601	1.11
Chlorinated VOCs (ug/L)								
Trichloroethene	*28.2*	*13000*	3100	8400	9600	9200	*150*	5900
cis-1,2-Dichloroethene	*4.8*	*1300*	1500	1600	1500	1300	*1.8*	1000
trans-1,2-Dichloroethene	*ND*	*ND*	ND	ND	ND	ND	*ND*	ND
Vinyl Chloride	*ND*	*ND*	ND	ND	ND	ND	*ND*	ND
1,1-Dichloroethene	*ND*	*ND*	ND	ND	ND	ND	*ND*	ND
1,1,1-Trichloroethane	*5.7*	*ND*	ND	ND	ND	ND	*0.43*	ND
Tetrachloroethene	*5.3*	*120*	ND	61	ND	ND	*2.3*	ND
Biogeochemical Parameters								
TOC (mg/L)	10.7	2.47	6.98	8.88	6.2	7.37	3.23	4.73
DOC (mg/L)	3.6	1.23	6.5	6.77	5.55	4	2.6	4.35
Carbon Dioxide (mg/L)	24.98	--	51.27	43.23	47.1	25.19	16.76	47.81
Nitrogen (mg/L)	--	--	16.14	16.12	16.84		--	17.41
Methane (ug/L)	0.376	--	1.312	2.284	0.855	0.434	0.319	1.033
Ethane (ng/L)	23	--	534	378	388	113	32	236
Ethene (ng/L)	17	--	94	209	ND	28	31	73
Sulfide (mg/L)	ND	0.0015	0.014	0.018	0.0006	0.01	0.036	0.0053
Ferrous Iron (mg/L)	1.43	ND	0.03	0.02	ND	ND	0.01	0.0007
Dissolved Iron (ug/L)	ND	--	72.4	17.2	ND	ND	60.5	ND
Total Iron (ug/L)	200	--	1700	134	ND	95.4	3440	657
Dissolved Manganese (ug/L)	6.3	--	29.2	60.5	0.7	11.5	24	5.1
Total Manganese (ug/L)	20.2	--	90.1	59.9	2.3	29.4	141	31.2
Alkalinity (mg/L)	177	--	138	169	197	273	207	185
Chloride (mg/L)	111	--	145	149	125	134	185	153
Nitrate (mg/L)	6.43	--	5.08	6.47	5.55	7.83	2.45	6.99
Nitrite (mg/L)	ND	--	ND	ND	ND	ND	ND	ND
Sulfate (mg/L)	61.2	--	127	107	76	79.8	57.6	108
Total Phosphorus (mg/L)	--	--	0.15	ND	ND	--	--	0.31

Footnotes on last page.

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Table 4. Summary of Baseline and Interim Baseline Groundwater Monitoring Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

		Baseline Data					
		Distal			Side-gradient		
	Well ID:	GP-103	MW-7S	GP-102S	GP-106	MW-2S	MW-4S
Parameter	Date:	7/6/2000	7/6/2000	7/6/2000	9/14/2000	7/5/2000	7/5/2000
Field Parameters							
DO (mg/L)		0.47	0.96	2.29	5.39	0.86	6.61
REDOX (mV)		79.7	-50.3	146.1	184	157.4	137.6
pH (SU)		7.13	6.5	6.62	6.97	6.41	6.69
Conductivity (mS/cm)		0.865	0.504	0.76	0.97	0.593	0.549
Chlorinated VOCs (ug/L)							
Trichloroethene		330	*177*	*1390*	100	*90.8*	*4.6*
cis-1,2-Dichloroethene		28	*32*	*146*	32	*56*	*ND*
trans-1,2-Dichloroethene		ND	*ND*	*ND*	ND	*1.3*	*ND*
Vinyl Chloride		ND	*ND*	*ND*	ND	*16*	*ND*
1,1-Dichloroethene		ND	*ND*	*ND*	ND	*ND*	*ND*
1,1,1-Trichloroethane		ND	*4.7*	*6.9*	9	*1.4*	*0.9*
Tetrachloroethene		27	*1.9*	*11.8*	3	*3.5*	*1.1*
Biogeochemical Parameters							
TOC (mg/L)		3.83	4.92	3.5	4.56	19.4	3.39
DOC (mg/L)		2.15	8.76	2.04	3.37	14.1	1.63
Carbon Dioxide (mg/L)		40.5	102.87	45.03	30.62	60.86	28.96
Nitrogen (mg/L)		--	--	--	15.02	--	--
Methane (ug/L)		77.52	58.57	0.721	0.097	0.624	0.449
Ethane (ng/L)		631	679	74	8	1914	105
Ethene (ng/L)		88	304	ND	ND	1372	87
Sulfide (mg/L)		ND	0.012	0.01	0.003	0.006	0.01
Ferrous Iron (mg/L)		ND	3.24	0.02	0.01	0.01	ND
Dissolved Iron (ug/L)		107	10100	ND	ND	ND	23.2
Total Iron (ug/L)		17.2	13700	ND	49.5	21.6	117
Dissolved Manganese (ug/L)		1170	1780	1.6	ND	555	6.2
Total Manganese (ug/L)		1180	1680	12.2	5.2	502	57
Alkalinity (mg/L)		321	196	171	126	138	112
Chloride (mg/L)		171	66.1	172	195	43.3	109
Nitrate (mg/L)		1.59	1.66	4.47	3.1	5.06	2.92
Nitrite (mg/L)		ND	0.417	ND	ND	ND	ND
Sulfate (mg/L)		44.3	39.2	52.8	44.7	105	43.9
Total Phosphorus (mg/L)		--	--	--	0.25	--	--

Footnotes on last page.

g:\aproject\kings electronics\gw data\Table 4. baseline data for RAWP.xls\baseline data

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Table 4. Summary of Baseline and Interim Baseline Groundwater Monitoring Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

		Interim Baseline Data							
		Mid-plume							Side-gradient
	Well ID:	PTW-1	PTW-2	GP-105	IW-2	IW-3	IW-4	GP-104	IW-1
Parameter	Date:	5/3/2001	5/3/2001	5/3/2001	5/3/2001	5/3/2001	5/4/2001	5/3/2001	5/3/2001
Field Parameters									
DO (mg/L)		0.13	0.73	3.42	2.94	6.98	2.62	2.38	8.87
REDOX (mV)		-119.8	-114	76.3	-36.7	41.1	280.7	27	54.7
pH (SU)		6.44	6.81	6.68	7	7.75	7.11	6.85	7.22
Conductivity (mS/cm)		3.773	2.684	1.185	1.811	1.242	1.208	0.933	0.929
Chlorinated VOCs (ug/L)									
Trichloroethene		4	380	5100	440	670	2400	200	21
cis-1,2-Dichloroethene		580	1200	1400	310	62	22	46	4
trans-1,2-Dichloroethene		ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	6	ND	ND	2	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	ND	ND	ND	6	4
Tetrachloroethene		ND	8	60	6	9	ND	5	2
Biogeochemical Parameters									
TOC (mg/L)		568	331	3.64	12.8	4.5	2.99	2.55	3.83
DOC (mg/L)		520	165	3.34	9.48	3.99	2.72	2.5	3.29
Carbon Dioxide (mg/L)		340	100	40	71	6.9	16	31	18
Nitrogen (mg/L)		4.2	21	17	22	14	20	18	15
Methane (ug/L)		21000	330	3.4	44	1.3	7.8	19	1.6
Ethane (ng/L)		7.1	340	130	130	61	290	73	84
Ethene (ng/L)		12	120	<5	76	20	140	ND	24
Sulfide (mg/L)		0.038	0.02	0.003	0.013	0.06	0.261	0.002	0.007
Ferrous Iron (mg/L)		OR	OR	0.02	1.41	0.46	2.01	0.04	0.09
Dissolved Iron (ug/L)		323000	109000	39.5	1790	31.3	ND	26	41.7
Total Iron (ug/L)		324000	98900	438	2060	5760	29700	119	1010
Dissolved Manganese (ug/L)		63000	80000	89	19200	10.2	59.5	ND	19.4
Total Manganese (ug/L)		68200	72900	106	17000	251	1410	8	59.4
Alkalinity (mg/L)		1580	936	226	576	288	204	162	214
Chloride (mg/L)		209	206	163	210	154	243	132	115
Nitrate (mg/L)		ND	1.7	9.63	3.2	5.48	1.71	4.88	4.28
Nitrite (mg/L)		6.49	3.1	ND	ND	ND	ND	ND	ND
Sulfate (mg/L)		1.94	21.5	78.1	69.2	95.6	41.3	65.5	57.4
Total Phosphorus (mg/L)		ND	0.193	ND	0.161	10.5	1.93	0.258	0.198

Footnotes on last page.

g:\aproject\kings electronics\gw data\Table 4. baseline data for RAWP.xls\baseline data

Footnotes:

VOCs	Volatile organic compounds.	ug/L	Micrograms per liter.
mg/L	Milligrams per liter.	ng/L	Nanograms per liter.
mV	Millivolts.	--	Parameter not analyzed.
SU	Standard units.	ND	Not detected.
mS/cm	Millisiemens per centimeter.		

VOC concentrations in italics were results from samples collected on April 6, 2000, with the exception of GP107 which was collected in September 1998.

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Table 5. List of Monitoring Wells and Time Related Cleanup Goals for the Remedial Action, Kings Electronics Site Co., Inc. Site, Tuckahoe, New York.

Well ID	Constituent	Estimated Concentration (ug/L) at Startup		1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year
			Estimated TCE Degradation Rate:	-0.007275	-0.007275	-0.007275	-0.007275	-0.007275	-0.007275	-0.007275
			Estimated TVOC Degradation Rate:	-0.0019	-0.0019	-0.0019	-0.0019	-0.0019	-0.0019	-0.0019
MW-9S	Trichloroethene	9400		661	46	<5	<5	<5	<5	<5
	Total VOCs	10380		5188	2593	1296	648	324	162	<100
PTW-2	Trichloroethene	2500		176	12	<5	<5	<5	<5	<5
	Total VOCs	4428		2213	1106	553	276	138	<100	<100
GP-104	Trichloroethene	1500		105	7	<5	<5	<5	<5	<5
	Total VOCs	4200		2099	1049	524	262	131	<100	<100
GP-102S	Trichloroethene	300		21	<5	<5	<5	<5	<5	<5
	Total VOCs	361		180	<100	<100	<100	<100	<100	<100
MW-5S	Trichloroethene	23		<5	<5	<5	<5	<5	<5	<5
	Total VOCs	31		<100	<100	<100	<100	<100	<100	<100

These goals, based upon the degradation rates from the pilot test are for tracking progress. All compounds will be remediated in accordance with NYSDEC guidance and standards.

ug/L Micrograms per liter.

Table 6. Summary of Injection Well Monitoring, Kings Electronics Site Co., Inc., Tuckahoe, New York.

Injection Wells	TOC	DOC	Field Parameters*
Injection Line #1			
IW-5	X	X	X
IW-6	X	X	X
IW-7	X	X	X
Injection Line #2			
MW-11	X	X	X
MW-10	X	X	X
MW-12	X	X	X
MW-2	X	X	X
Injection Line #3			
IW-8	X	X	X
IW-9	X	X	X
IW-10	X	X	X
IW-11	X	X	X
Injection Line #4			
GP-106	X	X	X
IW-1	X	X	X
IW-2	X	X	X
IW-3	X	X	X
IW-4	X	X	X
Injection Line #5			
IW-12	X	X	X
IW-13	X	X	X
IW-14	X	X	X
Injection Line #6			
IW-15	X	X	X
MW-7S	X	X	X
IW-16	X	X	X

TOC Total organic carbon.
DOC Dissolved organic carbon.
* Field parameters include pH only.
Note: Active injection wells will be monitored on a quarterly basis.

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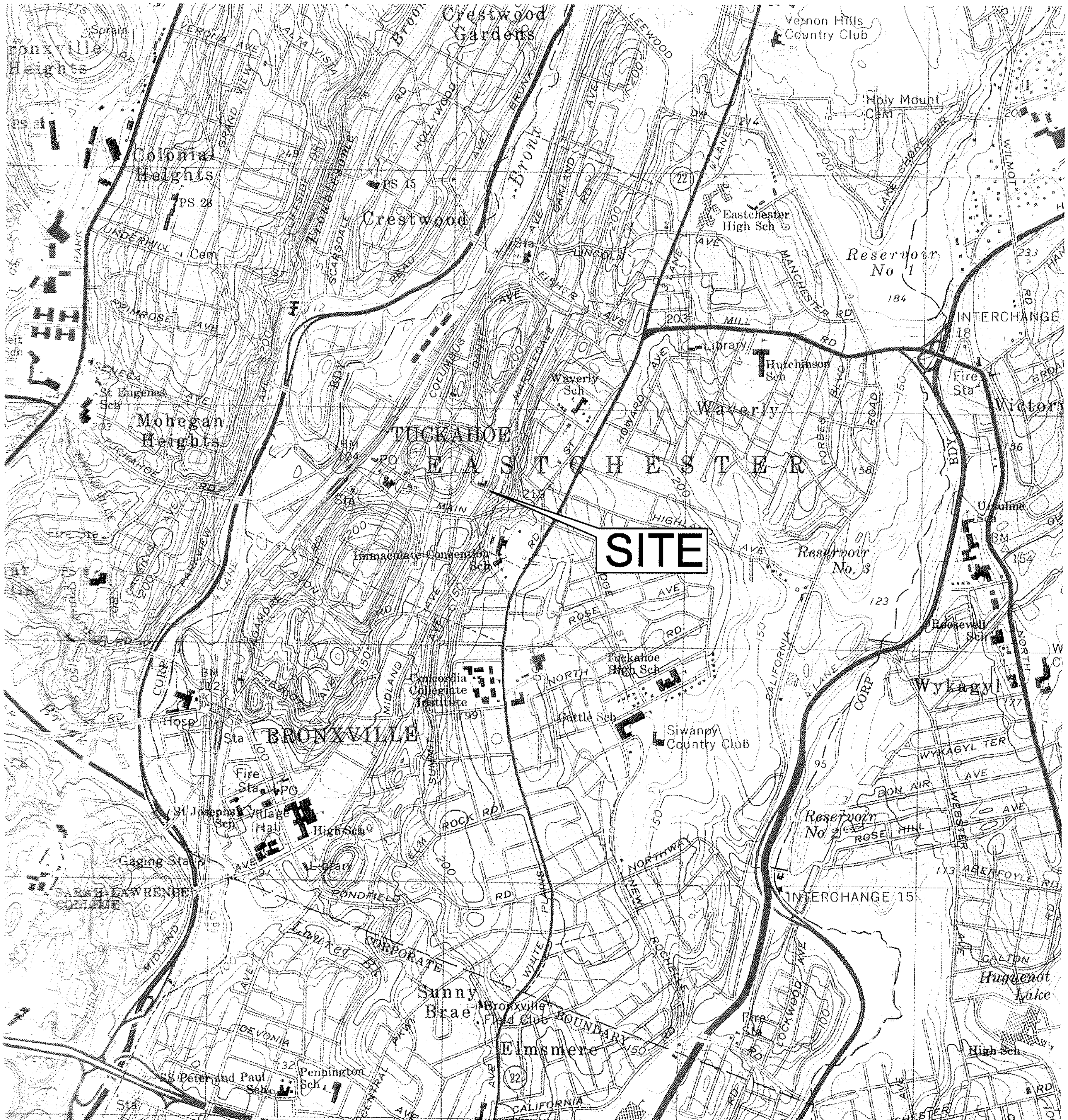
Table 7. Summary of Performance Monitoring Well Monitoring, Kings Electronics Site Co., Inc., Tuckahoe, New York.

Performance Monitoring Wells	TOC	DOC	Field Parameters*	CVOCs	Biogeo-chemical**
MW-6S	X	X	X	X	X
MW-9S	X	X	X	X	X
MW-13	X	X	X	X	X
PTW-2	X	X	X	X	X
GP-103	X	X	X	X	X
GP-104	X	X	X	X	X

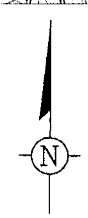
TOC Total organic carbon.
DOC Dissolved organic carbon.
CVOCs Chlorinated volatile organic compounds.
* Field parameters include pH, dissolved oxygen, oxidation-reduction potential, specific conductivity, and temperature.
** Biogeochemical analyses include ethene, ethane, methane, carbon dioxide, dissolved iron, ferrous iron, sulfate, and sulfide.
Note: Biogeochemical monitoring will be conducted on a semi-annual basis. All other parameters will be monitored quarterly.

FIGURES



SOURCE: U.S.G.S. 7.5 MINUTE QUADRANGLE, MT. VERNON, NY, 1995

QUADRANGLE LOCATION



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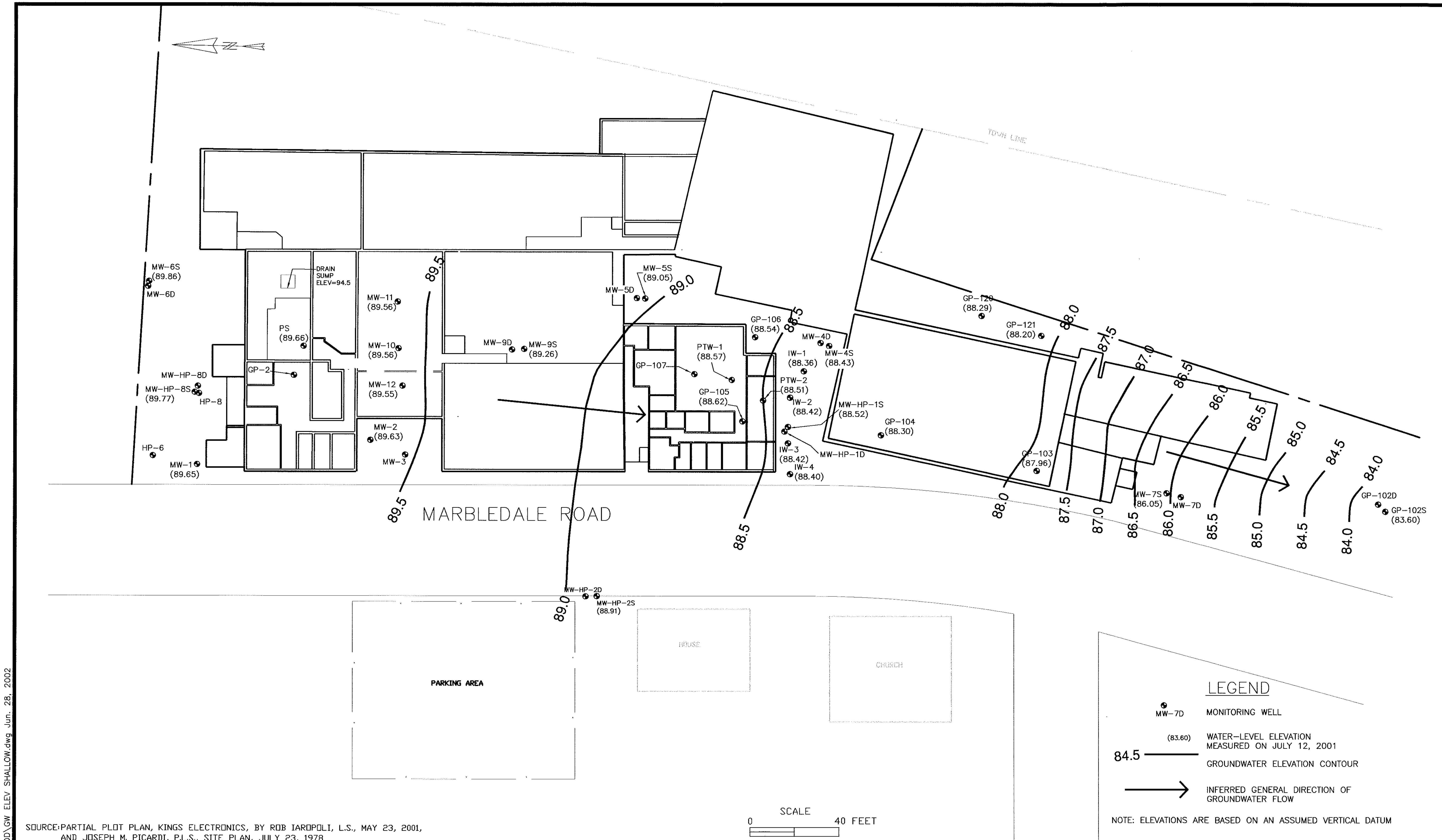
SCALE 0 2000 FEET	ARCADIS GERAGHTY & MILLER	DRAWN A.G. / DATE 9/18/01	PROJECT MANAGER	DEPARTMENT MANAGER T. ENG
		SITE LOCATION	LEAD DESIGN PROF. C. STOKES	CHECKED C.S.
		KINGS ELECTRONICS SITE TUCKAHOE, NEW YORK	PROJECT NUMBER NJ0423.02	DRAWING NUMBER 1



SOURCE: PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001, AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978

G:\Drafting\Kings\CADD\GW ELEV SHALLOW.dwg Jun. 28, 2002

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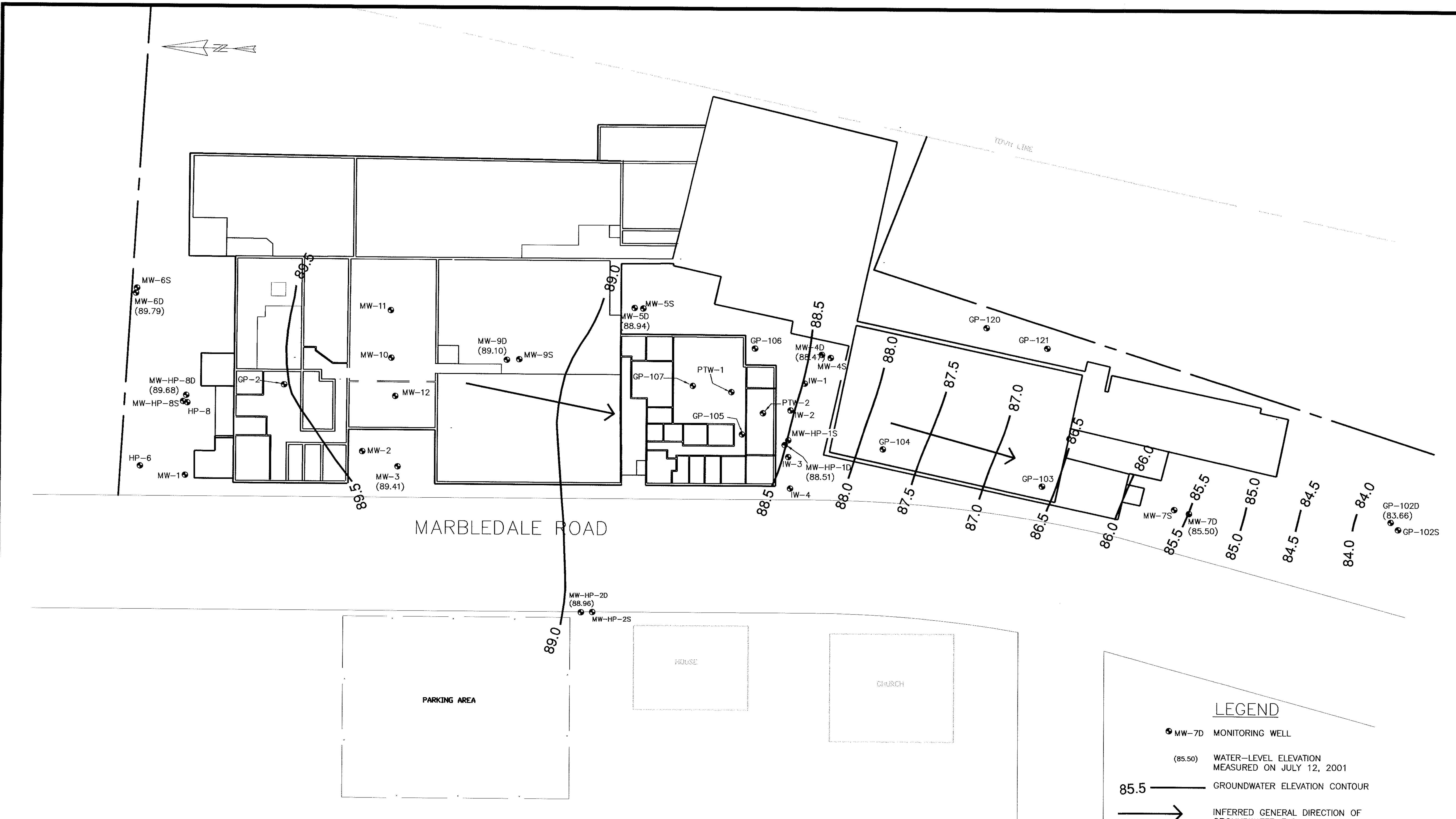
ARCADIS GERAGHTY&MILLER

KINGS ELECTRONICS SITE
TUCKAHOE, NEW YORK

DRAWN T.G.	DATE 8/16/01	PROJECT MANAGER K.MCGUINESS	DEPARTMENT MANAGER T.ENG
SHALLOW OVERBURDEN GROUNDWATER ELEVATION CONTOURS JULY 12, 2001		LEAD DESIGN PROF.	CHECKED E.RODRIGUEZ
		PROJECT NUMBER NJ00423.002	DRAWING NUMBER 2



SOURCE: PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001,
AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978

SCALE
0 40 FEET

LEGEND

- MW-7D MONITORING WELL
- (85.50) WATER-LEVEL ELEVATION MEASURED ON JULY 12, 2001
- 85.5 —— GROUNDWATER ELEVATION CONTOUR
- ⟶ INFERRED GENERAL DIRECTION OF GROUNDWATER FLOW

NOTE: ELEVATIONS ARE BASED ON AN ASSUMED VERTICAL DATUM

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KINGS ELECTRONICS SITE
TUCKAHOE, NEW YORK

DRAWN T.G.	DATE 8/16/01	PROJECT MANAGER K.MCGUINESS	DEPARTMENT MANAGER T.ENG
DEEP OVERBURDEN GROUNDWATER ELEVATION CONTOURS JULY 12, 2001		LEAD DESIGN PROF.	CHECKED E.RODRIGUEZ
		PROJECT NUMBER NJ00423.002	DRAWING NUMBER 3

Well ID	Date	Tetrachloroethene	Trichloroethene	1,1-Dichloroethene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,1,1-Trichloroethane	Vinyl Chloride
MW-6S	4/5/00	9.3	88.9	ND	0.94	ND	12.6	ND
MW-11	7/12/01	3	49	ND	6	ND	ND	ND
GP-107	9/21/98	120	13000	ND	1300	ND	ND	ND
MW-5S	4/5/00	0.67	23.3	ND	2.5	ND	4.4	ND
PTW-1	7/25/01	ND	19	ND	2400	ND	ND	ND
GP-106	9/14/00	3	100	ND	32	ND	9	ND
PTW-2	7/25/01	28	2500	ND	1900	ND	ND	ND
MW-4S	4/5/00	1.1	4.6	ND	ND	ND	0.9	ND
GP-121	4/6/00	ND	ND	ND	ND	ND	2	ND
MW-9S	7/12/01	ND	9400	ND	840	ND	ND	140
GP-103	7/6/00	27	330	ND	28	ND	ND	ND
IW-1	7/25/01	9	220	ND	32	ND	3	ND
GP-105	6/27/01	ND	3200	ND	1300	ND	ND	ND
MW-HP-8S	4/6/00	5.7	28.2	ND	4.8	ND	5.7	ND
MW-1	4/5/00	13.9	58.9	ND	5.4	ND	109	ND
MW-10	7/12/01	10	230	ND	110	ND	10	ND
IW-2	7/25/01	28	1300	ND	1300	ND	ND	ND
MW-HP-1S	7/25/01	ND	2700	ND	880	ND	ND	ND
GP-104	7/26/01	ND	1500	ND	2700	ND	ND	ND
MW-7S	7/12/01	ND	21	ND	6	ND	ND	ND
GP-102-S	7/12/01	ND	300	ND	61	ND	ND	ND
MW-2	7/12/01	ND	9	ND	7	ND	ND	2
IW-3	7/25/01	ND	440	ND	25	ND	ND	ND
MW-HP-2S	7/12/01	34	7	ND	4	ND	ND	ND
IW-4	7/25/01	ND	9900	ND	ND	ND	ND	ND
MW-12	7/12/01	27	630	ND	550	ND	ND	33

KEY

WELL ID — DATE SAMPLED

GP-102S 7/12/01

Analyte	Concentration (ppb)
Tetrachloroethene	ND
Trichloroethene	300
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	61
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

ANALYTE — CONCENTRATION (ppb)

LEGEND

MW-2 MONITORING WELL

ND NOT DETECTED

ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER LITER

SOURCE: PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001, AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978

SCALE 0 20 FEET

NO.	DATE	REVISION DESCRIPTION	BY / CKD

ARCADIS GERAGHTY&MILLER

KINGS ELECTRONICS SITE
TUCKAHOE, NEW YORK

CHLORINATED VOLATILE ORGANIC COMPOUNDS DETECTED IN SHALLOW OVERBURDEN GROUNDWATER

DRAWN: T.G. — DATE: 8/17/01

PROJECT MANAGER: K. MCGUINESS — DEPARTMENT MANAGER: T. ENG

LEAD DESIGN PROF. — CHECKED: E. RODRIGUEZ

PROJECT NUMBER: NJ00423.002 — DRAWING NUMBER: 4

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MW-6D	4/5/00
Tetrachloroethene	2.7
Trichloroethene	25.4
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	2.8
Vinyl Chloride	ND

MW-HP-8D	4/6/00
Tetrachloroethene	6.1
Trichloroethene	19.9
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

MW-9D	7/12/01
Tetrachloroethene	8
Trichloroethene	420
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

MW-5D	4/5/00
Tetrachloroethene	0.83
Trichloroethene	8
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	1.9
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	5.9
Vinyl Chloride	ND

MW-4D	4/5/00
Tetrachloroethene	ND
Trichloroethene	3.8
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	1.7
Vinyl Chloride	ND

MW-3	4/5/00
Tetrachloroethene	1.5
Trichloroethene	1.4
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

MW-HP-1D	7/12/01
Tetrachloroethene	5
Trichloroethene	84
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	8
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

MW-7D	7/12/01
Tetrachloroethene	ND
Trichloroethene	22
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

GP-102-D	7/12/01
Tetrachloroethene	NA
Trichloroethene	52
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	6
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

MW-HP-2D	7/12/01
Tetrachloroethene	59
Trichloroethene	2
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

KEY

WELL ID → ; DATE SAMPLED →

MW-7D	7/12/01
Tetrachloroethene	ND
Trichloroethene	22
1,1-Dichloroethene	ND
cis-1,2-Dichloroethene	ND
trans-1,2-Dichloroethene	ND
1,1,1-Trichloroethane	ND
Vinyl Chloride	ND

ANALYTE → ; CONCENTRATION (ppb) →

LEGEND

MW-7D MONITORING WELL

ND NOT DETECTED

ppb PARTS PER BILLION, EQUIVALENT TO MICROGRAMS PER LITER

SOURCE: PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001, AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978

SCALE 0 20 FEET

NO.	DATE	REVISION DESCRIPTION	BY CKD

ARCADIS GERAGHTY&MILLER

KINGS ELECTRONICS SITE
TUCKAHOE, NEW YORK

CHLORINATED VOLATILE ORGANIC COMPOUNDS DETECTED IN DEEP OVERBURDEN GROUNDWATER

DRAWN	DATE	PROJECT MANAGER	DEPARTMENT MANAGER
T.G.	8/20/01	K. MCGUINESS	T. ENG
		LEAD DESIGN PROF.	CHECKED E. RODRIGUEZ
		PROJECT NUMBER NJ00423.002	DRAWING NUMBER 5

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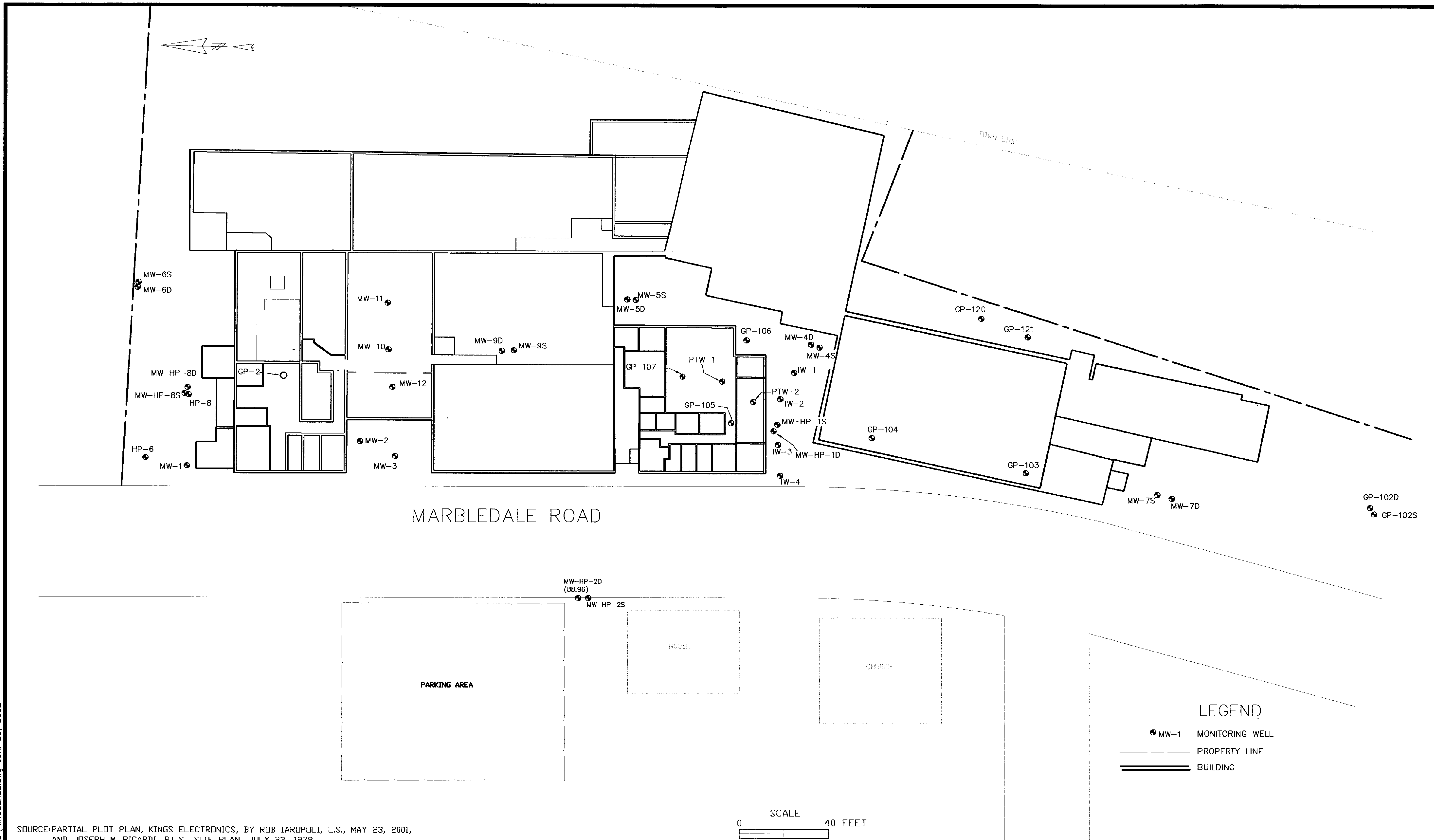

SOURCE: PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001, AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978

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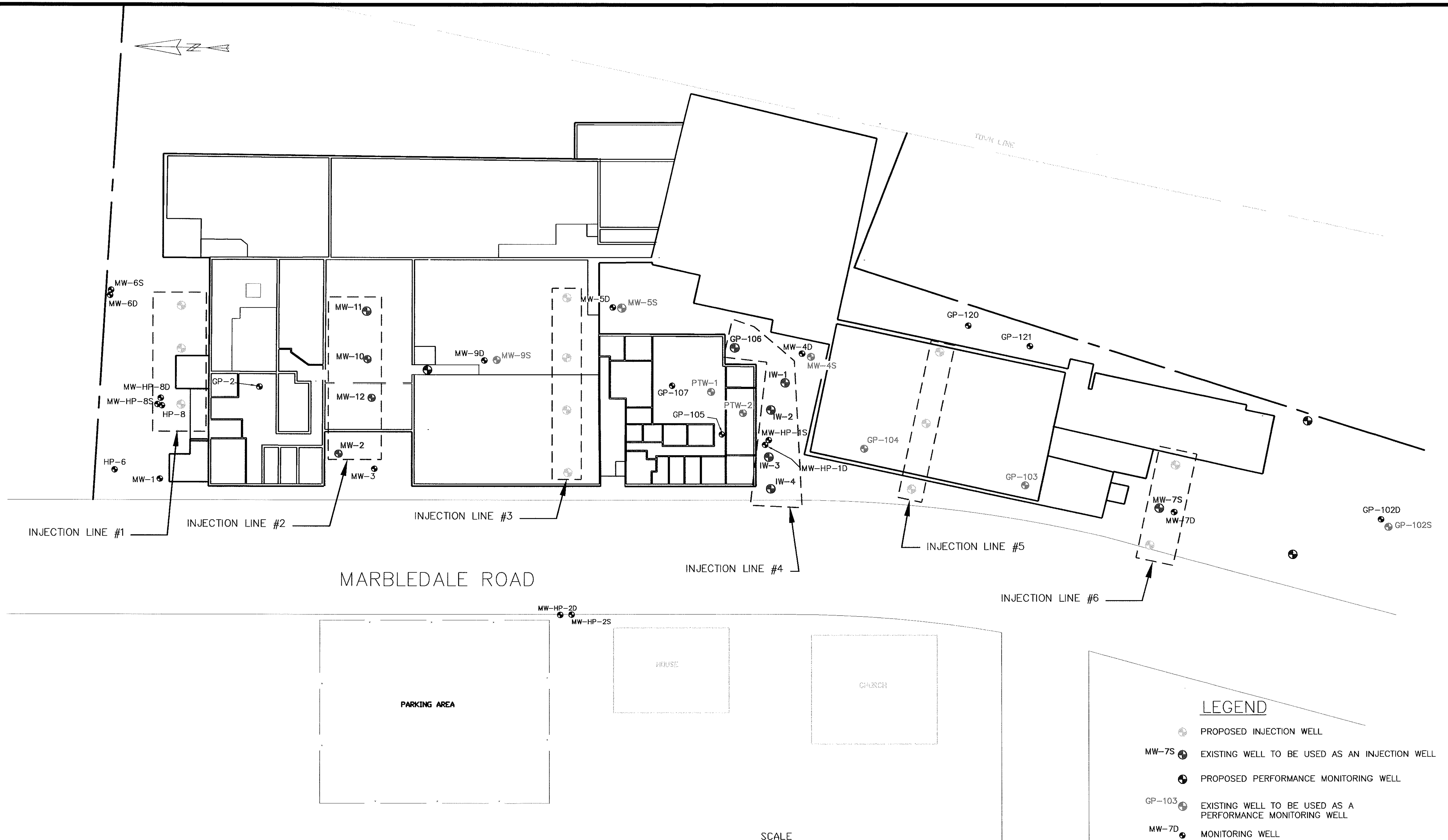
ARCADIS GERAGHTY&MILLER

KINGS ELECTRONICS SITE
TUCKAHOE, NEW YORK

DRAWN T.G.	DATE 8/16/01	PROJECT MANAGER K.MCGUINESS	DEPARTMENT MANAGER T.ENG
SITE PLAN		LEAD DESIGN PROF.	CHECKED E.RODRIGUEZ
		PROJECT NUMBER NJ00423.002	DRAWING NUMBER 6



SOURCE: PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAROPOLI, L.S., MAY 23, 2001, AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1978

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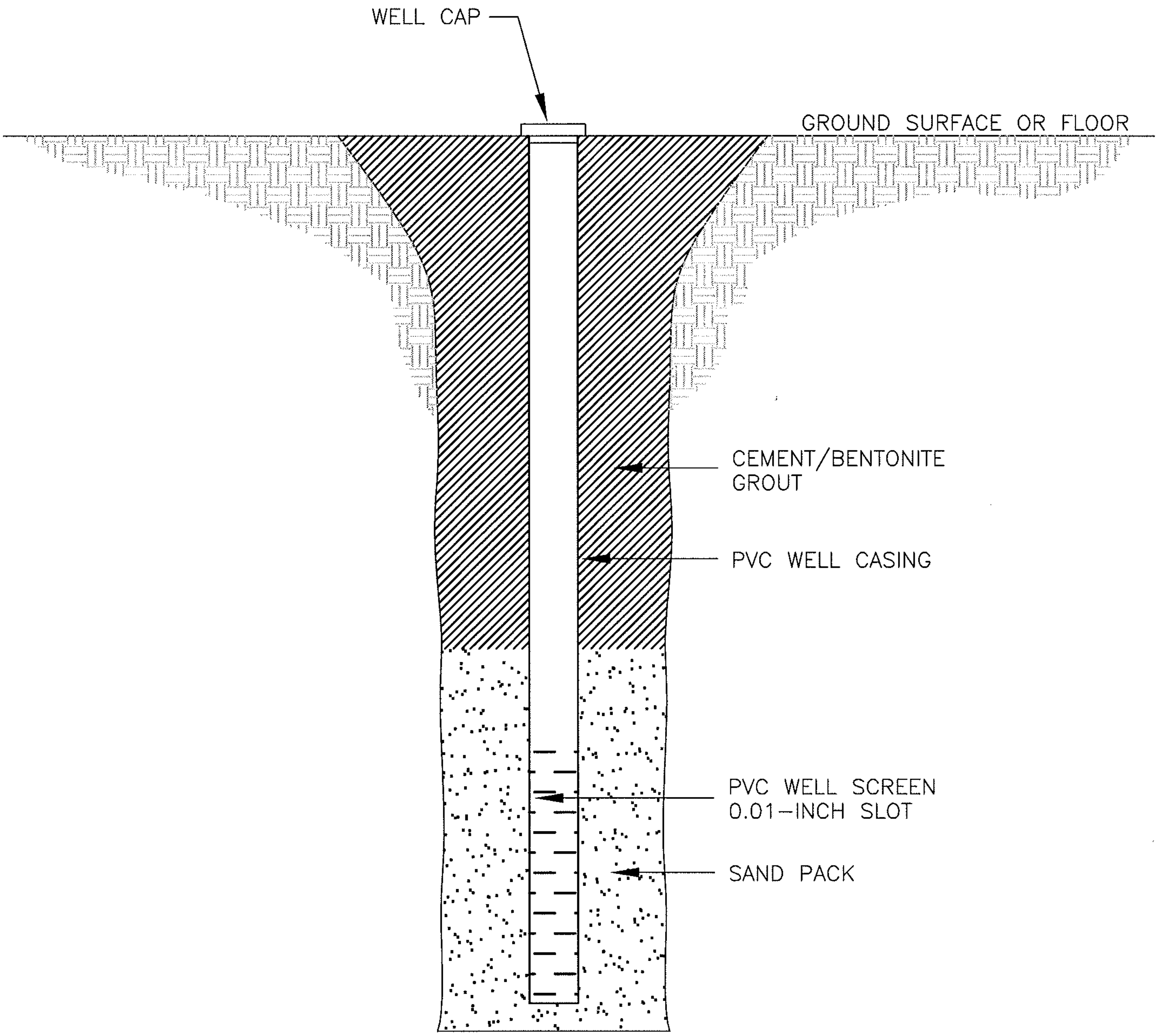
KINGS ELECTRONICS SITE
TUCKAHOE, NEW YORK

DRAWN T.G.	DATE 8/29/01	PROJECT MANAGER K.MCGUINESS	DEPARTMENT MANAGER T.ENG
PROPOSED IN-SITU BIOREMEDIATION WELL NETWORK		LEAD DESIGN PROF.	CHECKED E.RODRIGUEZ
		PROJECT NUMBER NJ00423.002	DRAWING NUMBER 7



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ARCADIS GERAGHTY & MILLER

DRAWN TG	DATE 9/12/01	PROJECT MANAGER K. McGuinness	DEPARTMENT MANAGER T. Eng
TYPICAL INJECTION WELL CONSTRUCTION DETAIL		LEAD DESIGN PROF.	CHECKED E. Rodriguez
		PROJECT NUMBER NJ0423.002	DRAWING NUMBER 8

ARCADIS

Appendix A

Voluntary Cleanup Program
Agreement

New York State Department of Environmental Conservation
Division of Environmental Enforcement
Central Field Unit, Room 627
50 Wolf Road, Albany, New York 12233-5500
Phone: (518) 457-2286 • **FAX:** (518) 485-8478
Website: www.dec.state.ny.us

Environmental Conservation 30 YEARS
John P. Cahill
Commissioner

May 11, 2000

Charles A. Goldberger, Esq.
McCullough, Goldberger & Staudt
61 Main Street
White Plains, NY 10601

RE: Kings Electronics Co., Inc.

Dear Mr. Goldberger:

Please find enclosed a fully executed original of the Voluntary Cleanup Agreement for the above-referenced site for your files. Please recall that prior to conducting any field activities, your client's consultant must notify our project manager, Ram Pergadia, in our Region 3 office, in advance of their proposed start date.

Thank you for your consideration during the course of this matter, and please feel free to call me should you have any questions.

Very truly yours,

Anthony B. Quartararo
Assistant Counsel

Enclosures

cc: R. Pergadia

16 2000

NEW YORK STATE CENSUS 2000
BE PART OF THE COUNT
¡SEA PARTE DE LA CUENTA!

NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

In the Matter of the Implementation of an Investigation and, if needed, Remediation of 40 Marbledale Road, Tuckahoe, New York, by KINGS ELECTRONICS CO., Inc. Volunteer.	AGREEMENT INDEX NO. W3-0855-99-07

DEFINITIONS

For purposes of this Agreement, the following terms have the following definitions:

A. "Contemplated Use": Volunteer intends to continue to use the Site for commercial purposes, other than as a daycare, childcare or medical facility, consistent with the permitted zoning classification of the Site.

B. The Site's "Covered Contamination": the concentrations of Existing Contamination to which the Existing Contamination shall have been remediated in accordance with the requirements of the Work Plan.

C. "ECL": the Environmental Conservation Law.

D. "Day": a calendar day unless otherwise specified.

E. "Department": the New York State Department of Environmental Conservation.

F. The Site's "Existing Contamination": volatile organic compound ("VOC") contamination in the soil and groundwater at the Site, including trichloroethene ("TCE"), 1,2-dichloroethene, 1,1-dichloroethane, vinyl chloride, 1,1,1-trichloroethane, and tetrachloroethene ("PCE"), primarily caused by former degreasing operations at the Site during the period 1951-1998, when manufacturing at the Site was conducted, as described in *Summary of Environmental Conditions - Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, New York* (February 23, 1999), and *April 1999 Soil Removal Summary Report - Kings Electronics Co., Inc., 40 Marbledale Road, Tuckahoe, New York* (June 24, 1999), both prepared by The Cody Ehlers Group (Fairfield, Connecticut). The term also includes contamination encountered during the course of either Work Plan's implementation, the nature and extent of which were unknown or inadequately characterized at the time either Work Plan was submitted to the Department for approval but shall have been fully characterized to the Department's satisfaction.

G. "Investigation Work Plan": the Department-approved Investigation Work Plan pertaining to the Site that Volunteer shall implement and that is attached to this Agreement as Exhibit "B", as may be modified under the terms of this Agreement and is an enforceable part of this Agreement.

H. "Professional engineer": an individual registered as a professional engineer in accordance with Article 145 of the New York State Education Law. If such individual is a member of a firm, that firm must be authorized to offer professional engineering services in the State of New York in accordance with Article 145 of the New York State Education Law.

I. "Remediation Work Plan": the Department-approved Remediation Work Plan pertaining to the Site that Volunteer shall implement and that is attached to this Agreement as Exhibit "C", as may be modified under the terms of this Agreement and, as a result, may appear in such other identified exhibit in this Agreement as this Agreement may provide, and is an enforceable part of this Agreement.

J. "Site": that property located at 40 Marbledale Road, Village of Tuckahoe, Town of Eastchester, Westchester County, New York, with Tax Map Identifier Numbers Section 68, Block 4, and Lots 29 and 36 E. Exhibit "A" of this Agreement is a map of the Site showing its general location.

K. "Volunteer": Kings Electronics Co., Inc., a corporation organized under the laws of New York State with offices at 40 Marbledale Road, Tuckahoe, New York 10707.

CONSIDERING

1. The Department is responsible for enforcement of the ECL. This Agreement is entered into pursuant to the Department's authority under that law and constitutes an administrative settlement for purposes of 42 USC 9613(f).

2. Volunteer represents, and for the purposes of this Agreement, the Department relies on those representations, that Volunteer's involvement with the Site and with the facility on that Site is as follows: Volunteer is the Site property owner and operates the facility at the Site. Volunteer has been the Site property owner since 1951 and is responsible under law to remediate the Site.

3. The Department has the power, *inter alia*, to provide for the prevention and abatement of all water, land, and air pollution. ECL 3-0301.1.i.

4. A. Volunteer wishes to enter into this Agreement to ensure, and the Department hereby determines, that this Agreement constitutes a demonstration that any remedial action undertaken under this Agreement will be in compliance with the ECL and will not:

1. prevent or interfere significantly with any proposed, ongoing or completed remedial program at the Site, or

2. expose the public health or the environment to a significantly increased threat of harm or damage.

B. Volunteer also wishes to enter into this Agreement in order to limit its potential liability as an owner and/or former operator of the Site and to resolve its potential liability as a party responsible for the investigation and remediation of the Site under ECL Article 27, Title 13 based upon Volunteer's investigation and, if necessary, remediation of the Site. The Department finds that such resolution, undertaken in accordance with the terms of this Agreement, is in the public interest.

C. Volunteer, desirous of implementing an investigation program acceptable to the Department, consents to the terms and conditions of this Agreement.

5. The Department and Volunteer agree that the goals of this Agreement are

A. for Volunteer to implement the Investigation Work Plan and, if necessary, develop and implement a Department-approved Remediation Work Plan for the Site, and reimburse the State's administrative costs as provided in this Agreement, and

B. in accordance with the terms of this Agreement, for the Department to release, covenant not to sue, and forbear from bringing any action, proceeding, or suit against Volunteer for the Site's further investigation or remediation.

6. Volunteer agrees to be bound by the terms of this Agreement. Volunteer consents to and agrees not to contest the authority or jurisdiction of the Department to issue or enforce this Agreement, and agrees not to contest the validity of this Agreement or its terms.

IN CONSIDERATION OF AND IN EXCHANGE FOR THE DEPARTMENT'S RELEASE AND COVENANT NOT TO SUE SET FORTH IN THIS AGREEMENT, VOLUNTEER AGREES TO THE FOLLOWING:

I. <u>Performance and Reporting of the Investigation Work Plan and Development and Implementation of the Remediation Work Plan, if Necessary</u>

A. Within 30 days of the effective date of this Agreement, Volunteer shall commence implementation of the Investigation Work Plan and implement it in accordance with its terms.

B. Volunteer shall notify the Department of any significant difficulties that may be encountered in implementing the Investigation Work Plan or any Department- approved modification to it and shall not modify any obligation unless first approved by the Department.

C. In accordance with the schedule contained in the Investigation Work Plan, Volunteer shall submit to the Department a final investigation report. The final investigation report shall:

1. include all data generated and all other information obtained during the investigation;

2. provide all of the assessments and evaluations identified in the Investigation Work Plan;

3. identify any additional data that must be collected; and

4. include a certification by the individual or firm with primary responsibility for the day to day performance of the investigation that all activities that comprised the investigation were performed in full accordance with the Investigation Work Plan.

D. 1. After its acceptance of the final investigative report submitted under Subparagraph I.C of this Agreement, the Department shall determine whether it has sufficient information respecting the nature and extent of the contamination on the Site.

i. If the Department determines that it does not have sufficient information respecting the nature and extent of the Site's contamination, it will so notify Volunteer in writing. Volunteer shall collect such additional data under a Department-approved revision to the Investigation Work Plan, which shall be attached to this Agreement as Exhibit "B-1" and made a part of this Agreement. However, if within 10 days after receipt of the Department's written notification, Volunteer elects in writing not to collect such additional data or if within that period the Department and Volunteer cannot agree upon revisions to the Investigation Work Plan, then, except with respect to

a. Volunteer's obligations under Paragraphs VI and VIII of this Agreement; and

b. Volunteer's obligation to ensure that it does not leave the Site in a condition, from the perspective of human health and environmental protection, worse than that which prevailed before any investigative activities were commenced; and

c. the Department's right to enforce the obligations in Subparagraphs I.D.1.i.a and I.D.1.i.b of this Agreement under Paragraph IV of this Agreement, this Agreement shall terminate effective the tenth day after Volunteer's receipt of the Department's written notification; and both parties retain whatever rights they may have had respecting each other as they had before the effective date of this Agreement.

ii. If the Department determines that it has sufficient information respecting the nature and extent of the Site's contamination, it will so inform Volunteer in writing, and the Department will inform it in that communication whether the Department believes that remediation of contamination on the Site is needed to allow the Site to be used for the Contemplated Use.

2. If the Department determines that no remediation is needed to allow the Site to be used for the Contemplated Use, it shall so state in writing and shall provide Volunteer with the forbearance, release, and covenant not to sue described in Subparagraph I.G of this Agreement and with the notification letter described in Subparagraph I.H of this Agreement.

3. If the Department determines that remediation is needed to allow the Site to be used for the Contemplated Use, it shall so state in writing; and Volunteer shall develop a proposed Remediation Work Plan that shall be noticed for public comment in accordance with Subparagraph I.D.4 of this Agreement. If within 10 days after receipt of the Department's written determination, Volunteer elects not to develop a Remediation Work Plan; or, in the event that the Department concludes that a mutually acceptable Remediation Work Plan cannot be successfully negotiated, then, except with respect to

i. Volunteer's obligations under Paragraphs VI and VIII of this Agreement; and

ii. Volunteer's obligation to ensure that it does not leave the Site in a condition, from the perspective of human health and environmental protection, worse than that which prevailed before any remedial activities were commenced; and

iii. the Department's right to enforce the obligations in Sub-paragraphs I.D.3.i and I.D.3.ii of this Agreement under Paragraph IV of this Agreement,

this Agreement shall terminate; and both parties retain whatever rights they may have had respecting each other as they had before the effective date of this Agreement.

The proposed Remediation Work Plan shall provide, *inter alia*, that if during the Remediation Work Plan's implementation, contamination is discovered that was not discussed in the final investigative report, Volunteer shall investigate the nature and extent of such newly discovered contamination, and the Remediation Work Plan will be revised to have Volunteer remediate such newly discovered contamination in the event that this remediation is needed to allow the Contemplated Use to proceed.

4. Upon development of a proposed Remediation Work Plan, the Department will publish a notice in the Environmental Notice Bulletin to inform the public of the public's opportunity to submit to the Department by no later than 30 days after the date of the issue of the Environmental Notice Bulletin in which the notice shall appear, comments on the proposed Remediation Work Plan and shall mail an equivalent notice to the Village of Tuckahoe, Town of Eastchester and County of Westchester. If, as a result of its review of the comments received, the Department determines that the proposed Remediation Work Plan to implement the Department-approved remedial activities for the Site must be revised:

i. due to environmental conditions related to the Site that were unknown to the Department at the time of its approval of the proposed Remediation Work Plan; or

ii. due to information received, in whole or in part, after the Department's approval of the proposed Remediation Work Plan, which indicates that the activities carried out in accordance with it are not sufficiently protective of human health and the environment for the Contemplated Use,

then the Department will so notify Volunteer and will immediately commence negotiations with Volunteer to revise the proposed Remediation Work Plan accordingly. If the Department and Volunteer agree upon revisions to the proposed Remediation Work Plan, the revised proposed Remediation Work Plan shall become the final Remediation Work Plan and shall be attached to this Agreement as Exhibit "C" and made a part of this Agreement. However, if after goodfaith negotiations, Volunteer and the Department cannot agree upon revisions to the proposed Remediation Work Plan, then, except with respect to

iii. Volunteer's obligations under Paragraphs VI and VIII of this Agreement; and

iv. Volunteer's obligation to ensure that it does not leave the Site in a condition, from the perspective of human health and environmental protection, worse than that which prevailed before any remedial activities were commenced; and

v. the Department's right to enforce the obligations in Sub-paragraphs I.D.4.iii and I.D.4.iv of this Agreement of Paragraph IV of this Agreement,

this Agreement shall terminate effective the date of the Department's written notification to Volunteer that negotiations have failed to develop an acceptable Remediation Work Plan; and both parties retain whatever rights they may have had respecting each other as they had before the effective date of this Agreement.

If, following the 30 day comment period, the Department determines that the proposed Remediation Work Plan to implement the Department-approved remedial activities for the Site does not need to be revised then the proposed Remediation Work Plan shall become the final

Remediation Work Plan and shall be attached to this Agreement as Exhibit "C" and made a part of this Agreement.

5. Volunteer shall commence implementation of, and implement, the final Remediation Work Plan contained in Exhibit "C" in accordance with its terms. However, the parties agree that the final Remediation Work Plan will be modified in the event that contamination previously unknown or inadequately characterized is encountered during implementation of the final Remediation Work Plan unless after good faith negotiations, Volunteer and the Department cannot agree upon modifications to the final Remediation Work Plan. In such event, except with respect to

i. Volunteer's obligations under Paragraphs VI and VIII of this Agreement; and

ii. Volunteer's obligation to ensure that it does not leave the Site in a condition, from the perspective of human health and environmental protection, worse than that which prevailed before any remedial activities were commenced; and

iii. the Department's right to enforce the obligations in Sub-paragraphs I.D.5.i and I.D.5.ii of this Agreement under Paragraph IV of this Agreement,

this Agreement shall terminate effective the date of the Department's written notification to Volunteer that negotiations have failed to develop an acceptable modification to the final Remediation Work Plan; and both parties retain whatever rights they may have had respecting each other as they had before the effective date of this Agreement.

E. 1. In accordance with the schedule contained in Exhibit "C," as may be modified by agreement between the parties, Volunteer shall submit to the Department a final engineering report that shall include "as-built" drawings showing all changes made during construction, to the extent necessary; and a certification that all activities were completed in full accordance with the Remediation Work Plan, any Department-approved modification to the Remediation Work Plan, any Department-approved detail, document, or specification prepared by or for Volunteer pursuant thereto, and this Agreement.

2. Volunteer shall submit a detailed post-remedial operation, maintenance, and monitoring plan ("O&M Plan"), if needed, along with the final engineering report.

3. A professional engineer must prepare, sign, and seal the O&M Plan, "as built" drawings, final engineering report, and certification.

F. Should post-remedial operation and maintenance prove to be necessary, upon the Department's approval of the O&M Plan, Volunteer shall implement the O&M Plan in accordance with the schedule and requirements of the Department-approved O&M Plan.

G. 1. After receipt of the final engineering report, the Department shall notify Volunteer in writing whether the Department is satisfied that the Remediation Work Plan was satisfactorily implemented in compliance with Exhibit "C" (and, as appropriate "C-1") and the Department-approved design, which notification shall not be unreasonably withheld.

2. Upon being satisfied that the Site-specific cleanup levels identified in, or to be identified in accordance with, the Remediation Work Plan have been reached, the Department shall notify Volunteer in writing of its satisfaction and, except for the reservations identified below, the Department releases, covenants not to sue, and shall forbear from bringing any action, proceeding, or suit against, Volunteer for the further investigation and remediation of the Site, based upon the release or threatened release of any Covered Contamination, provided that (a) timely payments of the amounts specified in Paragraph VI of this Agreement continue to be or have been made to the Department, (b) appropriate notices and deed restrictions have been recorded in accordance with Paragraphs IX and X of this Agreement, and (c) Volunteer and/or Volunteer's lessees, sublessees, successors, or assigns promptly commence and diligently pursue to completion the Department-approved O&M Plan, if any. Nonetheless, the Department hereby reserves all of its rights concerning, and such release, covenant not to sue, and forbearance shall not extend to natural resource damages nor to any further investigation or remedial action the Department deems necessary:

i. due to the off-Site presence of contaminants, other than petroleum, that may have migrated off-Site from an on-Site source resulting in impacts to environmental resources, to human health, or to other biota that are not inconsequential and to the off-Site presence of petroleum that may have migrated off-Site from an on-Site source, irrespective of whether the information available to Volunteer and the Department at the time of the development of the Remediation Work Plan disclosed the existence or potential existence of such off-Site presence;

ii. due to environmental conditions related to the Site that were unknown to the Department at the time of its approval of the Remediation Work Plan which indicate that Site conditions are not sufficiently protective of human health and the environment for the Contemplated Use;

iii. due to information received, in whole or in part, after the Department's approval of the final engineering report, which indicates that the activities carried out in accordance with the Remediation Work Plan are not sufficiently protective of human health and the environment for the Contemplated Use;

iv. due to Volunteer's failure to implement this Agreement to the Department's satisfaction; or

v. due to fraud committed, or mistake made, by Volunteer in demonstrating that the Site-specific cleanup levels identified in, or to be identified in accordance with, the Remediation Work Plan were reached.

Additionally, the Department reserves all its rights concerning, and any such release, covenant not to sue, and forbearance shall not extend to Volunteer if Volunteer causes a, or suffers the, release or threat of release, at the Site of any hazardous substance (as defined at 42 USC 9601[14]) or petroleum (as defined in Navigation Law § 172[15]), other than Covered Contamination; or if Volunteer causes a, or suffers the use of the Site to, change from the Contemplated Use to one requiring a lower level of residual contamination before that use can be implemented with sufficient protection of human health and the environment; nor to any of Volunteer's lessees, sublessees, successors, or assigns who causes a, or suffers the, release or threat of release, at the Site of any hazardous substance (as defined at 42 USC 9601[14]) or petroleum (as defined in Navigation Law § 172[15]), other than Covered Contamination, after the effective date of this Agreement; who causes a, or suffers the use of the Site to, change from the Contemplated Use to one requiring a lower level of residual contamination before that use can be implemented with sufficient protection of human health and the environment; or who is otherwise a party responsible under law for the remediation of the Existing Contamination independent of any obligation that party may have respecting same established resulting solely from this Agreement's execution.

3. Notwithstanding any other provision in this Agreement, if with respect to the Site there exists or may exist a claim of any kind or nature on the part of the New York State Environmental Protection and Spill Compensation Fund against any party, nothing in this Agreement shall be construed, or deemed, to preclude the State of New York from recovering such claim.

H. If the Department is satisfied with the implementation of the Remediation Work Plan, any Department-approved modification to the Remediation Work Plan, and Department-approved details, documents, and specifications prepared by or on behalf of Volunteer pursuant thereto, the Department shall provide Volunteer with a written "no further action" letter substantially similar to the model letter attached to this Agreement and incorporated in this Agreement as Exhibit "D;"

I. 1. Notwithstanding any other provision of this Agreement, with respect to any claim or cause of action asserted by the Department, the one seeking the benefit of the forbearance, covenant not to sue, or release set forth in Subparagraph I.G or in a "no further action" letter issued under Subparagraph I.H of this Agreement shall bear the burden of proving that the claim or cause of action, or any part thereof, is attributable solely to Covered Contamination.

2. Except as above provided in Subparagraph I.G of this Agreement and in the "no further action" letter issued under Subparagraph I.H of this Agreement, nothing in this Agreement is intended as a release, forbearance, or covenant not to sue for any claim or cause of action, administrative or judicial, civil or criminal, past or future, in law or in equity, which the Department or the State of New York may have against any person, firm, corporation, or other entity not a party to this Agreement. In addition, notwithstanding any other provision in this Paragraph I of this Agreement, the forbearance, covenant not to sue, and release described in

Subparagraph I.G and in the "no further action" letter issued under Subparagraph I.H of this Agreement shall not extend to parties (other than Volunteer) that were responsible under law before the effective date of this Agreement to address the Existing Contamination.

J. During implementation of all activities conducted on the Site under either the Investigation Work Plan or the Remediation Work Plan, Volunteer shall

1. have on-Site a full-time representative who is qualified to supervise the activities undertaken; and

2. notify the Department of any significant difficulties that may be encountered in implementing the Investigative Work Plan, the Remediation Work Plan, any Department-approved modification to either of them, or any Department-approved detailed document or specification prepared by or on behalf of Volunteer pursuant to either, and shall not modify any obligation unless first approved by the Department, which approval shall not be unreasonably withheld.

II. Progress Reports

A. Volunteer shall submit to the parties identified in Subparagraph XI.A.1 in the numbers specified therein copies of written monthly progress reports that:

1. describe the actions which have been taken toward achieving compliance with this Agreement;

2. include all results of sampling and tests and all other data received or generated by Volunteer or Volunteer's contractors or agents in the previous month, including quality assurance/quality control information, whether conducted pursuant to this Agreement or conducted independently by Volunteer;

3. identify all reports and other deliverables required by this Agreement that were completed and submitted during the previous month;

4. describe all actions, including, but not limited to, data collection and implementation of the Investigation Work Plan or the Remediation Work Plan, that are scheduled for the next month and provide other information relating to the progress at the Site;

5. include information regarding percentage of completion, unresolved delays encountered or anticipated that may affect the schedule for implementation of Volunteer's obligations under the Agreement, and efforts made to mitigate those delays or anticipated delays; and

6. include any modifications to the Investigation Work Plan or the Remediation Work Plan that Volunteer has proposed to the Department and any that the Department has approved.

B. Volunteer shall submit these progress reports to the Department by the tenth day of every month following the effective date of this Agreement; and Volunteer's obligation to submit the progress reports shall terminate upon its receipt of the written satisfaction notification identified in Subparagraph I.G.2 of this Agreement approving Volunteer's final engineering report concerning the Remediation Work Plan's implementation. However, Volunteer shall continue to submit reports concerning the implementation of any O&M Plan that may be required under this Agreement, in accordance with that Plan's requirements.

C. Volunteer also shall allow the Department to attend, and shall provide the Department at least five days advance notice of, any of the following: prebid meetings, job progress meetings, substantial completion meeting and inspection, and final inspection and meeting.

III. Review of Submittals

A. 1. The Department shall, in a timely manner review each of the submittals Volunteer makes pursuant to this Agreement to determine whether it was prepared, and whether the work done to generate the data and other information in the submittal was done, in accordance with this Agreement and generally accepted technical and scientific principles. The Department shall notify Volunteer in writing of its approval or disapproval of the submittal. All Department-approved submittals shall be incorporated into and become an enforceable part of this Agreement.

2. i. If the Department disapproves a submittal, it shall so notify Volunteer in writing and shall specify the reasons for its disapproval and may request Volunteer to modify or expand the submittal; provided, however, that the matters to be addressed by such modification or expansion are within the specific scope of work as described in the Investigation or Remediation Work Plan. Within 30 days after receiving written notice that Volunteer's submittal has been disapproved, Volunteer shall make a revised submittal to the Department which endeavors to address and resolve all of the Department's stated reasons for disapproving the first submittal.

ii. If the Department disapproves the revised submittal, the Department and Volunteer may pursue whatever remedies at law or in equity that may be available to them, without prejudice to either's right to contest the same. If the Department approves the revised submittal, it shall be incorporated into and become an enforceable part of this Agreement.

B. Within 30 days after the Department's approval of the final engineering report, Volunteer shall submit to the Department one microfilm copy (16 millimeter roll film M type cartridge) of that report and all other Department-approved drawings and submittals. Such submission shall be made to:

Director, Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, New York 12233-7010

IV. Enforcement

A This Agreement shall be enforceable as a contractual agreement under the laws of the State of New York.

B. Volunteer shall not suffer any penalty under this Agreement or be subject to any proceeding or action if it cannot comply with any requirement of this Agreement because of fire, lightning, earthquake, flood, adverse weather conditions, strike, shortages of labor and materials, war, riot, obstruction or interference by adjoining landowners, or any other fact or circumstance beyond Volunteer's reasonable control ("*force majeure* event"). Volunteer shall, within five working days of when it obtains knowledge of any such *force majeure* event, notify the Department in writing. The failure to so notify the Department shall result in the waiver of this Subparagraph IV.B. Volunteer shall include in such notice the measures taken and to be taken by Volunteer to prevent or minimize any delays and shall request an appropriate extension or modification of this Agreement. Volunteer shall have the burden of proving by a preponderance of the evidence that an event is a defense to compliance with this Agreement pursuant to this Subparagraph IV.B of this Agreement.

V. Entry upon Site

Volunteer hereby consents to the entry upon the Site or areas in the vicinity of the Site which may be under the control of Volunteer by any duly designated employee, consultant, contractor, or agent of the Department or any State agency having jurisdiction with respect to the matters addressed in either Work Plan for purposes of inspection, sampling, and testing and to ensure Volunteer's compliance with this Agreement. The Department shall abide by the health and safety rules in effect for work performed at the Site under the terms of this Agreement. Upon request, Volunteer shall provide the Department with suitable office space at the Site, including access to a telephone, and shall permit the Department full access to all records relating to matters addressed by this Agreement and to job meetings.

VI. Payment of State Costs

Within thirty days after receipt of an itemized invoice from the Department, Volunteer shall pay to the Department a sum of money which shall represent reimbursement for the State's expenses including, but not limited to, direct labor, fringe benefits, indirect costs, travel, analytical costs, and contractor costs incurred by the State of New York for work performed at the Site to the effective date of this Agreement, as well as for negotiating this Agreement, reviewing and revising submittals made pursuant to this Agreement, overseeing activities conducted pursuant to this Agreement, collecting and analyzing samples, and administrative costs associated with this Agreement, but not including the State's expenses incurred after the Department's notification identified in Subparagraph I.G.2 of this Agreement of its approval of the final engineering report pertaining to the implementation of the Work Plan or, if any, of the Department-approved O&M Plan, whichever is later. Each such payment shall be made by certified check payable to the Department of Environmental Conservation and shall be sent to:

Bureau of Program Management
Division of Environmental Remediation
New York State Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233-7010

Personal service costs shall be documented by reports of Direct Personal Service, which shall identify the employee name, title, biweekly salary, and time spent (in hours) on the project during the billing period, as identified by an assigned time and activity code. Approved agency fringe benefit and indirect cost rates shall be applied. Non-personal service costs shall be summarized by category of expense (*e.g.*, supplies, materials, travel) and shall be documented by expenditure reports. The Department may aggregate its billing of these State costs for more than one year.

VII. Department Reservation of Rights

A. Except as provided in Subparagraph I.G.2 of this Agreement and in any "no further action" letter issued under Subparagraph I.H of this Agreement, nothing contained in this Agreement shall be construed as barring, diminishing, adjudicating, or in any way affecting any of the Department's rights (including, but not limited to, the right to recover natural resources damages) with respect to any party, including Volunteer.

B. Nothing contained in this Agreement shall prejudice any rights of the Department to take any investigatory or remedial action it may deem necessary.

C. Nothing contained in this Agreement shall be construed to prohibit the Commissioner or his duly authorized representative from exercising any summary abatement powers.

D. Nothing contained in this Agreement shall be construed to affect the Department's right to terminate this Agreement at any time during its implementation if Volunteer fails to comply substantially with this Agreement's terms and conditions, provided that the Department first notifies the Volunteer of its intent to exercise this reservation of rights and provides the Volunteer with the opportunity to cure any failure not due to fraud on the part of the Volunteer.

E. Except as otherwise provided in this Agreement, Volunteer specifically reserves all defenses Volunteer may have under applicable law respecting any Departmental assertion of remedial liability against Volunteer; and reserves all rights Volunteer may have respecting the enforcement of this Agreement, including the rights to notice, to be heard, to appeal, and to any other due process. The existence of this Agreement or Volunteer's compliance with this Agreement shall not be construed as an admission of liability, fault, or wrongdoing by Volunteer, and shall not give rise to any presumption of law or finding of fact which shall inure to the benefit of any third party.

VIII. Indemnification

Volunteer shall indemnify and hold the Department, the State of New York, and their representatives and employees harmless for all claims, suits, actions, damages, and costs of every name and description arising out of or resulting from the fulfillment or attempted fulfillment of this Agreement by Volunteer and/or any of Volunteer's directors, officers, employees, servants, agents, successors, and assigns.

IX. Notice of Sale or Conveyance

A. Within 30 days after the effective date of this Agreement, Volunteer shall

1. file the Notice of Agreement, which is attached to this Agreement as Exhibit "E," with the Westchester County Clerk to give all parties who may acquire any interest in the Site notice of this Agreement and

2. provide the Department with evidence of such filing.

Volunteer may terminate the Notice when the Department notifies Volunteer in writing, which writing shall be in a form recordable with the Westchester County Clerk, pursuant to Subparagraph I.G.2 of this Agreement that the Department is satisfied that the Site-specific cleanup levels identified in, or to be identified in accordance with, the Remediation Work Plan have been reached and that the O&M Plan has been successfully implemented.

B. If Volunteer proposes to convey the whole or any part of Volunteer's ownership interest in the Site, Volunteer shall, not fewer than 60 days before the date of conveyance, notify the Department in writing of the identity of the transferee and of the nature and proposed date of the conveyance and shall notify the transferee in writing, with a copy to the Department, of the applicability of this Agreement.

X. Deed Restriction

A. If the Department determines that a deed restriction is necessary, within 30 days of Volunteer's receipt of the Department's notification pursuant to Subparagraph I.G.2 of this Agreement approving Volunteer's final engineering report concerning the Remediation Work

Plan, Volunteer shall record an instrument with the Westchester County Clerk, to run with the land, that:

1. shall prohibit the Site from ever being used for purposes other than for the Contemplated Use without the express written waiver of such prohibition by the Department, or if at such time the Department shall no longer exist, any New York State department, bureau, or other entity replacing the Department; and/or

2. shall prohibit the use of the groundwater underlying the Site without treatment rendering it safe for drinking water or industrial purposes, as appropriate, unless the user first obtains permission to do so from the Department, or if at such time the Department shall no longer exist, any New York State department, bureau, or other entity replacing the Department; and/or

3. shall require Volunteer and Volunteer's successors and assigns to continue in full force and effect any institutional and/or engineering controls the Department may require Volunteer to put in place and maintain; and

4. shall provide that Volunteer, on behalf of itself and its successors and assigns, hereby consents to the enforcement by the Department, or if at such time the Department shall no longer exist, any New York State department, bureau, or other entity replacing the Department, of the prohibitions and restrictions that this Paragraph X requires to be recorded, and hereby covenants not to contest such enforcement.

B. Within 30 days after Volunteer's receipt of the Department's notification pursuant to Subparagraph I.G.2 of this Agreement approving Volunteer's final engineering report concerning the Remediation Work Plan, Volunteer shall provide the Department with a copy of such instrument certified by the Westchester County Clerk to be a true and faithful copy of the instrument as recorded in the Office of the Westchester County Clerk.

XI. <u>Communications</u>

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

1. Communication from Volunteer shall be sent to:

Ramanand Pergadia, P.E.
New York State Department of Environmental Conservation
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, New York 12561-1696

with copies to:

G. Anders Carlson, Ph.D.
Director, Bureau of Environmental Exposure Investigation
New York State Department of Health
547 River Road
Troy, New York 12180-2216

Anthony Quartararo, Esq.
New York State Department of Environmental Conservation
Division of Environmental Enforcement, Room 627
Albany, New York 12233-5500

Copies of work plans and reports shall be submitted as follows:

- Four copies (one unbound) to Mr. Pergadia.
- Two copies to Dr. Carlson

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

Bruce M. Munson
Corporate Environmental Manager
Kings Electronics Co., Inc.
40 Marbledale Road
Tuckahoe, New York 10707

and to

Charles Goldberger, Esq.
McCullough, Goldberger & Staudt
81 Main Street
White Plains, New York 10601

B. The Department and Volunteer reserve the right to designate additional or different addressees for communication on written notice to the other given in accordance with this Paragraph XI.

XII. Miscellaneous

A. 1. By entering into this Agreement, Volunteer certifies that Volunteer has fully and accurately disclosed to the Department all information known to Volunteer and all information in the possession or control of Volunteer's officers, directors, employees, contractors, and agents which relates in any way to the contamination existing on the effective date of this Agreement, and to any past or potential future release of hazardous substances, pollutants, or contaminants, at or from the Site and to their application for this Agreement.

2. If the Department determines that information Volunteer provided and certifications made are not materially accurate and complete, this Agreement, within the sole

discretion of the Department, shall be null and void *ab initio* except with respect to the provisions of Paragraphs VI and VIII and except with respect to the Department's right to enforce those obligations under this Agreement, and the Department shall reserve all rights that it may have.

B. Volunteer shall retain professional consultants, contractors, laboratories, quality assurance/quality control personnel, and data validators acceptable to the Department to perform the technical, engineering, and analytical obligations required by this Agreement. The responsibility for the performance of the professionals retained by Volunteer shall rest solely with Volunteer.

C. The Department shall have the right to obtain split samples, duplicate samples, or both, of all substances and materials sampled by Volunteer, and the Department also shall have the right to take its own samples. Volunteer shall make available to the Department the results of all sampling and/or tests or other data generated by Volunteer with respect to implementation of this Agreement and shall submit these results in the progress reports required by this Agreement.

D. Volunteer shall notify the Department at least five working days in advance of any field activities to be conducted pursuant to this Agreement.

E. 1. Subject to Subparagraph XII.E.2 of this Agreement, Volunteer shall obtain all permits, easements, rights-of-way, rights-of-entry, approvals, or authorizations necessary to perform Volunteer's obligations under this Agreement.

2. In carrying out the activities identified in either Work Plan, the Department will exempt Volunteer from the requirement to obtain any Department permit for any activity associated with the remedial activity that may be conducted on the Site and that the Department determines satisfies all substantive technical requirements applicable to like activity conducted pursuant to a permit.

F. Volunteer, Volunteer's officers, directors, agents, servants, and employees (in the performance of their designated duties on behalf of Volunteer), and Volunteer's lessees, sublessees, successors, and assigns shall be bound by this Agreement. Any change in ownership or corporate status of Volunteer including, but not limited to, any transfer of assets or real or personal property, shall in no way alter Volunteer's responsibilities under this Agreement. Volunteer's officers, directors, employees, servants, and agents shall be obliged to comply with the relevant provisions of this Agreement in the performance of their designated duties on behalf of Volunteer.

G. Volunteer shall provide a copy of this Agreement to each contractor hired to perform work required by this Agreement and to each person representing Volunteer with respect to the Site and shall condition all contracts entered into in order to carry out the obligations identified in this Agreement upon performance in conformity with the terms of this Agreement. Volunteer or Volunteer's contractors shall provide written notice of this Agreement to all subcontractors hired to perform any portion of the work required by this Agreement. Volunteer shall nonetheless be responsible for ensuring that Volunteer's contractors and subcontractors perform the work in satisfaction of the requirements of this Agreement.

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

I. 1. No term, condition, understanding, or agreement purporting to modify or vary any term of this Agreement 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 regarding any report, proposal, plan, specification, schedule, or any other submittal shall be construed as relieving Volunteer of Volunteer's obligation to obtain such formal approvals as may be required by this Agreement.

2. If Volunteer desires that any provision of this Agreement be changed, Volunteer shall make timely written application, signed by the Volunteer, to the Commissioner setting forth reasonable grounds for the relief sought. Copies of such written application shall be

J. That portion of this Agreement concerning the Site's investigation is not subject to review under the State Environmental Quality Review Act, ECL Article 8, and its implementing regulations, 6 NYCRR Part 617. 6 NYCRR 617.5(c)(18). That portion of this Agreement concerning the Site's remediation constitutes an exercise of the Department's prosecutorial discretion and accordingly, is not subject to review under the State Environmental Quality Review Act and its implementing regulations. ECL 8-0105.5(i), 6 NYCRR 617.5(c)(29).

K. The provisions of this Agreement do not constitute and shall not be deemed a waiver of any right Volunteer otherwise may have to seek and obtain contribution and/or indemnification from other potentially responsible parties or their insurers, or Volunteer's insurers, for payments made previously or in the future for response costs. To the extent authorized under 42 USC 9613 and any other applicable law, Volunteer shall not be liable for any claim, now or in the future, in the nature of contribution by potentially responsible parties concerning the Existing Contamination. In any future action brought by Volunteer against a potentially responsible party under the Comprehensive Environmental Response, Compensation and Liability Act of 1980, as amended, the provisions of 42 USC 9613(f)(3) shall apply.

L. Volunteer and Volunteer's employees, servants, agents, lessees, sublessees, successors, and assigns hereby affirmatively waive any right they had, have, or may have to make a claim pursuant to Article 12 of the Navigation Law with respect to the Site, and further release and hold harmless the New York State Environmental Protection and Spill Compensation Fund from any and all legal or equitable claims, suits, causes of action, or demands whatsoever that any of same has or may have as a result of Volunteer's entering into or fulfilling the terms of this Agreement with respect to the Site.

M. The effective date of this Agreement shall be the date it is signed by the Commissioner or his designee.

DATED: Albany, New York
~~April~~ 9, 2000
May

JOHN P. CAHILL, COMMISSIONER
NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

CONSENT BY VOLUNTEER

Kings Electronics Co., Inc.

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

By: Estelle Fassler

Title: Chief Executive Officer

Date: April 10, 2000

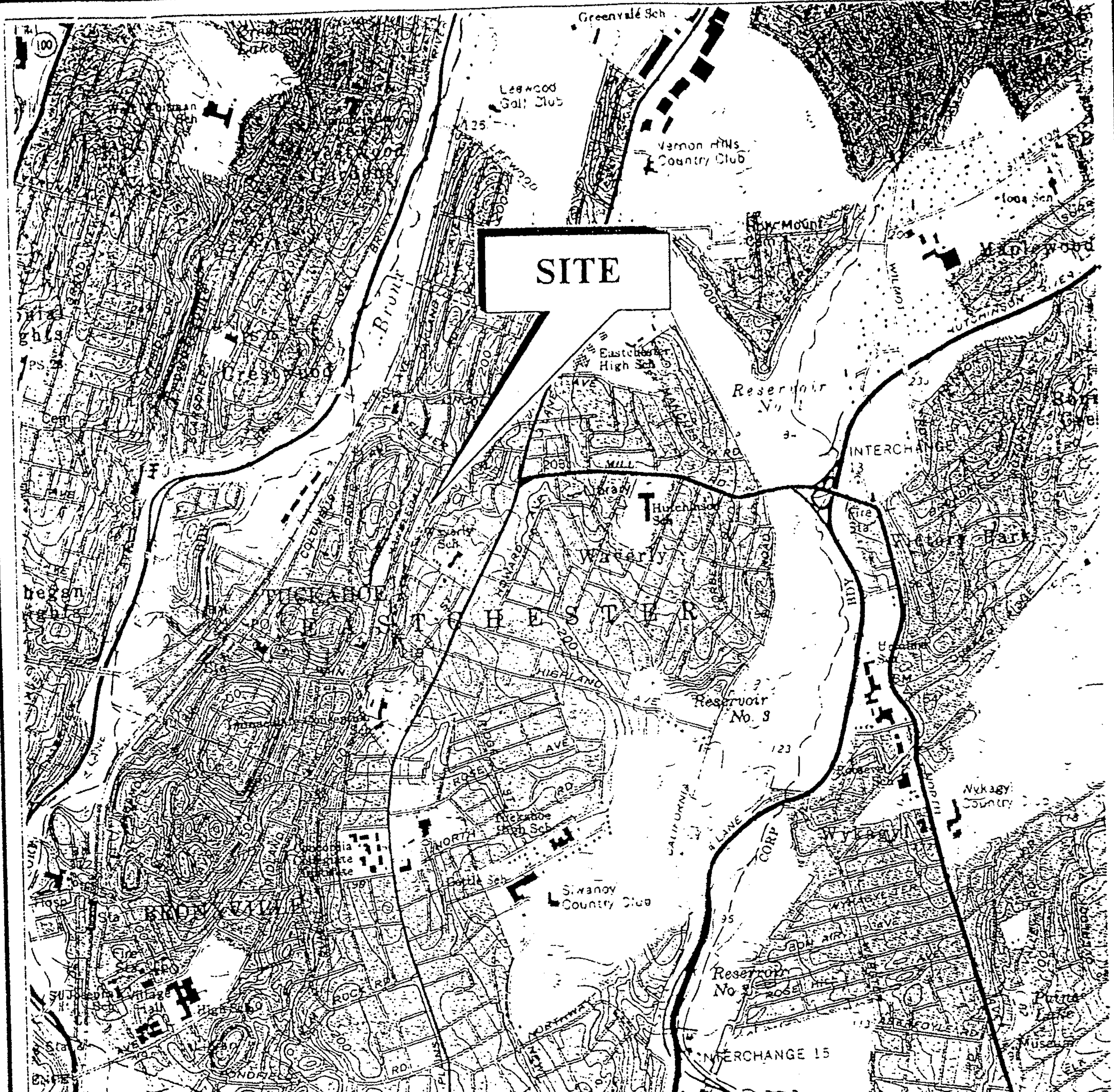
STATE OF NEW YORK)
) s.s.:
COUNTY OF WESTCHESTER)

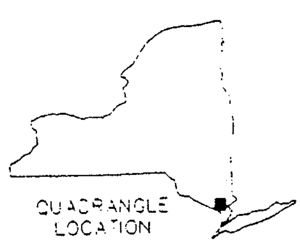
On the 10th day of April, in the year 2000, before me, the undersigned, personally appeared Estelle Fassler, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies) as Chief Financial Officer, 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.

Signature and Office of individual
taking acknowledgment

EXHIBIT "A"

Map of Site





N
W — E
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0 500 1000 1500 2000 3000 4000
Scale in Feet

SOURCE: USGS TOPOGRAPHIC MAP – MOUNT VERNON, NY QUADRANGLE DATED 1966, PHOTOREVISED 1979

CODY EHLERS GROUP EHS CONSULTING AND SERVICES 140 SHERMAN STREET, FAIRFIELD, CONNECTICUT 06432	
TITLE: SITE LOCATION MAP	DATE: 9/20/93
	SCALE: AS SHOWN
FIGURE: 1	PREPARED FOR: KINGS ELECTRONICS CO., INC TUCKAHOE, NEW YORK 10707
DRAWING NO: 137-001A	

EXHIBIT "B"

Investigative Work Plan

New York State Department of Environmental Conservation
Region 3
Division of Environmental Remediation
21 South Putt Corners Rd., New Paltz, NY 12561-1696
Telephone: (914) 256-3000 FAX: (914) 255-3414
Website: www.dec.state.ny.us

Environmental Conservation 30 YEARS
John P. Cahill
Commissioner

March 17, 2000

DONALD J. WANAMAKER
PRESIDENT
ENVIRONMENTAL MANAGEMENT, LTD.
48 SCOTLAND HILL ROAD
CHESTNUT RIDGE
NEW YORK 10977-5838

RECEIVED
MAR 2 2 2000

Re: Kings Electronics Co. - VCA ID No. V00237-3

Dear Mr. Wanamaker:

The New York State Dept. of Environmental Conservation (NYSDEC) and the New York State Dept. of Health (NYSDOH) have reviewed Cody Ehler's October 11, 1999 "Site Investigation Work Plan." The NYSDOH's comments are attached. The NYSDEC's comments are as follow:

1) The work plan makes frequent references to a silt layer as a geologic feature of significance. As noted in the February 23, 1999 "Summary of Environmental Conditions," the site may be partially or wholly lie on reclaimed land. If the contaminant source area is wholly on reclaimed land, then the premise of a distinct silt layer as a significant feature needs substantiation. If the source area is partially over the reclaimed land, the edge of the silt layer would need to be delineated to evaluate the layer's influence on the hydrogeology and contamination transport at the site.

2) The monitoring wells included in the proposed monitoring program are narrowly disposed in the north-south direction. This near linear configuration may not lend itself to a satisfactory determination of groundwater flow direction. Please include wells MW-HP-2S & 2D for groundwater elevation measurements. If a westerly component to flow exists at the site, then wells MW-HP-2S&D must be included in the monitoring plan.

3) At the completion of the investigation, and before any remedial action is implemented, representative cross-sections must be prepared that show groundwater table, well locations, soil removal area, concentration of contaminants in the soil groundwater at the sampled depths, details of any ancillary structures that may affect a remedial measure, and soil profiles.

f

STATE OF NEW YORK DEPARTMENT OF HEALTH

Flanigan Square, 547 River Street, Troy, New York 12180-2216

Antonia C. Novello, M.D., M.P.H.
Commissioner

Dennis P. Whalen
Executive Deputy Commissioner

March 17, 2000

Ramanand Pergadia, P.E.
NYS Dept. of Environmental Conservation
Division of Environmental Remediation, Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1696

RE: Kings Electronics, Site # V00237-3
Tuckahoe, Westchester County

Dear Mr. Pergadia:

I have reviewed the Site Investigation Work Plan for the above-referenced site and have the following comments.

1. Conceptually, the plan seems reasonable and the specified procedures appear sufficient to gather the targeted data. Because the document does not include the previously gathered environmental data and this office does not have these data, I cannot comment at the present time with respect to proposed sample number, type, nor location. (It appears that this information may have been inadvertently omitted from Section 2.1.)

2. Attempting to use existing off-site groundwater data (Section 3.3.1 – Task 1) is excellent.

3. The plan to survey the area for possible well use (Section 3.3.1 - Task 1) is an excellent provision.

4. Depending upon the proposed (or current) site use and if residual TCE contamination is present in subsurface soil in appreciable quantity, soil vapor with consequent indoor air impacts may be a concern. For this reason consideration should be given to testing soil vapor and/or indoor air.

5. Additional information should be provided about the nature of operations at the site between 1931 and 1952 under the ownership of O.D. Chemical Corporation (page 1-2). Depending upon the nature of these activities, consideration should be given to testing select samples for Target Analyte List or other compounds (as appropriate).

6. The site-specific Health and Safety Plan (HASP) presented in Appendix A covers personnel conducting site investigation/remediation activities but does not include provisions for

community health and safety. If VOC levels exceed 5 ppm in the work area and activities proceed under the provisions of HASP Sections 4.1 and 4.2, then continuous perimeter monitoring must be implemented along with the vapor emission response plan provisions of the enclosed Community Air Monitoring Plan for Ground Intrusive Activities. The diminished frequency of monitoring for non-intrusive activities (last paragraph of page 6 in the HASP) should not be less than once every 2 hours as specified in the enclosed Community Air Monitoring Plan for Non-Intrusive Activities.

7. Field calibration of PID instruments (Section 2.7.2 of the QAPP) should be done (at a minimum) before each day's use and a recheck against the calibrant gas should be done at the end of each day's use. This latter recheck/calibration provides an indication of instrument drift during the period of operation.

Thank you for the opportunity to review this document. If you have any questions about these comments, please contact me at (518) 402-7880.

Sincerely,

William Gilday

William M. Gilday, P.E.
Senior Sanitary Engineer
Bureau of Environmental Exposure Investigation

Enclosures

cc: Dr. G. A. Carlson
Mr. S. Bates
Mr. S. Ervolina (NYSDEC)
Mr. C. Torres (WCDOH)

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Community Air Monitoring Plan
(Ground Intrusive Activities)

Real-time air monitoring, for volatile compounds and particulate levels at the perimeter of the work area is necessary. The plan must include 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 <u>Vapor Emission Response Plan</u>. 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. If the downwind particulate level is 150 $\mu g/m^3$ 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.

<u>Vapor Emission Response Plan</u>

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 feet 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 <u>Major Vapor Emission</u> section.

Community Air Monitoring Plan
(Non-Intrusive Activities)

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

- Volatile organic compounds must be monitored at the downwind perimeter of the work area daily at **2 hour intervals.** 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. 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 feet 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, and

- more frequent intervals of monitoring, as directed by the Safety Officer, are conducted.

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

DRAFT

Kevin,
Bound separately for convenience
Bruce Nelson

The Cody Ehlers Group

SITE INVESTIGATION WORK PLAN

KINGS ELECTRONICS CO., INC. SITE
TUCKAHOE, NEW YORK

OCTOBER 11, 1999

Prepared for:
KINGS ELECTRONICS CO., INC.
40 MARBLEDALE ROAD
TUCKAHOE, NEW YORK 10707

Prepared by:
THE CODY EHLERS GROUP
140 SHERMAN STREET
FAIRFIELD, CT 06430

EXHIBIT "C"

Final Remediation Work Plan

EXHIBIT "D"

Assignable Release and Covenant Not To Sue

Kings Electronics Co., Inc.
40 Marbledale Road
Tuckahoe, NY 10707

Dear Sirs:

Unless otherwise specified herein, all terms used in this letter shall have the meaning assigned to them under the terms of the Voluntary Agreement entered into between the New York State Department of Environmental Conservation ("Department") and Kings Electronics Co., Inc. ("Volunteer"), Index No. W3-0855-99-07 ("Agreement").

The Department is pleased to report that the Department is satisfied that the Agreement's Work Plans covering the investigation and remediation of the Site located at 40 Marbledale Road in the Village of Tuckahoe, Town of Eastchester, Westchester County, which parcel is also referred to as Section 68, Block 4, Lots 29 and 36E in the Tax Maps on file with the Westchester County Clerk, has been successfully implemented.

The Department therefore, hereby releases, covenants not to sue, and shall forbear from bringing any action, proceeding, or suit against Volunteer and Volunteer's lessees and sublessees and Volunteer's successors and assigns and their respective secured creditors, for the further investigation and remediation of the Site, based upon the release or threatened release of Covered Contamination, provided that (a) timely payments of the amounts specified in Paragraph VI of the Agreement continue to be or have been made to the Department, (b) appropriate notices and deed restrictions have been recorded in accordance with Paragraphs IX and X of the Agreement, and (c) Volunteer and/or Volunteer's lessees, sublessees, successors, or assigns promptly commence and diligently pursue to completion the Department-approved O&M Plan, if any. Nonetheless, the Department hereby reserves all of its rights concerning, and such release, covenant not to sue, and forbearance shall not extend to natural resource damages nor to any further investigation or remedial action the Department deems necessary:

- due to off-Site migration of contaminants other than petroleum resulting in impacts to environmental resources, to human health, or to other biota that are not inconsequential and to off-Site migration of petroleum, irrespective of whether the information available to Volunteer and the Department at the time of the development of the Work Plan disclosed the existence or potential existence of such off-Site migration;

- due to environmental conditions related to the Site that were unknown to the Department at the time of its approval of the Remediation Work Plan which indicate that Site conditions are not sufficiently protective of human health and the environment for the Contemplated Use;

- due to information received, in whole or in part, after the Department's approval of the final engineering report, which indicates that the activities carried out in accordance with the Remediation Work Plan are not sufficiently protective of human health and the environment for the Contemplated Use;

- due to Volunteer's failure to implement the Agreement to the Department's satisfaction, which determination of satisfaction and/or approval shall not be unreasonably withheld; or

- due to fraud committed, or mistake made, by Volunteer in demonstrating that the Site-specific cleanup levels identified in, or to be identified in accordance with, the Remediation Work Plan were reached.

Additionally, the Department hereby reserves all of its rights concerning, and any such release, covenant not to sue, and forbearance shall not extend to:

- Volunteer if Volunteer causes a, or suffers the, release or threat of release, at the Site of any hazardous substance (as that term is defined at 42 USC 9601[14]) or petroleum (as that term is defined in Navigation Law § 172[15]), other than Covered Contamination; or if Volunteer causes a, or suffers the use of the Site to, change from the Contemplated Use to one requiring a lower level of residual contamination before that use can be implemented with sufficient protection of human health and the environment; nor to

- any of Volunteer's lessees, sublessees, successors, or assigns who causes a, or suffers the, release or threat of release, at the Site of any hazardous substance (as defined at 42 USC 9601[14]) or petroleum (as defined in Navigation Law § 172[15]), other than Covered Contamination, after the effective date of the Agreement; who causes a, or suffers the use of the Site to, change from the Contemplated Use to one requiring a lower level of residual contamination before that use can be implemented with sufficient protection of human health and the environment; or who is otherwise a party responsible under law for the remediation of the Existing Contamination independent of any obligation that party may have respecting same established resulting solely from the Agreement's execution.

Notwithstanding the above, however, with respect to any claim or cause of action asserted by the Department, the one seeking the benefit of this release, covenant not to sue, and forbearance shall bear the burden of proving that the claim or cause of action, or any part thereof, is attributable solely to Covered Contamination.

Notwithstanding any other provision in this release, covenant not to sue, and forbearance,

- if with respect to the Site there exists or may exist a claim of any kind or nature on the part of the New York State Environmental Protection and Spill Compensation Fund against any party, nothing in this release shall be construed, or deemed, to preclude the State of New York from recovering such claim.

- except as provided in Subparagraph I.G of the Agreement and in this letter, nothing contained in the Agreement or in this letter shall be construed as barring, diminishing, adjudicating, or in any way affecting any of the Department's rights (including, but not limited to, nor exemplified by, the right to recover natural resources damages) with respect to any party, including Volunteer.

- nothing contained in this letter shall prejudice any rights of the Department to take any investigatory or remedial action it may deem necessary if Volunteer fails to comply with the Agreement or if contamination other than Existing Contamination or Covered Contamination is encountered at the Site.

- nothing contained in this letter shall be construed to prohibit the Commissioner or his duly authorized representative from exercising any summary abatement powers.

- nothing contained in this letter shall be construed to affect the Department's right to terminate the Agreement at any time during its implementation if Volunteer fails to comply substantially with the Agreement's terms and conditions.

In conclusion, the Department is pleased to be part of this effort to return the Site to productive use of benefit to the entire community.

NEW YORK STATE DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

By:______________________________

Exhibit "E"

NOTICE OF AGREEMENT

This Notice is made as of the _____ day of _______________, 2000 by Kings Electronics Co., Inc., the fee owner of a parcel of real property located at 40 Marbledale Road, Village of Tuckahoe, Town of Eastchester, Westchester County, New York, which parcel is also referred to as Section 68, Block 4, Lots 29 and 36E in the Tax Maps on file with the Westchester County Clerk, and more particularly described on Appendix "A" attached hereto (the "Property"); and

WHEREAS, Kings Electronics Co., Inc. by authorized signature, entered into an agreement with the Department, Index # W3-0855-99-07 (the "Agreement"), concerning the remediation of contamination present on the Property, which Agreement was signed by the Commissioner of Environmental Conservation on __________________________; and

WHEREAS, in return for the remediation of the Property pursuant to the Agreement to the satisfaction of the Department, the Department will provide Kings Electronics Co., Inc. and Volunteer's lessees and sublessees and Volunteer's successors and assigns, including their respective secured creditors, with a release, covenant not to sue, and forbearance from bringing any action, proceeding, or suit related to the Site's further investigation or remediation, subject to certain reservations set forth in the Agreement; and

WHEREAS, pursuant to the Agreement, Kings Electronics Co., Inc. agreed that it would give notice of the Agreement to all parties who may acquire any interest in the Property by filing this Notice with the Westchester County Clerk,

NOW, THEREFORE, Kings Electronics Co., Inc., for itself and for its successors and assigns, declares that:

1. This Notice of the Agreement is hereby given to all parties who may acquire any interest in the Property; and that

2. This Notice shall terminate upon the filing by Kings Electronics Co., Inc., or its successors and assigns, of a termination of notice of Agreement after having first received approval to do so from the New York State Department of Environmental Conservation.

IN WITNESS WHEREOF, Kings Electronics Co., Inc. has executed this Notice of Agreement by its duly authorized representative.

Kings Electronics Co., Inc.

Dated: Apr. 10, 2000

By: Estelle Fassler

Its: ______________________

[acknowledgment]

Appendix "A"

(to Exhibit "E")

Map of the Property

Appendix B

Soil Investigation Performed by
Geovation Consultants, Inc.

APPENDIX B

Prepared by: Geovation Consultants, Inc., 468 Rt. 17A Florida NY 10921
Prepared for: Kings Electronics, 670 White Plains Road, Scarsdale, NY 10583

Evaluation of Soil Sampling Performed in the Former Area of the Vapor Degreaser and the Evaluation of the Chlorinated Organic Compound Concentration within the Silt Layer

Soil Sampling

As reported in Cody Ehlers Group 1999 *Soil Removal Report*, soil removal activities, in the area beneath the former location of the vapor degreaser, were performed on 5 April 1999 through 9 April 1999. Approximately 200 tons of concrete, gravel and soil were removed and stockpiled in the paved alley north of the facility. Soils were transported off-site on 25 May 1999 to the Michigan Disposal Waste Treatment Plant. Concrete was stockpiled separately and remains stockpiled at the site. Manifests/shipping papers for materials transported off-site are provided in Attachment 1.

The Cody Ehlers Group (CEG) tested the concrete floor samples and found that the concentration of organic constituents was consistently below the NYSDEC recommended soil clean-up objectives (RSCOs). Some visually stained concrete was reported to contain metal concentrations above the RSCOs, and this material was included with the soil that was transported off-site for proper disposal.

Silt Layer

An obvious subsurface feature noted during excavation activities was the presence of a silt layer approximately 6.6 feet below the floor in the facility. Based on field screening measurements, this silt layer contained a higher concentration of volatile contaminants than either the soils above or below the silt layer. Subsequent laboratory analysis for volatile organic compounds indicated that subsurface soils in this area were impacted by elevated levels of Trichloroethene (TCE) and, within the silt layer, elevated concentrations of tetrachloroethene (PCE). Minor concentrations of the breakdown products of these primary constituents were also reported to be present.

When soil excavation activities were completed, CEG sampled the excavation bottom and sidewalls. Sidewall excavation samples were primarily collected from the silt layer horizon. Sidewall excavation sampling indicated that each sidewall contained concentrations of TCE above the NYSDEC RSCOs. One soil sample from the bottom of the excavation, reported to have been collected from the silt layer (CS-8), contained TCE above the RSCOs, whereas a second bottom of excavation soil sample collected from within the silt layer (CS-3) was not found to contain concentrations of TCE constituents above the NYSDEC RSCOs.

Sidewall samples collected by CEG were primarily collected from the silt layer. Additional confirmatory sampling performed by CEG above, within and below the silt layer confirmed that the highest concentration of trichloroethene (TCE) was located within the silt layer. In summary, the CEG soil sampling indicates that at the edge of the current excavation, the concentration of TCE was greater than the NYSDEC RSCOs above and within the silt layer and that soils below the silt layer have concentrations of TCE below the NYSDEC RSCOs.

Subsequently, Geovation sampled subsurface soils to the north and south of the excavation. Soil sampling to the north was performed on 8 January 2001, and soil samples were collected from the silt layer and immediately above and below the silt layer. The results of this sampling indicate that within approximately 5 feet to the north of the current excavation, the concentration of TCE above, within and below the silt layer is below the NYSDEC RSCOs.

Geovation also sampled soils to the south of the excavation on 20-22 March 2001. Soil samples were collected from above, within and below the silt layer at locations (MW-10 and MW-12) to the south and south west of the excavation, and soil samples were collected from below the silt layer to the south east of the excavation (MW-11). The results of this sampling indicate that at a distance of approximately 40 feet south of the former location of the vapor degreaser, the concentration of organic constituents (including TCE & PCE) is below the NYSDEC RSCO at each of the three soil horizons investigated, (i.e. above the silt layer, below the silt layer and within the silt layer).

Discussion

CEG had collected soil samples prior to performing excavation activities within the former area of the degreaser. Analysis of the results of soil sampling at locations GP-200, GP-201, GP-202, and GP-112, represent the level of contamination most likely present in the soils transported off-site for disposal. In addition to providing a waste characterization, contaminant concentrations can be used to establish a gradient to predict the contaminant concentration at a distance from the excavation.

Soils Above the Silt Layer. In total, seven soil samples had been collected (by CEG and Geovation) from above the silt layer and significantly below the system of double concrete floors which formerly existed in this room. The location of each sample and the respective concentration of TCE reported at each location are provided on Figure 1. Of the seven samples collected, only one (GP-201 @ 4') was reported to contain concentrations of TCE above the NYSDEC RSCOs. This sample, collected from a soil boring prior to excavation, had a reported TCE concentration of 70,000 ug/kg, suggesting that the TCE concentration at the southern and possibly eastern sidewalls may be above the NYSDEC RSCOs. The soil in the area of this sample was subsequently excavated and transported off-site for disposal (see manifests/shipping papers, attachment 1). Soil samples were not collected above the silt layer on the southern or eastern sidewalls of the excavation.

As stated in the approved *Sampling and Analysis Plan* (see section 3.3.3 Task 3), soil sampling will be performed above the silt layer at the southern, eastern and northeastern extent of the excavation for chlorinated volatile organic compounds (VOCs). Proposed soil sampling locations are shown on Figure 1.

Within the Silt Layer. In total, fourteen soil samples were colleted from within the silt layer. The locations of these samples and concentrations of TCE reported at each location are provided on Figure 2. Of the fourteen soil samples, eight were reported to contain TCE at a concentration above the NYSDEC RSCOs. Most of these samples were collected from the excavation sidewalls, indicating that the silt layer is impacted above the NYSDEC RSCOs on each of the excavation sidewalls. Subsequent additional sampling performed to the north and south of the excavation suggests that this level of impact, approximately one order of magnitude above the RSCOs, does not extend significantly to the north of the excavation and is limited to within approximately 40 feet to the south of the excavation.

The silt layer is a relatively thin feature, typically less than one foot in thickness making additional sampling of the silt layer to the south, east, and west of the excavation difficult. In addition, current information indicates that 6 feet to 11 feet of fill materials that do not require excavation/removal overlie the silt layer.

The NYSDEC RSCOs can be site specific, if the total organic carbon content (TOC) of the material is known. As stated in section 3.3.3, (Vertical Delineation Sampling) of the *Site Investigation Work Plan*, Kings will collect three soil samples, for TOC analysis from the silt layer to estimate the average TOC content of the silt layer and calculate site specific RSCOs for the silt layer. The existing VOC data from the samples previously collected from the silt layer will then be compared to the site specific RSCOs.

Below the Silt Layer. A total of eight soil samples were collected from below the silt layer (see Figure 3). Each of the soil samples collected were reported to contain TCE concentrations below the NYSDEC RSCOs, although the excavation sidewall on the east and west sides of the excavation are not well represented by the samples collected. Kings will collect additional soil samples, for VOC analysis, from below the silt layer on the eastern and western excavation side walls to confirm that soils below the silt layer are below the NYSDEC RSCOs. Proposed soil sampling locations are shown on Figure 3.

Summary of Required Additional Post-Excavation Sampling

Based on the discussion presented above, Kings will perform additional soil sampling above, within and below the silt layer. Four soil samples will be collected for analysis of volatile organic compounds and associated library search (VOCs+10) above the silt layer along the southern, eastern and northeastern portions of the excavation (see proposed sampling locations provided on Figure 1). Within the silt layer, three soil samples will be collected for TOC analysis. These samples will be collected from different portions of the silt layer where such sampling is practical (see proposed sampling locations on Figure 2). Below the silt layer, two to four soil samples will be collected for analysis of VOCs+10 along the eastern and western potions of the excavation (see proposed sampling locations on Figure 3). All soil sampling will be conducted in accordance with the *Site Investigation Work Plan* previously prepared for this site.

Description of the Silt Layer

The silt layer has been identified in numerous borings in the area beneath the location where the degreaser was formerly located. Whereas the surrounding soil generally consists of a fine sand, the silt layer is typically darker in color and can be described as a clayey silt. The presence of the silt layer has been found to be a nearly continuous, site wide feature both in the area beneath the degreaser and across the site. The presence of the silt layer as a predominant subsurface feature was confirmed by CEG by the identification of its presence in more than a dozen separate borings across the site. Based on this data, a diagram was prepared by Leggette, Brashears & Graham, Inc. (LBG) which provided the elevation silt layer as a contiguous site-wide feature (LBJ June 2000, *Summary of Remedial Investigation Findings* report). The silt layer was subsequently identified by Geovation in test pitting activities performed to the north of the former location of the degreaser and in monitor well installations located to the south of the former position of the degreaser. Arcadis, Geraghty & Miller (Arcadis) identified the silt layer within borings advanced in areas further to the south, during the installation of monitor wells MW-9S, MW-9D, PTW-1, and IW-4. A compilation of this information is provided as Figure 4. In addition, an enlarged view of this figure, highlighting the topography of the silt layer in the former area of the vapor degreaser, is provided as Figure 5. While both of these figures present the silt layer as a continuous subsurface feature, its presence was not observed/confirmed at every boring location. The figures display the locations and subsurface data on which the diagrams were prepared.

Based on the site history provided in previously prepared documents (Cody Ehlers Group, 1999 *Summary of Environmental Conditions* report), the relationship of the silt layer to the water table (discussed below), the reported presence of root structures in the silt layer (CEG, boring logs) and the examination of the silt layer in the waste water treatment room excavation, the silt layer most likely represents the remains of a disturbed B-horizon of a paleo-soil. The B-soil horizon, the zone of enrichment, lies below the A-soil horizon, the zone of depletion. The A-soil horizon may have a thickness of up to 5 feet; however, the A-horizon appears to be absent at this location. The occurrence of fill above the B-soil horizon and the presence of rock-fragments pressed into the silt layer suggest that the A-horizon may have been excavated from this location (the B-soil horizon may have been excavated in certain areas as well). The apparent presence of iron and manganese precipitate minerals within the silt layer identify this layer as a zone of enrichment and, at this location, this soil is then most likely a member of the Stockbridge catena.

Silt Layer Site Topography. As stated above, information from several sources regarding the elevation of the silt layer was utilized to update and revise the site-wide, *Silt Lense Elevation Contour Map*, previously prepared by LBG. This updated information is presented as Figure 4 and shows several depressions in the topography of the silt lense located: (i) in the former waste water treatment room (enlarged as figure Y); (ii) approximately 60 feet to the south of the former vapor degreaser, in the former brazing room; and (iii) in the western portion of the central alley. Each of these depressions may be identified by the use of a hatched contour line on Figure 4. Based on the silt layer sampling performed at the site, the silt layer is not impacted by volatile organic compounds above the NYSDEC RSCOs more than 40 feet outside of the area of the former degreaser.

Based on the data collected in numerous borings, the topography of the silt layer in the former location of the degreaser is presented as Figure 5. This figure shows that within the large excavation in this room (which is beneath the former location of the vapor degreaser and extending to areas to north and east) the silt layer forms a roughly bowl-shaped structure with a rim elevation of 96 feet and the bottom of the bowl at an elevation of approximately 93 feet. In this area, the silt layer expresses a high degree of topography in this small area, with slopes of various magnitudes directed towards the center of the bowl, which appears to be located to the east of the former location of the degreaser. The topography of the silt layer (Figure 5) and the patterns of soil contaminant concentrations measured within or below the silt layer (Figures 2 & 3) do not have similar patterns. The bottom of the topographic silt layer "bowl" was found to be impacted to a lesser degree than the portion (side) of the topographic bowl directly beneath the former location of the vapor degreaser. This suggests that the silt layer topography is not a good predictor of the contaminant concentration.

Location of the Silt Layer Relative to the Water Table

Comparison of Silt Layer to Bedrock and Ground Water. To further evaluate the nature and elevation of the silt layer, the elevation of the silt layer as provided on Figure 4 was projected onto the geologic cross-section previously prepared for the site (Figure 6). This diagram portrays the elevation of the silt layer and static water table across the site and is based on ground water elevation measurements made by LBG on 24 April, 2000. The springtime, when this water table elevation data was collected, is typically a season when the ground water table is at a relatively higher elevation. As indicated by this figure, the silt layer is well above the overburden/bedrock interface and entirely above the water table at this time.

The assumption that the ground water table is higher in the spring is supported by periodic water table measurements collected at the site from May 2001 through August 2001 at ground water monitoring locations MW-5S, HP-1S and GP-121. This long-term ground water elevation data, provided graphically as Figure 7, shows the water table relatively higher in May/June and lower in July/August. These monitoring locations experienced an average deviation in the water table elevation of 1.42 feet from May to August.

Based on this information, the silt layer is most likely above the water at all times at most locations. In the former area of the degreaser, where the silt layer is impacted above the NYSDEC RSCOs, the water table was measured to be approximately 2 feet below the silt layer in the spring, when the water table is at its highest. Meteorological forcing, such as major storm events, which coincide with the seasonal high water table may be capable of causing the water table to occasionally intersect the silt layer.

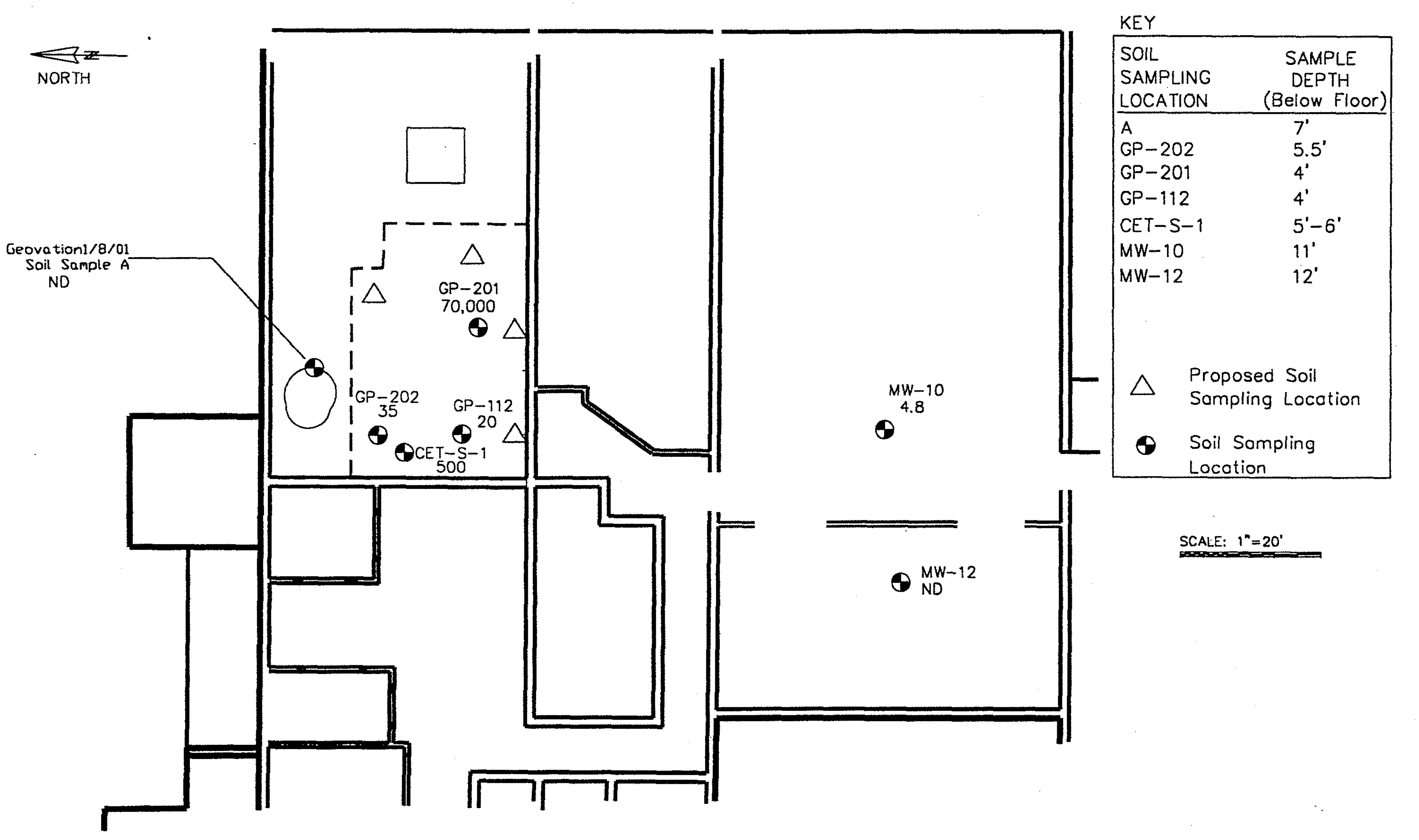

Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

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FLORIDA, NEW YORK

Former Degreaser Area --- Soil Sampling ABOVE the Silt Layer

Concentration of TCE in Soil (in ug/Kg)

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 1

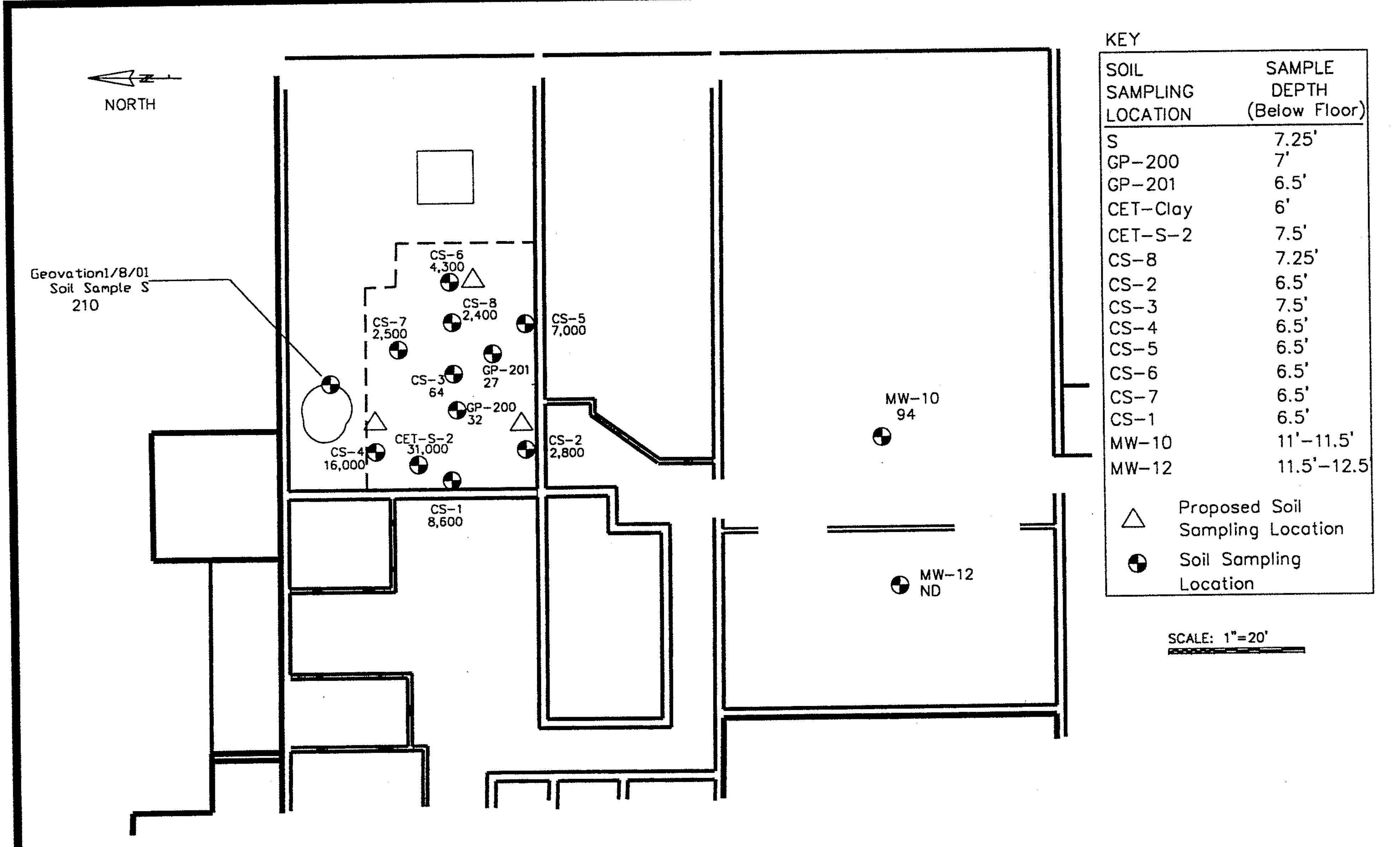

Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

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Former Degreaser Area --- Soil Sampling WITHIN the Silt Layer
Concentration of TCE in Soil (in ug/Kg)
KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE
2

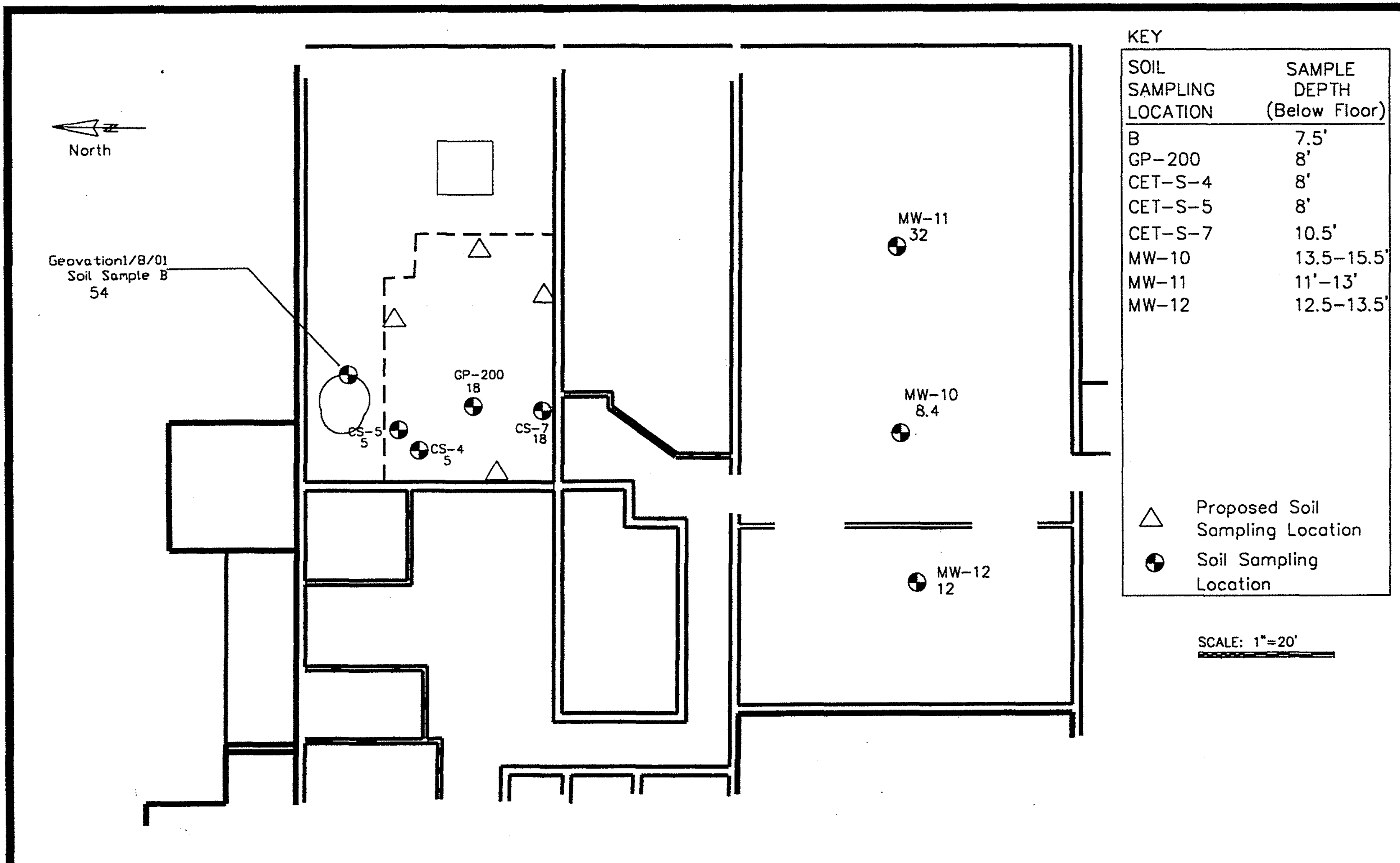

Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

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Former Degreaser Area --- Soil Sampling BELOW the Silt Layer

Concentration of TCE in Soil (in ug/Kg)

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 3

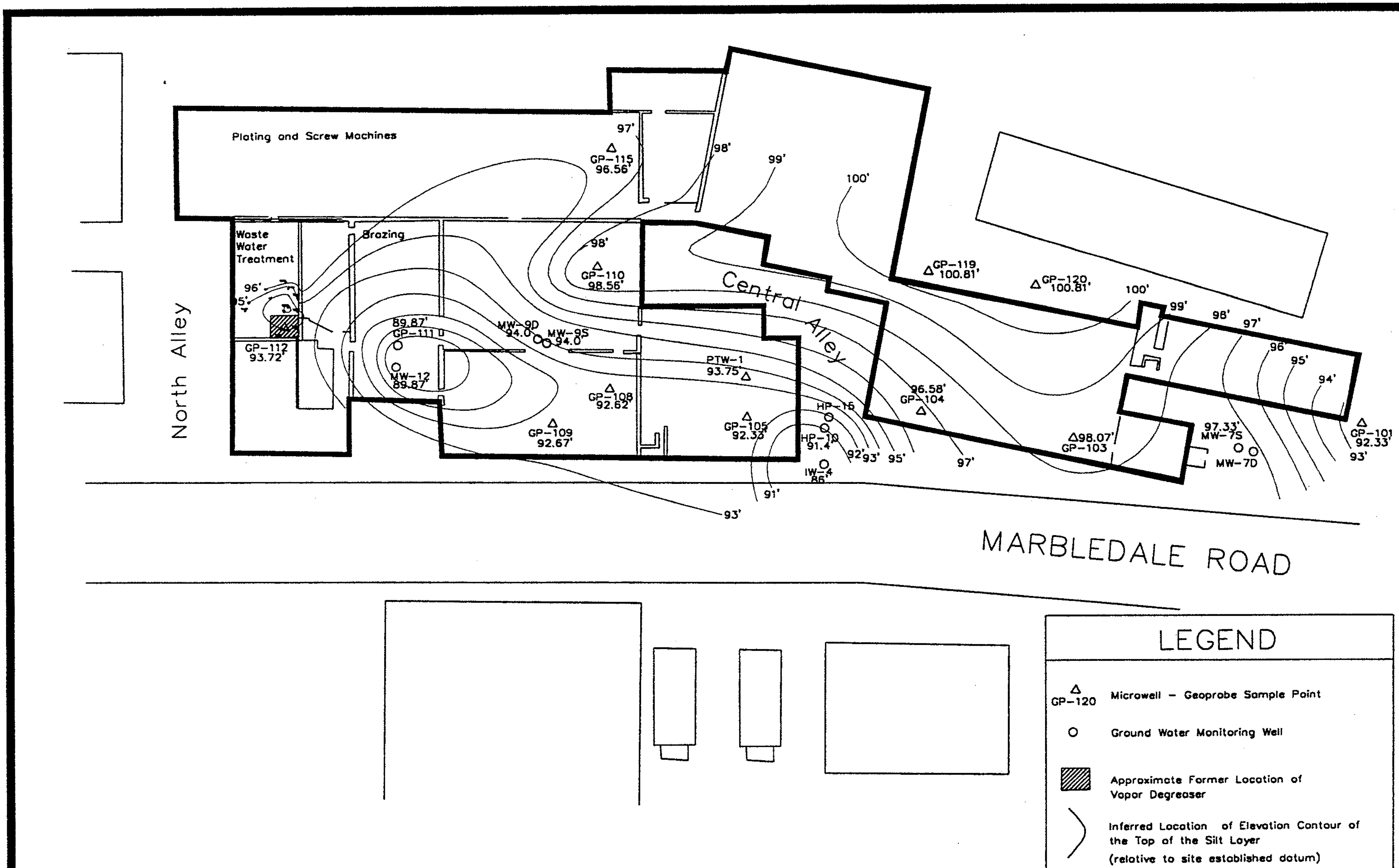

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Graham, Inc.

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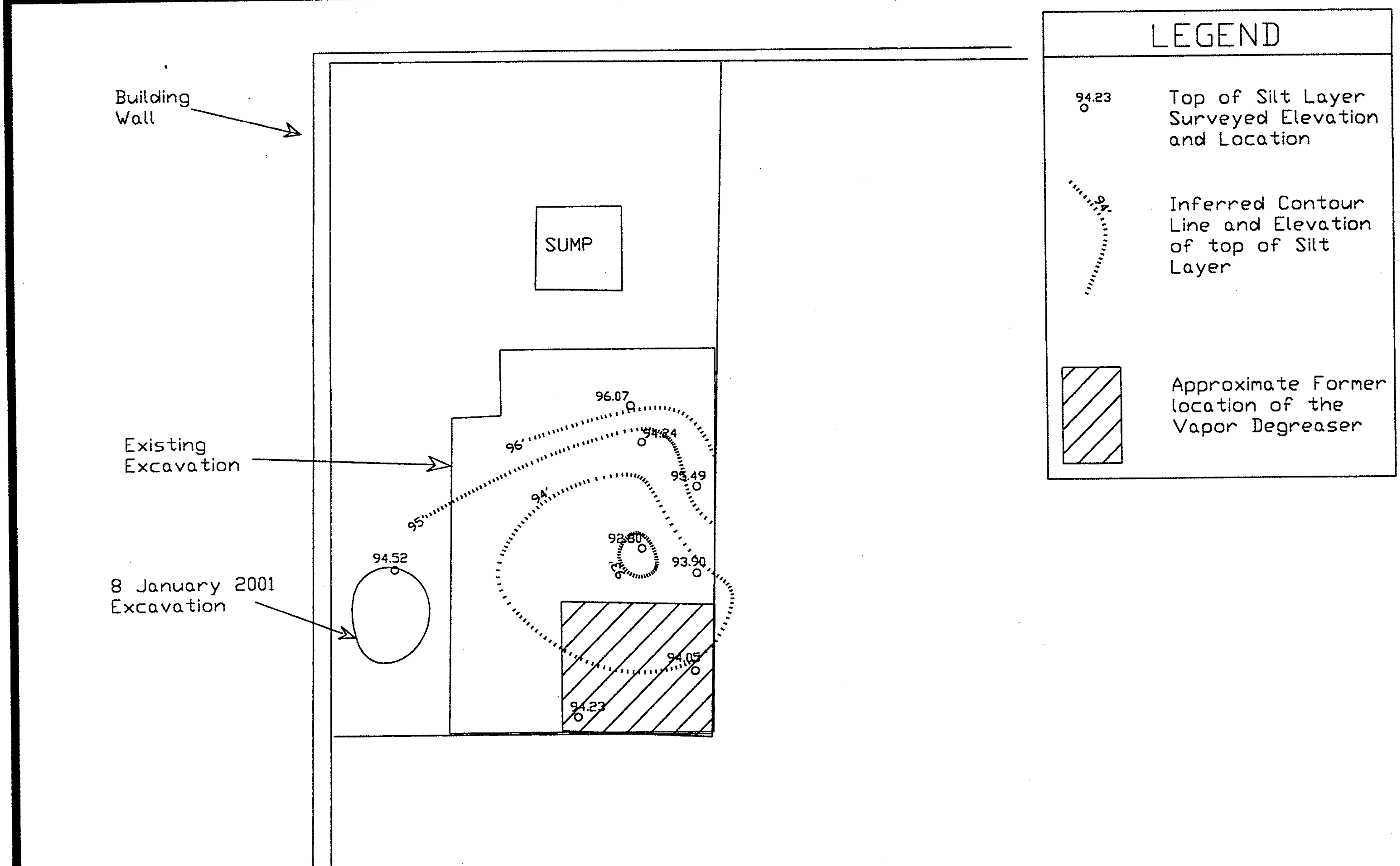
Site-Wide Silt Layer Topography

Contour Interval = 1 foot

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 4



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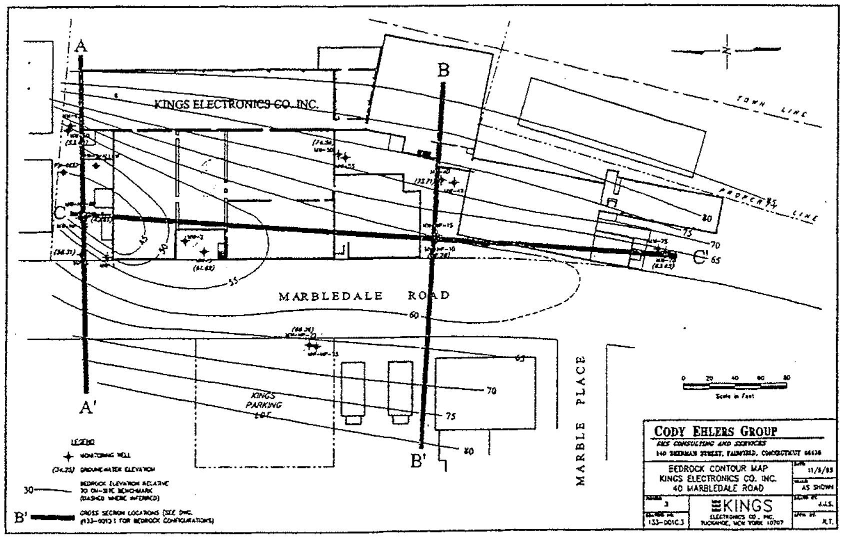
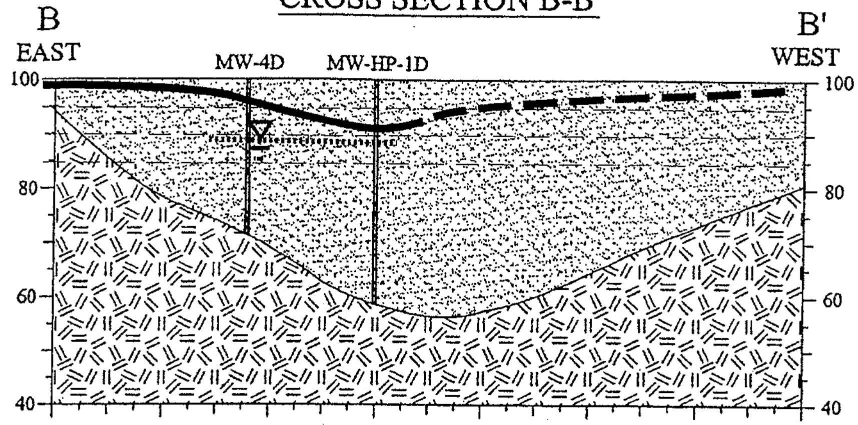
Former Degereaser Area – Silt Layer Topography
Contour Interval = 1 Foot
KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE
5

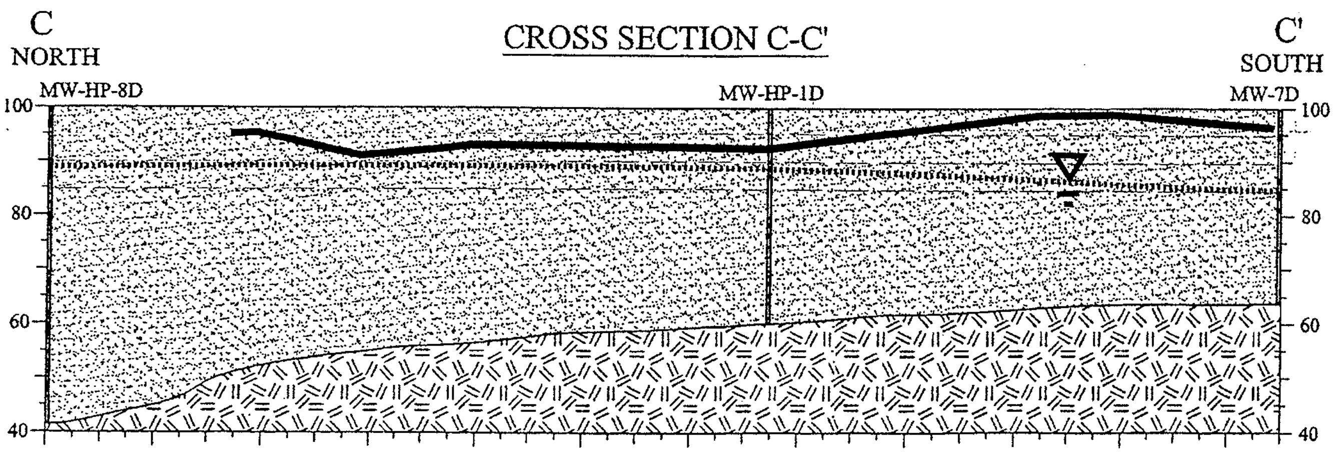


CROSS SECTION B-B'



VERTICAL EXAGGERATION = 2x

CROSS SECTION C-C'



VERTICAL EXAGGERATION = 2x

LEGEND

- UNCONSOLIDATED MATERIAL (SILT, SAND, GRAVEL, BOULDERS)
- BEDROCK
- Inferred Elevation of the Top of the Silt Layer
- Inferred Elevation of the Top of the Water Table

Source: 10/27/98 Cross Sections - Bedrock Configurations Prepared by: Cody Ehlers Group

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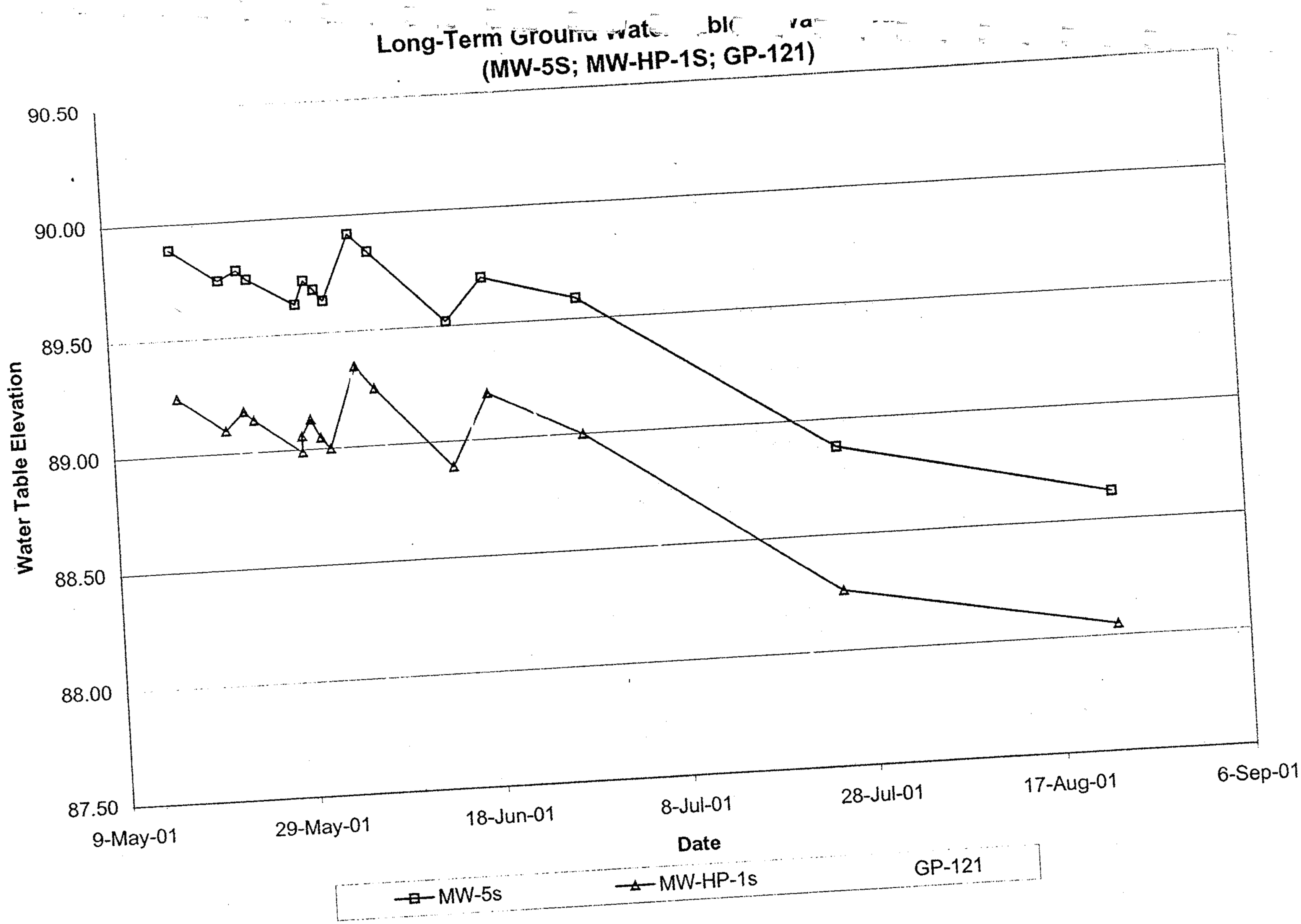
Geologic Cross Section with Silt Layer and Ground Water Table added

Kings Electronics Co., Inc. 40 Marbledale Rd., Tuckahoe, NY

FIGURE
6


Long-Term Ground Wate ble va
(MW-5S; MW-HP-1S; GP-121)
90.50
90.00
89.50
89.00
88.50
88.00
87.50
Water Table Elevation
9-May-01
29-May-01
18-Jun-01
8-Jul-01
28-Jul-01
17-Aug-01
6-Sep-01
Date
MW-5s
MW-HP-1s
GP-121

ARCADIS

Appendix C

Summary of Pilot Test Results

Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

GP-107	Date Sampled:	9/21/98	7/7/00	9/15/00	10/2/00	10/16/00	10/31/00	11/14/00	11/28/00	12/13/00	12/28/00	1/10/01
Field Parameters												
DO (mg/L)		--	2.33	2.17	0.36	0.44	0.17	0.12	0.19	--	0.38	0.37
REDOX (mV)		--	129.3	106	-104	-125	-90	-252	--	-328.4	-226.9	-142
pH (SU)		--	6.73	6.94	6.58	6.26	5.66	5.21	5.22	5.15	4.67	4.66
Conductivity (mS/cm)		--	0.663	0.9	1.31	2.15	3.03	3.4	--	3.097	3.077	2.593
Chlorinated VOCs (ug/L)												
Trichloroethene		13000	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene		1300	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene		ND	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride		ND	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene		ND	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane		ND	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene		120	--	--	--	--	--	--	--	--	--	--
Biogeochemical Parameters												
TOC (mg/L)		--	2.47	--	328	--	1460	2570	4585	2086	1300	2127
DOC (mg/L)		--	1.23	--	313	--	1410	2434	3594	1962	1190	1972
Carbon Dioxide (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Nitrogen (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Methane (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Ethane (ng/L)		--	--	--	--	--	--	--	--	--	--	--
Ethene (ng/L)		--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/L)		--	0.0015	--	--	--	--	--	--	--	--	--
Ferrous Iron (mg/L)		--	ND	--	--	--	--	--	--	--	--	--
Dissolved Iron (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Total Iron (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Total Manganese (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Alkalinity (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Chloride (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Nitrate (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Nitrite (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Sulfate (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Injection Data												
Ratio / Volume (gallons)		NI	NI	20:1 / 100	20:1 / 100	20:1 / 100	10:1 / 100	10:1 / 100	10:1 / 100	10:1 / 100	10:1 / 100	10:1 / 100

Footnotes on last page.

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

GP-107	Date Sampled:	1/25/01	2/8/01	2/22/01	3/8/01	3/22/01	4/5/01	4/19/01	5/4/01	5/17/01	5/31/01	6/14/01
Field Parameters												
DO (mg/L)		0.28	0.27	0.46	0.25	0.14	0.29	0.15	0.74	0.38	0.3	--
REDOX (mV)		8.3	-46.9	-310.8	-247.5	-43.8	-330.6	-369.6	-439.4	14.2	-96.5	-27.7
pH (SU)		4.85	4.5	4.44	4.28	4.38	5.55	5.39	4.92	4.55	4.42	4.54
Conductivity (mS/cm)		2.644	3.721	3.257	3.988	3.851	4.771	3.534	2.328	5.129	4.979	5.614
Chlorinated VOCs (ug/L)												
Trichloroethene		--	--	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene		--	--	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene		--	--	--	--	--	--	--	--	--	--	--
Vinyl Chloride		--	--	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene		--	--	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane		--	--	--	--	--	--	--	--	--	--	--
Tetrachloroethene		--	--	--	--	--	--	--	--	--	--	--
Biogeochemical Parameters												
TOC (mg/L)		1481	2033	2984	3779	3450	2390	1590	2580	3810	3360	4630
DOC (mg/L)		1312	1626	2222	3500	3360	2330	767	2300	3590	3090	3710
Carbon Dioxide (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Nitrogen (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Methane (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Ethane (ng/L)		--	--	--	--	--	--	--	--	--	--	--
Ethene (ng/L)		--	--	--	--	--	--	--	--	--	--	--
Sulfide (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Ferrous Iron (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Dissolved Iron (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Total Iron (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Total Manganese (ug/L)		--	--	--	--	--	--	--	--	--	--	--
Alkalinity (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Chloride (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Nitrate (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Nitrite (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Sulfate (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Total Phosphorus (mg/L)		--	--	--	--	--	--	--	--	--	--	--
Injection Data												
Ratio / Volume (gallons)		10:1 / 100	10:1 / 200	10:1 / 200	10:1 / 200	10:1 / 200	10:1 / 200	10:1 / 200	10:1 / 200	10:1 / 200	10:1 / 200	NI

Footnotes on last page.

Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

GP-107	Date Sampled: 6/27/01	7/12/01	7/26/01
Field Parameters			
DO (mg/L)	0.12	1.06	--
REDOX (mV)	85.4	22.8	71.1
pH (SU)	4.68	5.17	5.17
Conductivity (mS/cm)	2.745	2.11	1.069
Chlorinated VOCs (ug/L)			
Trichloroethene	--	--	--
cis-1,2-Dichloroethene	--	--	--
trans-1,2-Dichloroethene	--	--	--
Vinyl Chloride	--	--	--
1,1-Dichloroethene	--	--	--
1,1,1-Trichloroethane	--	--	--
Tetrachloroethene	--	--	--
Biogeochemical Parameters			
TOC (mg/L)	2000	1060	1310
DOC (mg/L)	1560	955	1300
Carbon Dioxide (mg/L)	--	--	--
Nitrogen (mg/L)	--	--	--
Methane (ug/L)	--	--	--
Ethane (ng/L)	--	--	--
Ethene (ng/L)	--	--	--
Sulfide (mg/L)	--	--	--
Ferrous Iron (mg/L)	--	--	--
Dissolved Iron (ug/L)	--	--	--
Total Iron (ug/L)	--	--	--
Dissolved Manganese (ug/L)	--	--	--
Total Manganese (ug/L)	--	--	--
Alkalinity (mg/L)	--	--	--
Chloride (mg/L)	--	--	--
Nitrate (mg/L)	--	--	--
Nitrite (mg/L)	--	--	--
Sulfate (mg/L)	--	--	--
Total Phosphorus (mg/L)	--	--	--
Injection Data			
Ratio / Volume (gallons)	NI	NI	NI

Footnotes on last page.

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GP-105 Date Sampled:	9/21/98	9/14/00	10/2/00	10/16/00	10/31/00	11/14/00	12/13/00	1/25/01	2/22/01	4/5/01	4/19/01
Field Parameters											
DO (mg/L)	--	3.29	1.79	1.35	0.75	0.26	0.73	1.97	2.05	3.13	2.39
REDOX (mV)	--	191	282	268	125	162	198.1	121.2	266.3	206.6	242.9
pH (SU)	--	6.77	7.05	7.14	6.9	7.09	6.7	6.83	6.77	6.71	6.82
Conductivity (mS/cm)	--	0.98	0.96	0.856	0.805	0.95	0.92	1.05	1.203	1.247	0.973
Chlorinated VOCs (ug/L)											
Trichloroethene	26000	9600	--	--	--	--	--	--	--	--	--
cis-1,2-Dichloroethene	590	1500	--	--	--	--	--	--	--	--	--
trans-1,2-Dichloroethene	ND	ND	--	--	--	--	--	--	--	--	--
Vinyl Chloride	ND	ND	--	--	--	--	--	--	--	--	--
1,1-Dichloroethene	ND	ND	--	--	--	--	--	--	--	--	--
1,1,1-Trichloroethane	ND	ND	--	--	--	--	--	--	--	--	--
Tetrachloroethene	ND	ND	--	--	--	--	--	--	--	--	--
Biogeochemical Parameters											
TOC (mg/L)	--	6.2	7.25	--	--	--	4.44	6.77	5.96	4.57	2.79
DOC (mg/L)	--	5.55	6.55	--	--	--	4.41	3.52	5.83	4.19	2.52
Carbon Dioxide (mg/L)	--	47.1	--	--	--	--	--	--	--	--	--
Nitrogen (mg/L)	--	16.84	--	--	--	--	--	--	--	--	--
Methane (ug/L)	--	0.855	--	--	--	--	--	--	--	--	--
Ethane (ng/L)	--	388	--	--	--	--	--	--	--	--	--
Ethene (ng/L)	--	ND	--	--	--	--	--	--	--	--	--
Sulfide (mg/L)	--	0.0006	--	--	--	--	--	--	--	--	--
Ferrous Iron (mg/L)	--	ND	--	--	--	--	--	--	--	--	--
Dissolved Iron (ug/L)	--	ND	--	--	--	--	--	--	--	--	ND
Total Iron (ug/L)	--	ND	--	--	--	--	--	--	--	--	--
Dissolved Manganese (ug/L)	--	0.7	--	--	--	--	--	--	--	--	--
Total Manganese (ug/L)	--	2.3	--	--	--	--	--	--	--	--	--
Alkalinity (mg/L)	--	197	--	--	--	--	--	--	--	--	--
Chloride (mg/L)	--	125	--	--	--	--	--	--	--	--	--
Nitrate (mg/L)	--	5.55	--	--	--	--	--	--	--	--	--
Nitrite (mg/L)	--	ND	--	--	--	--	--	--	--	--	--
Sulfate (mg/L)	--	76	--	--	--	--	--	--	--	--	--
Total Phosphorus (mg/L)	--	ND	--	--	--	--	--	--	--	--	--
Injection Data											
Ratio / Volume	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

GP-105	Date Sampled:	5/3/01	5/16/01	5/31/01	6/14/01	6/27/01	7/12/01	7/26/01
Field Parameters								
DO (mg/L)		3.42	2.87	2.66	0.97	2.23	1.08	--
REDOX (mV)		76.3	172.4	193.7	77.7	72.4	-20.7	-11.2
pH (SU)		6.68	6.61	6.6	6.8	6.72	6.71	6.62
Conductivity (mS/cm)		1.185	1.049	1.107	1.125	1.136	1.414	0.694
Chlorinated VOCs (ug/L)								
Trichloroethene		5100	--	5900	4200	3200	--	--
cis-1,2-Dichloroethene		1400	--	2100	1400	1300	--	--
trans-1,2-Dichloroethene		ND	--	ND	ND	ND	--	--
Vinyl Chloride		ND	--	ND	ND	ND	--	--
1,1-Dichloroethene		ND	--	ND	ND	ND	--	--
1,1,1-Trichloroethane		ND	--	ND	ND	ND	--	--
Tetrachloroethene		60	--	51	40	ND	--	--
Biogeochemical Parameters								
TOC (mg/L)		3.64	7.02	5.11	7.99	14	28.1	88.4
DOC (mg/L)		3.34	5.53	4.94	5.53	6.32	21.6	62.4
Carbon Dioxide (mg/L)		40	--	--	76	48	--	--
Nitrogen (mg/L)		17	--	--	15	15	--	--
Methane (ug/L)		3.4	--	--	0.75	27	--	--
Ethane (ng/L)		130	--	--	52	18	--	--
Ethene (ng/L)		<5	--	--	ND	ND	--	--
Sulfide (mg/L)		0.003	--	--	--	0.021	--	--
Ferrous Iron (mg/L)		0.02	--	--	--	0.03	--	--
Dissolved Iron (ug/L)		39.5	--	147	ND	ND	--	--
Total Iron (ug/L)		438	--	--	--	--	--	--
Dissolved Manganese (ug/L)		89	--	--	--	--	--	--
Total Manganese (ug/L)		106	--	--	--	--	--	--
Alkalinity (mg/L)		226	--	--	--	--	--	--
Chloride (mg/L)		163	--	--	--	--	--	--
Nitrate (mg/L)		9.63	--	--	--	--	--	--
Nitrite (mg/L)		ND	--	--	--	--	--	--
Sulfate (mg/L)		78.1	--	76.2	71.2	68.4	--	--
Total Phosphorus (mg/L)		ND	--	--	--	--	--	--
Injection Data								
Ratio / Volume		NI	NI	NI	NI	10:1 / 200	10:1 / 200	10:1 / 200

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ARCADIS GERAGHTY&MILLER

Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

PTW-1	Date Sampled:	9/15/00	10/2/00	10/16/00	10/31/00	11/14/00	12/13/00	1/10/01	1/25/01	2/8/01	2/22/01	3/8/01
Field Parameters												
DO (mg/L)		0.54	0.4	0.34	0.33	0.14	0.28	0.48	0.2	0.38	0.53	0.16
REDOX (mV)		70	17	-36	-164	-216	-543.7	-181.6	-82.1	-54.1	-176.6	-112.8
pH (SU)		7.21	6.65	6.9	6.96	7.06	6.81	6.94	6.99	6.93	6.71	6.6
Conductivity (mS/cm)		1.03	0.92	0.817	0.975	1.48	2.87	1.502	1.745	2.039	2.108	2.387
Chlorinated VOCs (ug/L)												
Trichloroethene		3100	--	3980	--	--	190	--	--	35	47	--
cis-1,2-Dichloroethene		1500	--	2000	--	--	2000	--	--	640	660	--
trans-1,2-Dichloroethene (ug/L)		ND	--	ND	--	--	ND	--	--	ND	ND	--
Vinyl Chloride (ug/L)		ND	--	62.2	--	--	ND	--	--	ND	ND	--
1,1-Dichloroethene (ug/L)		ND	--	ND	--	--	7	--	--	ND	ND	--
1,1,1-Trichloroethane (ug/L)		ND	--	ND	--	--	ND	--	--	ND	ND	--
Tetrachloroethene (ug/L)		ND	--	111	--	--	ND	--	--	ND	ND	--
Biogeochemical Parameters												
TOC (mg/L)		6.98	36.9	--	125	162	109	137	105	143	504	528
DOC (mg/L)		6.5	32.6	--	95.5	159	86	120	94	135	359	464
Carbon Dioxide (mg/L)		51.27	--	--	--	--	98	--	--	86	120	--
Nitrogen (mg/L)		16.14	--	--	--	--	21	--	--	16	15	--
Methane (ug/L)		1.312	--	--	--	--	15	--	--	950	2000	--
Ethane (ng/L)		534	--	--	--	--	310	--	--	12	ND	--
Ethene (ng/L)		94	--	--	--	--	290	--	--	200	120	--
Sulfide (mg/L)		0.014	--	--	--	--	--	--	--	--	0.042 J	--
Ferrous Iron (mg/L)		0.03	--	--	--	--	--	--	--	--	118.3 J	--
Dissolved Iron (ug/L)		72.4	--	--	--	--	77000	--	--	97800	222000	--
Total Iron (ug/L)		1700	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese (ug/L)		29.2	--	--	--	--	--	--	--	--	--	--
Total Manganese (ug/L)		90.1	--	--	--	--	--	--	--	--	--	--
Alkalinity (mg/L)		138	--	--	--	--	--	--	--	--	--	--
Chloride (mg/L)		145	--	--	--	--	--	--	--	--	--	--
Nitrate (mg/L)		5.08	--	--	--	--	--	--	--	--	--	--
Nitrite (mg/L)		ND	--	--	--	--	--	--	--	--	--	--
Sulfate (mg/L)		127	--	--	--	--	15.2	--	--	15.4	1.49	--
Total Phosphorus (mg/L)		0.15	--	--	--	--	--	--	--	--	--	--

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ARCADIS GERAGHTY&MILLER

Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

PTW-1	Date Sampled:	3/22/01	4/5/01	5/3/01	5/31/01	6/14/01	6/27/01	7/25/01
Field Parameters								
DO (mg/L)		0.14	0.39	0.13	0.2	0.01	0.23	0.01
REDOX (mV)		-90.3	-107.5	-119.8	-44.2	-108.4	-83	-108.2
pH (SU)		6.66	6.79	6.44	6.21	6.28	6.39	6.67
Conductivity (mS/cm)		2.166	1.071	3.773	3.347	4.043	2.589	1.4
Chlorinated VOCs (ug/L)								
Trichloroethene		85	--	4	ND	ND	20	19
cis-1,2-Dichloroethene		450	--	580	1600	1200	1600	2400
trans-1,2-Dichloroethene (ug/L)		ND	--	ND	ND	ND	ND	ND
Vinyl Chloride (ug/L)		ND	--	ND	ND	ND	ND	ND
1,1-Dichloroethene (ug/L)		ND	--	ND	6	ND	ND	ND
1,1,1-Trichloroethane (ug/L)		ND	--	ND	ND	ND	ND	ND
Tetrachloroethene (ug/L)		ND	--	ND	ND	ND	ND	ND
Biogeochemical Parameters								
TOC (mg/L)		334	45.4	568	932	1050	502	775
DOC (mg/L)		309	35.6	520	926	1000	464	399
Carbon Dioxide (mg/L)		140	--	340	--	570	220	170
Nitrogen (mg/L)		8.9	--	4.2	--	36	2.5	1.5
Methane (ug/L)		11000	--	21000	--	36000	34000	55000
Ethane (ng/L)		ND	--	7.1	--	ND	ND	ND
Ethene (ng/L)		93	--	12	--	ND	ND	ND
Sulfide (mg/L)		0.027	--	0.038	--	--	0.077	0.167
Ferrous Iron (mg/L)		15.45	--	OR	--	--	OR	OR
Dissolved Iron (ug/L)		259000	--	323000	321000	355000	65600	288000
Total Iron (ug/L)		--	--	324000	--	--	--	--
Dissolved Manganese (ug/L)		--	--	63000	--	--	--	--
Total Manganese (ug/L)		--	--	68200	--	--	--	--
Alkalinity (mg/L)		--	--	1580	--	--	--	--
Chloride (mg/L)		--	--	209	--	--	--	--
Nitrate (mg/L)		--	--	ND	--	--	--	--
Nitrite (mg/L)		--	--	6.49	--	--	--	--
Sulfate (mg/L)		10.7	--	1.94	18.4	9.88	4.11	ND
Total Phosphorus (mg/L)		--	--	ND	--	--	--	--

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ARCADIS GERAGHTY & MILLER

PTW-2	Date Sampled:	9/14/00	10/2/00	10/16/00	10/31/00	11/14/00	12/13/00	1/10/01	1/25/01	2/8/01	2/22/01	3/8/01
Field Parameters												
DO (mg/L)		1.2	0.37	0.61	0.82	0.4	0.85	0.64	0.83	0.59	0.3	0.2
REDOX (mV)		56	145	195	103	114	-57.9	6	126.4	243.5	137.8	-22.4
pH (SU)		7.6	6.88	6.93	6.75	6.81	6.61	6.61	6.67	6.63	6.71	6.87
Conductivity (mS/cm)		1.08	0.91	1.28	0.687	0.802	1.93	1.048	1.265	1.506	1.218	1.366
Chlorinated VOCs (ug/L)												
Trichloroethene		8400	--	--	--	--	--	--	--	--	4800	--
cis-1,2-Dichloroethene		1600	--	--	--	--	--	--	--	--	810	--
trans-1,2-Dichloroethene		ND	--	--	--	--	--	--	--	--	ND	--
Vinyl Chloride		ND	--	--	--	--	--	--	--	--	ND	--
1,1-Dichloroethene		ND	--	--	--	--	--	--	--	--	ND	--
1,1,1-Trichloroethane		ND	--	--	--	--	--	--	--	--	ND	--
Tetrachloroethene		61	--	--	--	--	--	--	--	--	55	--
Biogeochemical Parameters												
TOC (mg/L)		8.88	9.91	--	--	--	4.49	4.55	8.27	6.19	4.58	28
DOC (mg/L)		6.77	6.34	--	--	--	3.78	ND	3.8	5.71	4.28	25.6
Carbon Dioxide (mg/L)		43.23	--	--	--	--	--	--	--	--	63	--
Nitrogen (mg/L)		16.12	--	--	--	--	--	--	--	--	17	--
Methane (ug/L)		2.284	--	--	--	--	--	--	--	--	2.2	--
Ethane (ng/L)		378	--	--	--	--	--	--	--	--	120	--
Ethene (ng/L)		209	--	--	--	--	--	--	--	--	43	--
Sulfide (mg/L)		0.018	--	--	--	--	--	--	--	--	0.006	--
Ferrous Iron (mg/L)		0.02	--	--	--	--	--	--	--	--	0.06	--
Dissolved Iron (ug/L)		17.2	--	--	--	--	--	--	--	--	71.6	--
Total Iron (ug/L)		134	--	--	--	--	--	--	--	--	--	--
Dissolved Manganese (ug/L)		60.5	--	--	--	--	--	--	--	--	--	--
Total Manganese (ug/L)		59.9	--	--	--	--	--	--	--	--	--	--
Alkalinity (mg/L)		169	--	--	--	--	--	--	--	--	--	--
Chloride (mg/L)		149	--	--	--	--	--	--	--	--	--	--
Nitrate (mg/L)		6.47	--	--	--	--	--	--	--	--	--	--
Nitrite (mg/L)		ND	--	--	--	--	--	--	--	--	--	--
Sulfate (mg/L)		107	--	--	--	--	--	--	--	--	93	--
Total Phosphorus (mg/L)		ND	--	--	--	--	--	--	--	--	--	--

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ARCADIS GERAGHTY&MILLER

Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

PTW-2	Date Sampled:	3/22/01	4/5/01	5/3/01	5/31/01	6/14/01	6/27/01	7/25/01
Field Parameters								
DO (mg/L)		0.48	0.29	0.73	0.26	0.55	0.21	0.01
REDOX (mV)		-71	-86.2	-114	-35.2	-100.3	-95.5	-64.2
pH (SU)		6.89	7.16	6.81	6.85	6.97	6.81	6.8
Conductivity (mS/cm)		1.509	1.49	2.684	1.475	1.574	1.669	0.809
Chlorinated VOCs (ug/L)								
Trichloroethene		3100	--	380	1400	1200	480	2500
cis-1,2-Dichloroethene		1100	--	1200	2500	1300	3500	1900
trans-1,2-Dichloroethene		ND	--	ND	ND	ND	ND	ND
Vinyl Chloride		ND	--	ND	ND	ND	ND	ND
1,1-Dichloroethene		ND	--	6	ND	ND	ND	ND
1,1,1-Trichloroethane		ND	--	ND	ND	ND	ND	ND
Tetrachloroethene		40	--	8	23	22	ND	28
Biogeochemical Parameters								
TOC (mg/L)		79.9	107	331	37.1	40.6	156	86.1
DOC (mg/L)		70	86.6	165	35.8	30.4	137	60.1
Carbon Dioxide (mg/L)		77	--	100	--	78	67	94
Nitrogen (mg/L)		20	--	21	--	16	19	22
Methane (ug/L)		67	--	330	--	350	2700	920
Ethane (ng/L)		86	--	340	--	410	20	150
Ethene (ng/L)		80	--	120	--	520	130	110
Sulfide (mg/L)		0.027	--	0.02	--		0.023	0.022
Ferrous Iron (mg/L)		4.68	--	OR	--		44.64	22.25
Dissolved Iron (ug/L)		6390	--	109000	32600	35400	54200	26200
Total Iron (ug/L)		--	--	98900	--	--	--	--
Dissolved Manganese (ug/L)		--	--	80000	--	--	--	--
Total Manganese (ug/L)		--	--	72900	--	--	--	--
Alkalinity (mg/L)		--	--	936	--	--	--	--
Chloride (mg/L)		--	--	206	--	--	--	--
Nitrate (mg/L)		--	--	1.7	--	--	--	--
Nitrite (mg/L)		--	--	3.1	--	--	--	--
Sulfate (mg/L)		74.6	--	21.5	47.1	47.5	28.1	54
Total Phosphorus (mg/L)		--	--	0.193	--	--	--	--

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

IW-1	Date Sampled:	5/3/01	5/31/01	6/27/01	7/25/01
Field Parameters					
DO (mg/L)		8.87	2.76	2.31	2.8
REDOX (mV)		54.7	318.2	100.5	74.8
pH (SU)		7.22	7.18	6.97	6.99
Conductivity (mS/cm)		0.929	1.067	1.306	1.344
Chlorinated VOCs (ug/L)					
Trichloroethene		21	68	75	220
cis-1,2-Dichloroethene		4	19	13	32
trans-1,2-Dichloroethene		ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND
1,1,1-Trichloroethane		4	3	6	3
Tetrachloroethene		2	2	4	9
Biogeochemical Parameters					
TOC (mg/L)		3.83	4.31	6.07	12.4
DOC (mg/L)		3.29	4.01	5.75	10.4
Carbon Dioxide (mg/L)		18	--	20	22
Nitrogen (mg/L)		15	--	15	19
Methane (ug/L)		1.6	--	0.5	0.78
Ethane (ng/L)		84	--	18	34
Ethene (ng/L)		24	--	22	16
Sulfide (mg/L)		0.007	--	0.003	0.002
Ferrous Iron (mg/L)		0.09	--	ND	0.03
Dissolved Iron (ug/L)		41.7	ND	ND	ND
Total Iron (ug/L)		1010	--	--	--
Dissolved Manganese (ug/L)		19.4	--	--	--
Total Manganese (ug/L)		59.4	--	--	--
Alkalinity (mg/L)		214	--	--	--
Chloride (mg/L)		115	--	--	--
Nitrate (mg/L)		4.28	--	--	--
Nitrite (mg/L)		ND	--	--	--
Sulfate (mg/L)		57.4	46.6	36.8	54.3
Total Phosphorus (mg/L)		0.198	--	--	--

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

IW-2	Date Sampled:	5/3/01	5/16/01	6/14/01	7/13/01	7/25/01
Field Parameters						
DO (mg/L)		2.94	3.07	0.17	0.52	0.02
REDOX (mV)		-36.7	166.5	-72.4	-84.1	-56
pH (SU)		7	7.17	7.01	6.76	6.72
Conductivity (mS/cm)		1.811	1.42	1.228	1.488	1.274
Chlorinated VOCs (ug/L)						
Trichloroethene		440	--	860	1500	1300
cis-1,2-Dichloroethene		310	--	790	1300	1300
trans-1,2-Dichloroethene		ND	--	ND	ND	ND
Vinyl Chloride		ND	--	ND	ND	ND
1,1-Dichloroethene		ND	--	ND	ND	ND
1,1,1-Trichloroethane		ND	--	ND	ND	ND
Tetrachloroethene		6	--	17	36	28
Biogeochemical Parameters						
TOC (mg/L)		12.8	11	21.3	40.8	68
DOC (mg/L)		9.48	4.35	17	40.2	60.1
Carbon Dioxide (mg/L)		71	--	72	92	91
Nitrogen (mg/L)		22	--	19	18	22
Methane (ug/L)		44	--	200	1200	2600
Ethane (ng/L)		130	--	ND	ND	27
Ethene (ng/L)		76	--	22	98	71
Sulfide (mg/L)		0.013	--	--	0.004	0.007
Ferrous Iron (mg/L)		1.41	--	--	11.8	8.84
Dissolved Iron (ug/L)		1790	--	18800	28300	22700
Total Iron (ug/L)		2060	--	--	--	--
Dissolved Manganese (ug/L)		19200	--	--	--	--
Total Manganese (ug/L)		17000	--	--	--	--
Alkalinity (mg/L)		576	--	--	--	--
Chloride (mg/L)		210	--	--	--	--
Nitrate (mg/L)		3.2	--	--	--	--
Nitrite (mg/L)		ND	--	--	--	--
Sulfate (mg/L)		69.2	--	53.7	47	52
Total Phosphorus (mg/L)		0.161	--	--	--	--

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

IW-3	Date Sampled:	5/3/01	5/16/01	6/14/01	7/13/01	7/25/01
Field Parameters						
DO (mg/L)		6.98	5.99	3.03	3.54	2.73
REDOX (mV)		41.1	185.6	180.2	131.7	-16
pH (SU)		7.75	7.59	7.43	7.31	7.38
Conductivity (mS/cm)		1.242	1.141	1.723	2.04	1.055
Chlorinated VOCs (ug/L)						
Trichloroethene		670	--	460	410	440
cis-1,2-Dichloroethene		62	--	33	26	25
trans-1,2-Dichloroethene		ND	--	ND	ND	ND
Vinyl Chloride		ND	--	ND	ND	ND
1,1-Dichloroethene		2	--	ND	ND	ND
1,1,1-Trichloroethane		ND	--	ND	ND	ND
Tetrachloroethene		9	--	ND	ND	ND
Biogeochemical Parameters						
TOC (mg/L)		4.5	11.1	10.9	7.32	11.9
DOC (mg/L)		3.99	3.85	3.99	4.09	10.5
Carbon Dioxide (mg/L)		6.9	--	21	14	15
Nitrogen (mg/L)		14	--	15	19	20
Methane (ug/L)		1.3	--	0.23	1.8	1
Ethane (ng/L)		61	--	41	37	39
Ethene (ng/L)		20	--	ND	50	21
Sulfide (mg/L)		0.06	--	--	0.004	0.003
Ferrous Iron (mg/L)		0.46	--	--	0.01	0.03
Dissolved Iron (ug/L)		31.3	--	ND	ND	ND
Total Iron (ug/L)		5760	--	--	--	--
Dissolved Manganese (ug/L)		10.2	--	--	--	--
Total Manganese (ug/L)		251	--	--	--	--
Alkalinity (mg/L)		288	--	--	--	--
Chloride (mg/L)		154	--	--	--	--
Nitrate (mg/L)		5.48	--	--	--	--
Nitrite (mg/L)		ND	--	--	--	--
Sulfate (mg/L)		95.6	--	75.2	73.1	71.8
Total Phosphorus (mg/L)		10.5	--	--	--	--

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

IW-4	Date Sampled:	5/4/01	5/31/01	6/27/01	7/25/01
Field Parameters					
DO (mg/L)		2.62	2.79	2.4	0.75
REDOX (mV)		280.7	319.7	146	-15.2
pH (SU)		7.11	7.17	7.15	7.07
Conductivity (mS/cm)		1.208	1.319	1.442	0.707
Chlorinated VOCs (ug/L)					
Trichloroethene		2400	6200	7200	9900
cis-1,2-Dichloroethene		22	53	41	ND
trans-1,2-Dichloroethene		ND	ND	ND	ND
Vinyl Chloride		ND	ND	ND	ND
1,1-Dichloroethene		ND	ND	ND	ND
1,1,1-Trichloroethane		ND	ND	ND	ND
Tetrachloroethene		ND	ND	ND	ND
Biogeochemical Parameters					
TOC (mg/L)		2.99	5.68	4.77	8.83
DOC (mg/L)		2.72	2.81	3.92	7.06
Carbon Dioxide (mg/L)		16	--	19	24
Nitrogen (mg/L)		20	--	18	23
Methane (ug/L)		7.8	--	0.94	4.6
Ethane (ng/L)		290	--	210	530
Ethene (ng/L)		140	--	51	140
Sulfide (mg/L)		0.261	--	0.081	0.015
Ferrous Iron (mg/L)		2.01	--	0.01	0.02
Dissolved Iron (ug/L)		ND	ND	119	ND
Total Iron (ug/L)		29700	--	--	--
Dissolved Manganese (ug/L)		59.5	--	--	--
Total Manganese (ug/L)		1410	--	--	--
Alkalinity (mg/L)		204	--	--	--
Chloride (mg/L)		243	--	--	--
Nitrate (mg/L)		1.71	--	--	--
Nitrite (mg/L)		ND	--	--	--
Sulfate (mg/L)		41.3	50.8	50.2	58.4
Total Phosphorus (mg/L)		1.93	--	--	--

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MW-HP-1S	Date Sampled:	7/29/98	4/6/00	7/7/00	9/15/00	11/14/00	12/13/00	1/10/01	2/8/01	3/8/01	3/22/01	4/19/01
Field Parameters												
DO (mg/L)		--	9.06	5.91	4.89	5.33	1.18	1.61	2.78	5.12	7.28	5.23
REDOX (mV)		--	170	106.5	53	154	-65	-1.5	251.1	171.2	246.9	147.4
pH (SU)		--	7.13	7.24	7.5	7.18	6.92	6.88	6.88	6.96	7.23	7.48
Conductivity (mS/cm)		--	--	0.624	1.08	0.862	1.83	0.964	1.338	1.114	1.255	1.236
Chlorinated VOCs (ug/L)												
Trichloroethene		16000	7740	9200	--	--	--	--	--	--	3800	--
cis-1,2-Dichloroethene		1700	875	1300	--	--	--	--	--	--	580	--
trans-1,2-Dichloroethene		12	ND	ND	--	--	--	--	--	--	ND	--
Vinyl Chloride		3.4	ND	ND	--	--	--	--	--	--	ND	--
1,1-Dichloroethene		14	ND	ND	--	--	--	--	--	--	ND	--
1,1,1-Trichloroethane		6.9	ND	ND	--	--	--	--	--	--	ND	--
Tetrachloroethene		49	62.4	ND	--	--	--	--	--	--	34	--
Biogeochemical Parameters												
TOC (mg/L)		--	--	7.37	--	--	--	2.99	10.28	7.71	6.24	16.7
DOC (mg/L)		--	--	4	--	--	--	2.56	3.18	3.79	2.76	9.01
Carbon Dioxide (mg/L)		--	--	25.19	--	--	--	--	--	--	35	--
Nitrogen (mg/L)		--	--	--	--	--	--	--	--	--	17	--
Methane (ug/L)		--	--	0.434	--	--	--	--	--	--	2.2	--
Ethane (ng/L)		--	--	113	--	--	--	--	--	--	120	--
Ethene (ng/L)		--	--	28	--	--	--	--	--	--	22	--
Sulfide (mg/L)		--	--	0.01	--	--	--	--	--	--	0.0043	--
Ferrous Iron (mg/L)		--	--	ND	--	--	--	--	--	--	0.02	--
Dissolved Iron (ug/L)		--	--	ND	--	--	--	--	--	--	182	--
Total Iron (ug/L)		--	--	95.4	--	--	--	--	--	--	--	--
Dissolved Manganese (ug/L)		--	--	11.5	--	--	--	--	--	--	--	--
Total Manganese (ug/L)		--	--	29.4	--	--	--	--	--	--	--	--
Alkalinity (mg/L)		--	--	273	--	--	--	--	--	--	--	--
Chloride (mg/L)		--	--	134	--	--	--	--	--	--	--	--
Nitrate (mg/L)		--	--	7.83	--	--	--	--	--	--	--	--
Nitrite (mg/L)		--	--	ND	--	--	--	--	--	--	--	--
Sulfate (mg/L)		--	--	79.8	--	--	--	--	--	--	84.2	--
Total Phosphorus (mg/L)		--	--	--	--	--	--	--	--	--	--	--

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

MW-HP-1S	Date Sampled:	5/3/01	5/16/01	6/14/01	7/13/01	7/25/01
Field Parameters						
DO (mg/L)		5.24	5.77	3.28	0.62	0.07
REDOX (mV)		149.9	161.9	183.1	-31	-40.9
pH (SU)		7.26	7.16	7.23	6.7	6.72
Conductivity (mS/cm)		1.447	1.374	1.293	2.081	1.01
Chlorinated VOCs (ug/L)						
Trichloroethene		3800	--	3900	3400	2700
cis-1,2-Dichloroethene		920	--	1200	1300	880
trans-1,2-Dichloroethene		ND	--	ND	ND	ND
Vinyl Chloride		ND	--	ND	ND	ND
1,1-Dichloroethene		ND	--	ND	ND	ND
1,1,1-Trichloroethane		ND	--	ND	ND	ND
Tetrachloroethene		38	--	34	ND	ND
Biogeochemical Parameters						
TOC (mg/L)		4.79	8.49	7.17	70	178
DOC (mg/L)		4.51	4.84	5.5	47.3	106
Carbon Dioxide (mg/L)		26	--	60	81	110
Nitrogen (mg/L)		16	--	16	17	23
Methane (ug/L)		3.2	--	0.6	4	23
Ethane (ng/L)		200	--	29	20	48
Ethene (ng/L)		<5	--	ND	65	120
Sulfide (mg/L)		0.018	--		0.012	0.03
Ferrous Iron (mg/L)		0.26	--		8.76	6.96
Dissolved Iron (ug/L)		145	--	71.2	13200	9960
Total Iron (ug/L)		1180	--	--	--	--
Dissolved Manganese (ug/L)		1870	--	--	--	--
Total Manganese (ug/L)		2140	--	--	--	--
Alkalinity (mg/L)		350	--	--	--	--
Chloride (mg/L)		187	--	--	--	--
Nitrate (mg/L)		6.78	--	--	--	--
Nitrite (mg/L)		ND	--	--	--	--
Sulfate (mg/L)		82.9	--	64.8	64.5	63
Total Phosphorus (mg/L)		0.131	--	--	--	--

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Appenix C. Summary of Pilot Test Results, Kings Electronics Co., Inc. Site, Tuckahoe, New York.

GP-104	Date Sampled:	9/21/98	9/14/00	4/5/01	4/19/01	5/3/01	5/16/01	6/14/01	7/13/01	7/26/01
Field Parameters										
DO (mg/L)		--	2.12	8.11	6.11	2.38	3.75	1.92	3.71	3.02
REDOX (mV)		--	182	206.7	164.1	27	203.1	98.7	48.7	76.4
pH (SU)		--	6.66	6.98	7	6.85	6.75	6.87	6.89	6.79
Conductivity (mS/cm)		--	1.11	0.828	0.81	0.933	1.162	1.348	2.04	0.822
Chlorinated VOCs (ug/L)										
Trichloroethene		3500	5900	--	--	200	--	--	1500	1500
cis-1,2-Dichloroethene		360	1000	--	--	46	--	--	2400	2700
trans-1,2-Dichloroethene		2.1	ND	--	--	ND	--	--	ND	ND
Vinyl Chloride		ND	ND	--	--	ND	--	--	ND	ND
1,1-Dichloroethene		ND	ND	--	--	ND	--	--	ND	ND
1,1,1-Trichloroethane		12	ND	--	--	6	--	--	ND	ND
Tetrachloroethene		85	ND	--	--	5	--	--	ND	ND
Biogeochemical Parameters										
TOC (mg/L)		--	4.73	4.05	11.2	2.55	6.8	7.51	10	15.9
DOC (mg/L)		--	4.35	2.76	2.87	2.5	5.29	7.34	9.8	14.8
Carbon Dioxide (mg/L)		--	47.81	--	--	31	--	--	53	60
Nitrogen (mg/L)		--	17.41	--	--	18	--	--	15	21
Methane (ug/L)		--	1.033	--	--	19	--	--	0.78	2.4
Ethane (ng/L)		--	236	--	--	73	--	--	75	100
Ethene (ng/L)		--	73	--	--	ND	--	--	160	200
Sulfide (mg/L)		--	0.0053	--	--	0.002	--	--	0.008	--
Ferrous Iron (mg/L)		--	0.0007	--	--	0.04	--	--	0.01	--
Dissolved Iron (ug/L)		--	ND	--	--	26	--	--	ND	ND
Total Iron (ug/L)		--	657	--	--	119	--	--	--	--
Dissolved Manganese (ug/L)		--	5.1	--	--	ND	--	--	--	--
Total Manganese (ug/L)		--	31.2	--	--	8	--	--	--	--
Alkalinity (mg/L)		--	185	--	--	162	--	--	--	--
Chloride (mg/L)		--	153	--	--	132	--	--	--	--
Nitrate (mg/L)		--	6.99	--	--	4.88	--	--	--	--
Nitrite (mg/L)		--	ND	--	--	ND	--	--	--	--
Sulfate (mg/L)		--	108	--	--	65.5	--	--	39.5	41.9
Total Phosphorus (mg/L)		--	0.31	--	--	0.258	--	--	--	--

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GP-106	Date Sampled:	9/21/98	9/14/00	11/14/00	12/13/00	1/25/01	2/22/01
Field Parameters							
DO (mg/L)		--	5.39	1.65	2.72	4.83	6.23
REDOX (mV)		--	184	164	219.8	127.3	269.7
pH (SU)		--	6.97	7.11	6.65	6.79	6.73
Conductivity (mS/cm)		--	0.97	0.825	0.816	0.898	0.773
Chlorinated VOCs (ug/L)							
Trichloroethene		200	100	--	--	--	--
cis-1,2-Dichloroethene		15	32	--	--	--	--
trans-1,2-Dichloroethene		ND	ND	--	--	--	--
Vinyl Chloride		ND	ND	--	--	--	--
1,1-Dichloroethene		0.9	ND	--	--	--	--
1,1,1-Trichloroethane		9.9	9	--	--	--	--
Tetrachloroethene		4.6	3	--	--	--	--
Biogeochemical Parameters							
TOC (mg/L)		--	4.56	--	3.48	7.22	3.71
DOC (mg/L)		--	3.37	--	2.72	2.22	3.11
Carbon Dioxide (mg/L)		--	30.62	--	--	--	--
Nitrogen (mg/L)		--	15.02	--	--	--	--
Methane (ug/L)		--	0.097	--	--	--	--
Ethane (ng/L)		--	8	--	--	--	--
Ethene (ng/L)		--	ND	--	--	--	--
Sulfide (mg/L)		--	0.003	--	--	--	--
Ferrous Iron (mg/L)		--	0.01	--	--	--	--
Dissolved Iron (ug/L)		--	ND	--	--	--	--
Total Iron (ug/L)		--	49.5	--	--	--	--
Dissolved Manganese (ug/L)		--	ND	--	--	--	--
Total Manganese (ug/L)		--	5.2	--	--	--	--
Alkalinity (mg/L)		--	126	--	--	--	--
Chloride (mg/L)		--	195	--	--	--	--
Nitrate (mg/L)		--	3.1	--	--	--	--
Nitrite (mg/L)		--	ND	--	--	--	--
Sulfate (mg/L)		--	44.7	--	--	--	--
Total Phosphorus (mg/L)		--	0.25	--	--	--	--

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Footnotes:

mg/L	Milligrams per liter.
mV	Millivolts.
SU	Standard units.
mS/cm	Millisiemens per centimeter.
VOCs	Volatile organic compounds.
ug/L	Micrograms per liter.
ng/L	Nanograms per liter.
--	Parameter not analyzed.
ND	Not detecetd.

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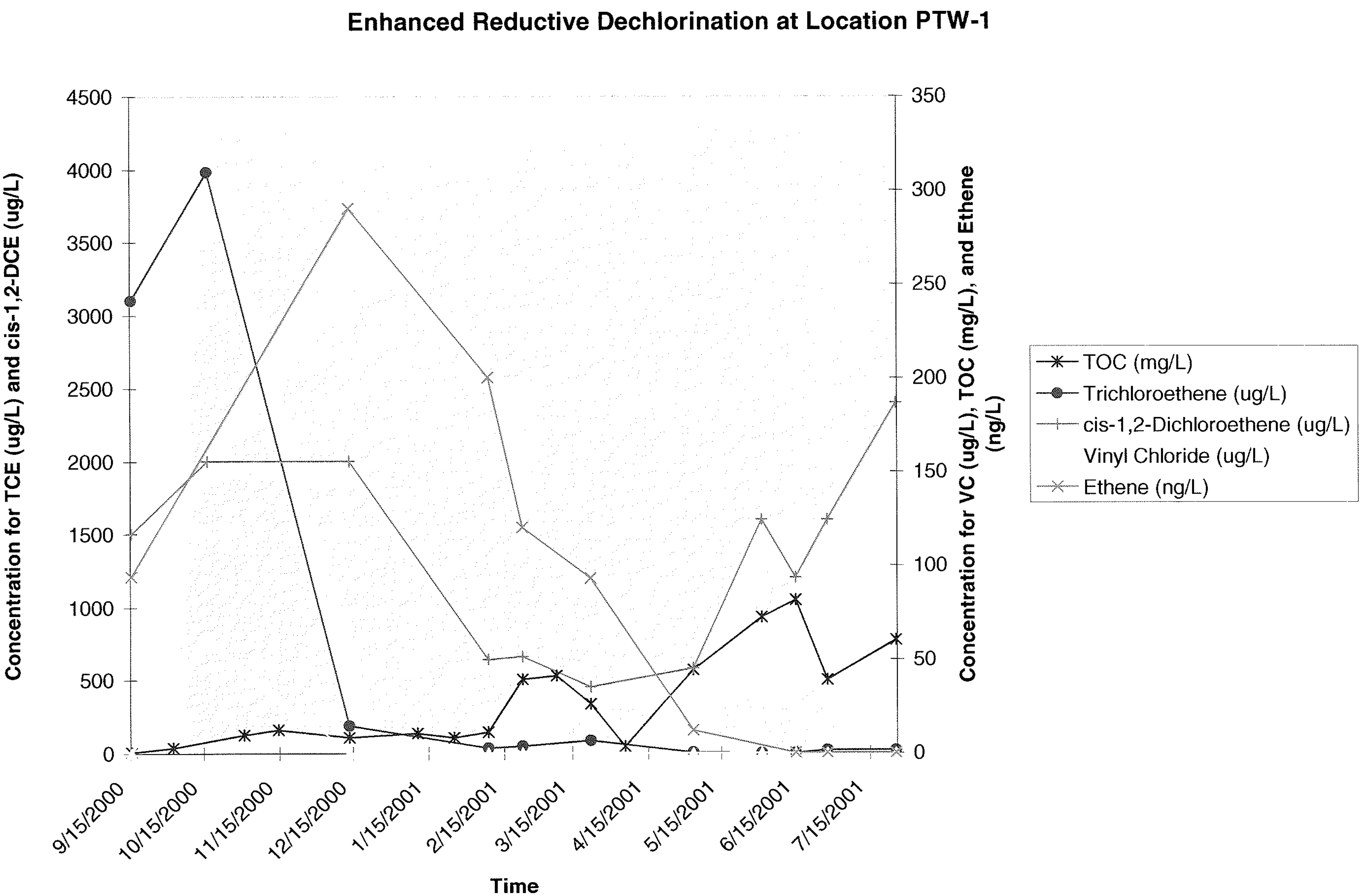
Appendix D

Pilot Test Graphs



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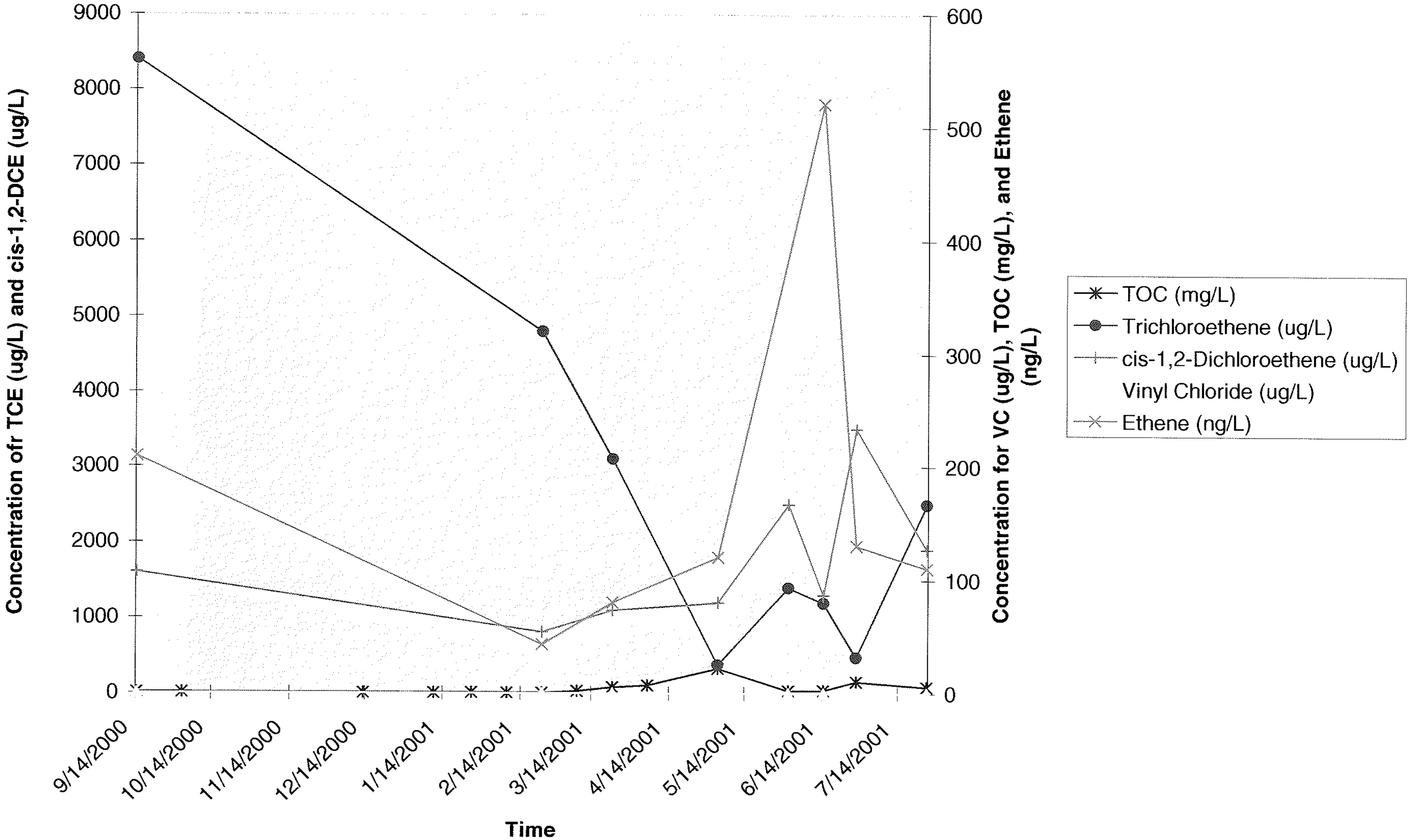
Enhanced Reductive Dechlorination at Location PTW-2



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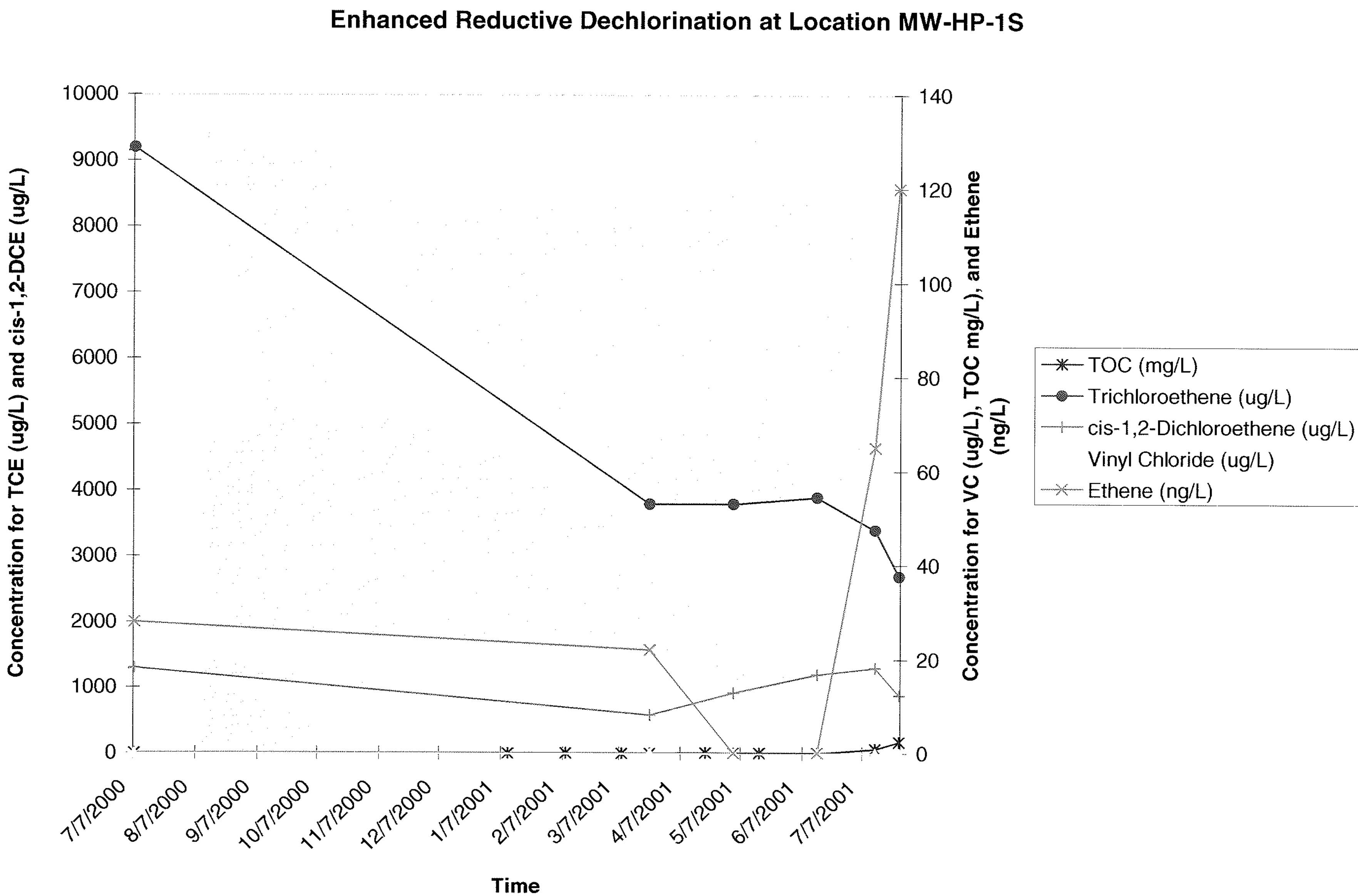

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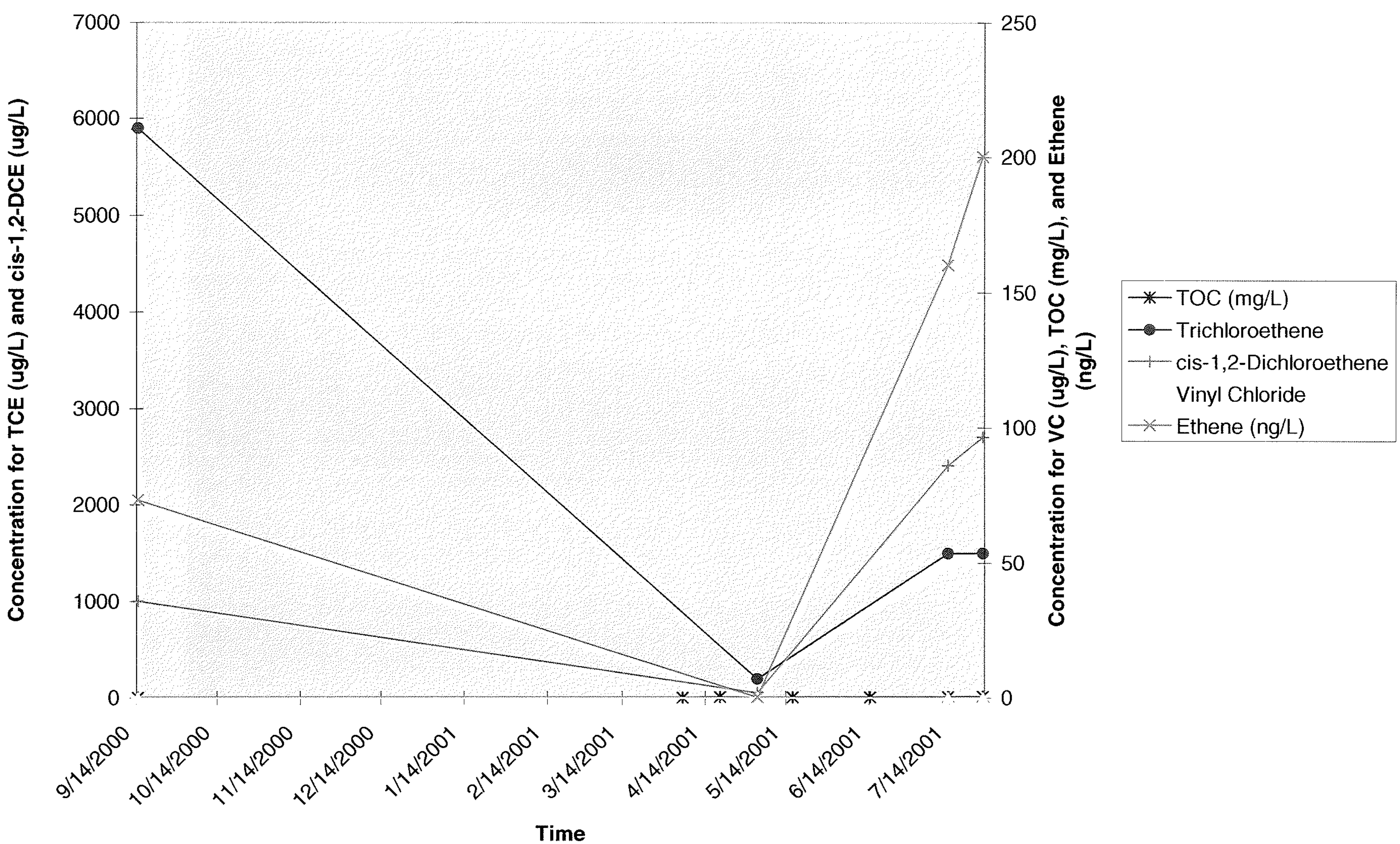
Enhanced Reductive Dechlorination at Location GP-104



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ARCADIS

Quality Assurance Project Plan

Kings Electronics Site
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Tuckahoe, New York

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Our Ref.:
NJ000423.0002.00004

Date:
15 February 2002

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Table of Contents

Tables

1. Introduction

This Quality Assurance Project Plan (QAPP) presents the organizational structure, data quality objectives (DQOs), and data management scheme for conducting the Remedial Action Work Plan (RAWP) for groundwater at the Kings Electronics Site in Tuckahoe, New York. The QAPP is designed to assure that the precision, accuracy, representativeness, comparability, and completeness (the PARCC parameters) of the collected data are known, documented, and adequate to satisfy the DQOs of the study. The format and contents of the QAPP have been prepared to be consistent with the following United States Environmental Protection Agency (USEPA) guidance documents: "Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans" (USEPA 1983); and "Data Quality Objectives for Remedial Response Activities: Development Process" (USEPA 1987).

1.1 Scope of Work

This QAPP is designed to ensure that appropriate levels of data quantity and quality are obtained. Data obtained during this sampling will be used to ensure that the remedial action remediates chlorinated volatile organic compounds (CVOCs) in the overburden groundwater. A discussion of the proposed Remedial Action and the Monitoring Program are contained in Sections 4 and 5 of the RAWP.

1.2 Data Quality Objectives

To best utilize the data generated during this investigation, a clear definition of data objectives and procedures is required. This is accomplished through the development of DQOs, which relate the extent and quality of data to be gathered in this investigation to their ultimate objective. DQOs are qualitative and quantitative goals for precision, accuracy, reproducibility, comparability, and completeness specified for each data set. DQOs for this investigation are provided in Table 1.

DQOs are based on the concept that different data uses may require different levels of data quality. DQOs are defined with respect to the types, numbers, and locations of samples that will be collected, and the quality assurance levels associated with the analysis. The guidance documents and "Data Quality Objectives: Development Guidance for Uncontrolled Hazardous Waste Site Remedial Response Activities" (USEPA 1987) have been used as a guide to determine the data quality levels required to obtain confidence levels that are appropriate for the intended data use. The data quality levels required for specific data uses and the types of analyses needed to achieve a data quality level are provided in Table 1.

Field data to be collected at the site include screening wells for organic vapors using a photoionization detector (PID), and for carbon dioxide and hydrogen sulfide using a combination meter. Field instrument operating procedures and calibration are described in Section 6. Water-level measurements, pH, temperature, specific conductance, dissolved oxygen and oxidation-reduction potential of water samples will be measured in the field. These data will be used to monitor groundwater flow patterns, and to evaluate the groundwater environment.

Integrated Analytical Laboratories of Randolph, New Jersey, a New York certified laboratory (NY Certification # 11402) will be selected for analysis of samples following USEPA Method 624 (USEPA 2000). The analytical data will have standard detection limits and documentation suitable for characterization of the groundwater collected at the site.

1.3 Sample Matrices, Parameters, and Frequency of Collection

Sample matrices, parameters, and frequencies of sample collection are provided in Table 2. The quantitation limits for the organic parameters are provided in Table 3; however, dilution or interference effects may make it necessary to adjust these limits. The laboratory will make every effort to achieve quantitation limits as low as practicable and will report estimated concentration values at less than the quantitation limit by flagging the value with "J".

2. Project Organization and Responsibilities

ARCADIS G&M will implement the field activities and will provide sampling supervision and project management, including overall quality assurance/quality control (QA/QC) review and health and safety coordination.

2.1 Project Organization

The primary personnel involved in the project are shown below. The addresses and telephone numbers for individuals with project management, quality assurance, and health and safety responsibilities are listed below.

Project Director:	Kevin McGuinness
Project Manager:	Kevin McGuinness
Project Quality Assurance Officer:	Donna Brown (Melville, NY 631-249-7600)
Health and Safety Manager:	Tom Eng
Task Manager/Site Safety Officer:	Eric Rodriguez or other

ARCADIS G&M, Inc.
1200 MacArthur Blvd., Mahwah, New Jersey 07430
201-236-2233

2.2 Field Organization

The Project Manager will be responsible for overall coordination of the monitoring plan and will oversee all aspects of its implementation. The Task Manager will be responsible for sample collection, chain-of-custody documentation, and sample shipment. The Task Manager will also be responsible for completing sampling documentation, including, but not limited to, daily logs, water-sampling logs, calibration logs, and chain-of-custody forms. All documentation will conform to the guidelines contained within this QAPP. Sample bottles, preservatives (if necessary), and shipping coolers will be provided by the laboratory. The sample bottles will be pre-cleaned, quality-controlled and certified analyte-free in accordance with OSWER

Directive #9240.0-05A, "Specifications and Guidance for Contaminant - Free Sample Containers" (OSWER, 1992).

The QA officer will be responsible for the implementation of this QAPP during the investigation. Adherence to these procedures will facilitate the collection of high quality data and increase data usability. If the guidelines described in this plan require modifications due to site conditions, changes to the work plan, or any other reasons, the QA officer and the Project Manager will be notified by the field technician, and the changes will be documented and implemented.

The site safety officer will be responsible for assuring that the on-site activities are conducted in accordance with the site health and safety requirements.

The evaluation of laboratory data and deliverables, and overall assessment of performance will be the responsibility of Donna Brown, ARCADIS G&M, 88 Duryea Road, Melville, NY 11747 [631-249-7600] (refer to Section 10).

The management of field activities will be the responsibility of the Task Manager, under the direction of the Project Manager.

3. Quality Assurance Objectives

The overall quality assurance (QA) objective is to develop and implement procedures for field measurements, sampling, and analytical testing that will provide data of known quality that is consistent with the intended use of the information. This section defines the objectives by (1) describing the use of the data, (2) specifying the applicable quality control (QC) effort (field checks and analytical support levels), and (3) defining the QC objectives (data quality acceptance criteria).

3.1 Data Usage and Requirements

The field measurements and laboratory analyses will be used to support the remedial action. The data to be collected range from qualitative information (based on field observations) to quantitative laboratory analyses.

3.2 Level of Quality Control Effort

The sampling team will use several types of QA/QC samples to ensure and document the integrity of the sampling procedures, and the laboratory sample-handling procedures, as well as the validity of the measurement data. Sample matrices, parameters, frequencies of sample collection and frequencies of QA/QC sample collection are provided in Table 2.

Field replicate samples will be collected to evaluate the reproducibility of the sampling technique. Replicate samples will be collected for each matrix at a rate of 5 percent or one for every 20 samples. If less than 20 samples are collected during a particular sampling event, one field replicate will be collected. Since the replicate will be "blind" to the laboratory, it will have a coded identity with the date of sampling (e.g., REP010100 for replicate sample collected on January 1, 2000) on its label and on the chain-of-custody record form. The actual sampling location will be recorded on the daily log form and the sampling log form. Examples of the LTO, COC, and groundwater sampling forms are included in Attachment A.

Analyte-free water will be obtained from the laboratory to be used for trip blanks, field blanks, and the final decontamination rinse, if required. If necessary, this water can be verified as being analyte-free by reviewing the analytical results of method blanks run by the laboratory on the days the trip and field blanks were prepared and shipped.

To assess whether cross-contamination of samples has occurred during shipping, the laboratory will provide one trip blank per aqueous sample shipment. Trip blank samples are prepared by the laboratory and consist of two 40-milliliter (ml) vials filled with analyte-free water. Trip blanks will be returned to the laboratory unopened with the same set of bottles they were shipped with and will not be held on-site for more than two calendar days. Trip blanks will be analyzed for volatile organic parameters.

Field blanks will be prepared to determine if cross-contamination has occurred during sampling. The laboratory will provide two sets of identical bottles, one set containing analyte-free water and one empty set. The analyte-free water from the set of bottles is poured over the field sampling device(s) and collected into the empty set of bottles. Field blanks will be preserved in the same manner as the samples. Field blanks will be collected each day of sampling and will have a coded identity with the date of sampling (e.g., FB010100 for the field blank sample collected on January 1, 2000) on its label and on the chain-of-custody record form.

Field blank water and trip blanks will be shipped with the sample containers and will be held on-site for no longer than two calendar days. Temperature blanks will be included for each cooler and field blanks, trip blanks and samples will be maintained at 4°C while stored on-site and during shipment and delivered to the laboratory on the next business day.

The level of QC effort provided by the laboratory for testing of the reduced list of CVOCs in the samples will conform to standard USEPA protocols. The USEPA method to be followed and quantitation levels for the parameters are listed in Tables 3.

3.2.1 Precision

Measurements of data precision are necessary to demonstrate the reproducibility of the analytical data. Precision of the organic sample data will be determined from the analyses of matrix spike/matrix spike duplicates (MS/MSDs) and field replicates. Replicate samples will be collected at a frequency of one per 20 samples collected per matrix or at least one per sample matrix if less than 20 samples are to be collected. Batch MS and MSD samples will be used for QA/QC. MS, MSD, FB, and field replicate samples will be labeled on the sample container and appropriate sample log and chain-of-custody forms.

3.2.2 Accuracy

Accuracy is the relationship of the reported data to the "true" value. The accuracy of the organic sample data will be determined from the analyses of calibration standards, MS/MSDs, and surrogate spikes. As indicated above, batch MS and MSD samples will be analyzed at a frequency of one per 20 samples per matrix. The spiking compounds and the corresponding accuracy limits are set by the analytical methodology to be followed by the laboratory.

3.2.3 Representativeness

The sampling procedures employed during the monitoring program are designed to provide data that are representative of actual conditions at the sampling location. Considerations for evaluating the representativeness of the data include, but are not limited to, the following: the sampling location, the methods used to obtain samples at the site, and the appropriateness of the analytical method to the type of sample obtained.

3.2.4 Comparability

Comparability expresses the confidence with which one data set can be compared with another data set. The extent to which existing and planned analytical data will be comparable depends on the similarity of sampling and analytical methods. The procedures used to obtain the analytical data, as documented in the QAPP, are expected to provide comparable data.

3.2.5 Completeness

Completeness is a measure of the amount of data obtained from a specific measurement that is judged to be valid as compared to the total amount of data collected. The validity of the collected data will be evaluated utilizing the guidelines discussed in Section 8.0. The laboratory should provide data that meet QC acceptance criteria for 90 percent or more of the requested determinations. If the percent completion limits are not met, the laboratory may be required to re-analyze samples or re-sampling may be required.

3.3 Quality Control Objective

The purpose of QC check samples is to determine if the data are of acceptable quality. Several different types of QC check samples will be analyzed and the results will be compared to data quality acceptance criteria and/or QC control limits that are specified for each method. The laboratory will routinely run these QC samples in accordance with the protocols and frequencies specified in the analytical methods used. The QC check samples include the following:

- Blank samples
  - Preparation
  - Method
  - Calibration
- Initial and continuing calibrations
- Surrogate spikes (if applicable to the method)
- Matrix spikes/analytical spikes
- Replicate samples
- Control samples

The specific types and frequencies of QC checks that will be performed in support of each test method, the calibration procedures for each instrument, and the QC control limits and/or data quality acceptance criteria for each of the types of QC check samples are specified in the appropriate analytical method.

To ensure the generation of data of sufficiently high quality from both the field sampling and laboratory programs, specified QC procedures would be followed in the field and in the laboratory. The laboratory will be responsible for performing QC samples at the frequencies specified in the USEPA protocols. The procedures for collecting replicate samples and preparing field QC samples are detailed below.

3.3.1 Laboratory Quality Control Procedures

Internal QC checks for laboratory activities will be carried out as specified by the specified analytical method, and/or the standard operating procedures and the laboratory QAPP. The QC checks will include, but are not limited to the following: method, reagent and/or holding blanks; accuracy of system monitoring compound spikes; precision and accuracy of matrix spike/spike duplicates, laboratory control samples, and laboratory duplicates; precision and accuracy of initial and continuing calibration standards; accuracy of internal standards; and accuracy of reference standards. The frequency of these QC checks will be as specified by the analytical method.

3.3.2 Field Quality Control Procedures

Field quality control procedures will include the collection of specified QC samples and the assessment of precision and accuracy of field measurements. These QC samples will include trip blanks, field blanks, and field replicates. In addition, all field equipment will be calibrated to instrument manufacturers specifications (see Section 6.1 for specific procedures).

3.3.2.1 Ground-Water Samples

Field QC procedures for groundwater samples will include the collection and use of field blanks and field replicates, and the use of matrix spike/matrix duplicates. The frequency of each will be as follows:

Replicates	One for every 20 field samples for each matrix.
Field blanks	One for every type of field sampling equipment per decontamination event, not to exceed one per day.
Matrix spike/matrix duplicate	One each for each matrix and SDG (20 samples).

Field replicates are defined as two samples collected independently at a single sampling location during a single sampling event. Field replicates will be collected for groundwater and will be analyzed for the same parameters as the field sample. Field replicates are useful in determining sampling variability and will be assessed quantitatively and qualitatively for precision.

For the preparation of field blanks, the laboratory will supply demonstrated analyte-free, deionized water. Analyte-free water is defined as water that has been analyzed prior to the start of sample collection and is demonstrated to have less than the levels of the target constituents (Table 3).

Field blanks are samples of demonstrated analyte-free, deionized water, which are transferred from laboratory containers through cleaned sampling equipment, collected in a secondary bottle, and sent back to the laboratory. Field blanks are indicators of sample-handling procedures at the laboratory and the site, and of possible intrusive site conditions. The frequency of field blank collection will be consistent with one for every type of field sampling equipment per decontamination event, not to exceed one per day. Sufficient analyte-free water will be available on-site to ensure the field blank bottles will be completely filled.

3.3.2.2 Field Measurements

Field QC procedures will include measurements for determinations of pH, specific conductance, oxidation-reduction potential, dissolved oxygen (DO), and temperature to assess precision of analysis.

Accuracy in the field will be maintained by adherence to specified calibration procedures and incorporation of known reference standards to verify calibrations.

4. Sampling Procedures

Groundwater samples will be collected in accordance with the USEPA procedures for low flow sampling (USEPA 1998).

5. Sample Custody

Sample custody procedures are designed to provide documentation of preparation, handling, storage, and shipment of all collected samples. An example of the chain-of-custody form can be found in Attachment A.

Samples collected during the site investigation will be the responsibility of specific personnel from the time the samples are collected until they arrive and are analyzed at the designated laboratory. Stringent chain-of-custody procedures will be followed to document sample possession.

5.1 Sample Identification

Each sample collected will be assigned a unique alphanumeric code. Replicate samples will be collected and submitted to the laboratory. Since the replicate will be "blind" to the laboratory, it will have a coded identity with the date of sampling (e.g., REP010100 for replicate sample collected on January 1, 2000) on its label and on the chain-of-custody record form. The actual sampling location will be recorded on the daily log form and the sampling log form. The field sampling personnel will be responsible for notifying the QA team as to which samples are replicates and how these samples are identified.

Field blanks will be collected each day of sampling and will have a coded identity with the date of sampling (e.g., FB010100 for the field blank sample collected on January 1, 2000).

Trip blanks will accompany each laboratory provided cooler containing lab samples and will be identified as "Trip Blank".

5.2 Field Chain-of-Custody Procedures

A sample is under custody if it is in the sampler's possession or in his/her view after being in his/her possession, or if the sample was in the sampler's possession and then locked up, or placed in a designated secure area. The following procedures will be used in the field:

1. The field personnel are responsible for the care and custody of the samples collected until they are delivered to the analyzing laboratory or entrusted to a carrier. As few people as possible should handle the samples.

2. ARCADIS G&M groundwater-sampling forms will be used to document the data collection activities. Entries will be made in ink with no erasures. A single stroke will be used to cross out incorrect information; corrections will be dated and initialed. The groundwater-sampling form will be used to record a variety of information, including date, start and end time of purge activities, names of all sampling team members, weather conditions, monitoring well ID, equipment used to collect sample and purge well, field parameters, collection depth of sample, time of collection, sample identification number, and the volume of water purged.

3. Chain-of-custody sample forms will be completed in the field to the fullest extent possible prior to sample shipment. They will include the following information: sample number, time and date collected, preservative, and name of sampler. These forms will be filled out in a legible manner, using waterproof ink, and will be signed by the sampler. Similar information will be provided on the sample label, which will be securely attached to the sample bottle. In addition, sampling forms will be used to document collection and preparation procedures.

4. The project manager will review all field activities to determine whether proper custody procedures were followed during the fieldwork and will decide if additional samples are required.

5.3 Transfer of Custody and Shipment

The following procedures will be used when transferring custody of samples:

1. Samples will be accompanied by a chain-of-custody record completed according to the protocols outlined in Section 5.2. When transferring samples, the individuals relinquishing and receiving them will sign, indicate the date, and note the time on the chain-of-custody record. This record documents the sample custody transfer from the sampler to the laboratory, often through another person or agency. Upon arrival at the laboratory, internal custody procedures will be followed, in accordance with standard laboratory procedures.

2. Samples will be packaged properly for shipment and dispatched to the laboratory for analysis with individual custody records accompanying each shipment. Shipping containers will be sealed for shipment to the laboratory.

The method of shipment, courier name, and other pertinent information will be entered in the remarks section of the chain-of-custody record.

3. All shipments will be accompanied by the chain-of-custody record identifying the contents. The original record will accompany the shipment; a copy will be retained by the field sampler.

4. Proper documentation will be maintained for shipments by common carrier.

5.4 Sample Shipment Procedures

The following procedures will be followed when shipping samples for laboratory analysis:

1. Samples requiring refrigeration will be promptly chilled with ice packs to a temperature of 4°C and packed in an insulated cooler for transport to the analyzing laboratory.

2. Only shipping containers that meet all applicable state and federal standards for safe shipment will be used.

3. To provide a means of detecting any potential tampering during shipment, all shipment containers (coolers) will be affixed with signed ARCADIS G&M chain-of-custody seals. Two seals will be affixed to each cooler, on opposite ends. In addition, 2-inch wide transparent tape will be wrapped entirely around the cooler.

4. The field chain-of-custody record will be placed inside the shipping container in a sealed plastic envelope after the courier has signed the document.

5. Shipment will be made by common carrier or laboratory courier.

5.5 Field Documentation Responsibilities

Daily field log forms and/or a field logbook will be used to record the data collection activities performed. Entries will be described in as much detail as possible so that personnel going to the site can reconstruct a particular situation without reliance upon memory. The field technician will be responsible for securing all documents produced in the field (e.g., technician's daily logs, sampling logs, and communications) at the end of each workday.

5.6 Laboratory Chain-of-Custody Procedures

The chain of custody procedures for the laboratory will be consistent with USEPA 624 Methodology (USEPA 2000).

5.7 Final Evidence Files Custody Procedures

ARCADIS G&M will be the custodian of the evidence file and will maintain the contents of evidence files for the investigation, including relevant records, reports, logs, field notebooks, pictures, subcontractor reports, correspondence, laboratory logbooks, and chain-of-custody forms, in a secured, limited access area, under custody of the project manager.

6. Calibration Procedures

This section describes procedures for maintaining the accuracy of all the instruments and measuring equipment that is used for conducting field tests and laboratory analyses. These instruments and equipment will be calibrated prior to each use or on a scheduled, periodic basis.

6.1 Field Instruments/Equipment

Instruments and equipment used to gather, generate, or measure environmental data will be calibrated with sufficient frequency and in such a manner that accuracy and reproducibility of results are consistent with the manufacturers' specifications.

Equipment to be used during the field sampling will be examined to certify that it is in operating condition. This includes checking the manufacturer's operating manual and the instructions for each instrument to ensure that maintenance requirements are being observed. Field notes from previous sampling events will be reviewed so that the notations of any prior equipment problem are not overlooked and necessary repairs have been made.

Calibration of field instruments will be performed at the intervals specified by the manufacturer or more frequently as conditions dictate. A logbook will be kept documenting calibration results for each field instrument. The logbook will include the date, standards, personnel, and calibration results.

6.2 Laboratory Instruments

Calibration procedures and frequencies for laboratory equipment used in the analysis of environmental samples will be performed in accordance with those specified in the USEPA 624 Methodology.

7. Analytical Procedures

Analytical procedures to be followed when analyzing samples for CVOCs are those methods specified in Table 1. The required sample container types and sizes, preservatives, and analytical holding times for these parameters are listed in Table 4.

All data packages provided by the laboratory will consist of a reduced analytical service protocol (ASP) deliverable format.

8. Data Reduction, Validation, and Reporting

Data collected during this investigation, including field and laboratory results, will be reduced, reviewed, summarized, and reported. The reduction of the field data will consist of summarizing the raw field data, which may be presented in the form of tables, logs, illustrations, and graphs, as deemed appropriate by the Project Manager. The analytical data from the laboratory will be reduced to appropriate forms as determined by the Project Manager.

Data validation consists of a review of an analytical data package with respect to sample receipt and handling, analytical methods, data reporting and deliverables, and document control.

The samples collected will be screened for completeness and technical compliance by the data validators. The information to be screened for the samples will include the following:

- The field chain-of-custody form will be checked to see if it was filled out and if samples were properly logged.
- The parameters will be checked to ensure that they were analyzed by the methods identified in the QAPP.
- The holding times will be checked to ensure that they were met for each parameter.
- Internal QA/QC data will be reviewed to confirm that blanks and spikes were analyzed for the minimum number of samples, as specified in this QAPP.
- Blank and MS/MSD data will be reviewed. If target compounds appear in blanks or if percent relative difference on duplicates is outside established limits, the reasons for these anomalies will be investigated. In such an event, sampling techniques will be discussed with the operations manager and/or the laboratory manager, and internal QA/QC data will be reviewed as appropriate.
- If data appears suspect, the specific data of concern will be investigated.

On the basis of the data review, the data validators will make judgments and comments on the quality and limitations of the data. If any data are determined not to be complete and/or technically compliant, the data validators will refer to the document entitled, USEPA Contract Laboratory Program National Function Guidelines for Organic Data Review (USEPA 1999), for assistance. The data validators will prepare documentation of the review and conclusions to summarize any overall deficiencies that require attention. The data validators will also assess general laboratory performance.

The data validators will inform the Project Manager of data quality and limitations, and assist in interacting with the laboratory to correct any data omissions and/or deficiencies. The laboratory may be required to re-run or re-submit data depending on the extent of the deficiencies and importance in meeting the DQOs within the overall context of the project.

The reviewed laboratory data will be reduced and tabulated. The tabulated format will be suitable for inclusion in the Final Engineering Report and will be designed to facilitate comparison and evaluation of the data. The data tabulations will be sorted by classes of constituents (i.e., chlorinated volatile organic compounds). Each table will contain the following information: sample number; matrix; analytical parameters; detection limits; concentrations detected; and qualifiers, as appropriate.

The field measurement data will be similarly reduced into a tabulated format suitable for inclusion in the Final Engineering Report and will be designed to facilitate comparison and evaluation for the data. These tabulations will include, but not be limited to, the following information:

- Field screening results.
- Field analyses (pH, temperature, DO, oxidation-reduction potential and specific conductance).

Field logs will be transferred into typed formats or organized in their original form for inclusion in the report as appendices. These will include groundwater sampling forms.

The tables and logs will be compiled, whenever feasible, by the field technician, who will inform the operations manager of any problems encountered during data collection, identify apparent inconsistencies, and provide opinions on the data quality and limitations. The tables and logs will be used as the basis for data interpretation and will be checked against the original field documentation by an independent reviewer prior to inclusion in the investigation report.

9. Internal Quality Control

The field technician will use the following types of QA/QC samples to ensure and document the integrity of the sampling procedures and the validity of the measurement data: field replicates, field blanks, and laboratory-prepared trip blanks. The frequencies for collecting the QA/QC samples are specified in Table 2. The QA/QC sample results will be compared to acceptance criteria, and documentation will be provided showing that these criteria have been met. Any samples in non-conformance with the QC criteria will be identified and reanalyzed by the laboratory, if appropriate.

Two types of QA/QC mechanisms are used to ensure the laboratory production of analytical data of known and documented quality: analytical method QC and program QA. The internal QC procedures for the analytical services to be provided are specified in the laboratory methodologies. These specifications include the types of control samples required (matrix spikes, surrogate spikes, reference samples, and blanks), the frequency of each control, the compounds to be used for matrix spikes and surrogate spikes, and the QC acceptance criteria. The laboratory will be responsible for documenting that both initial and on-going instrument and analytical QC criteria are met in each package. This information will be included in the case narrative of the packages generated by the laboratory and will be evaluated during the review performed by ARCADIS G&M.

10. Performance and System Audits

Performance and system audits of both field and laboratory activities will be performed on a periodic basis, as appropriate, to assure that the sampling and analysis are performed in accordance with this QAPP. Examples of audits that will be performed during this investigation are as follows:

The field technician will supervise and check on a daily basis the following: that the groundwater program is conducted correctly; that field measurements are made accurately; that equipment is thoroughly decontaminated; that samples are collected and handled properly; and that field work is accurately and neatly documented. Field log forms and/or a field logbook will be filled out daily during the sampling program. The field forms are provided in Attachment A.

The data validators will review, on a timely basis, the data package submitted by the laboratory to check the following information: that all requested analyses were performed; that sample holding times were met; that the data were generated using the appropriate methodology, level of QC effort, and reporting; and that the analytical results are in conformance with the prescribed acceptance criteria. The data validators will evaluate the data quality and limitations on the basis of these factors.

The Project Manager will oversee the field technician and data validators, and check that the management of the acquired data proceeds in an organized and expeditious manner.

As discussed in the USEPA 624 Methodology (USEPA 2000), audits of the laboratory are performed on a regular basis by regulatory agencies.

11. Preventive Maintenance

ARCADIS G&M has established a program to maintain field equipment to ensure the availability of equipment in good working order when and where it is needed. This program includes specific procedures as illustrated in the following examples:

- An inventory of equipment, including model and serial number, quantity, and condition, will be maintained. Routine checks will be made on the status of equipment, and spare parts will be stocked.

- The field technician will be responsible for ensuring that the equipment is tested, cleaned, charged, and calibrated in accordance with the manufacturer's instructions before it is used in the field.

The laboratory will also follow a well-defined program to prevent the failure of laboratory equipment and instrumentation. This preventative maintenance program will be as specified in the appropriate methodologies.

12. Data Assessment Procedures

The field- and laboratory-generated data will be assessed for their precision, accuracy, representativeness, completeness, and comparability. Both qualitative and quantitative procedures will be used for these assessments.

Field measurements will be assessed on the assumption that the measurements were made using properly calibrated instruments. Assessment of the sampling data with respect to field performance will be based on the criteria that the samples were properly collected and handled. The field QC sample results will also be used in assessing the representativeness and comparability of the samples collected. The operations manager will have the overall responsibility for assessing the data.

The laboratory will calculate and report in the data packages the precision, accuracy, completeness, and sensitivity of the analytical data. Precision will be expressed as the relative percent difference between values for MS/MSD samples. Accuracy will be expressed as percent recoveries for surrogate compounds and matrix spike compounds. The precision and accuracy results will be compared to the prescribed QC acceptance criteria.

Completeness is expressed as the percentage of valid data, based on the total amount of data intended to be collected. The laboratory will make every attempt to generate completely valid data.

The assessment of data representativeness with respect to laboratory performance will be based on the criteria that the samples were properly handled and analyzed within the holding times and the method blank results. Data comparability will be assessed based on the criteria that analyses were performed in strict adherence with the USEPA 624 Methodologies (USEPA 2000).

The achievement of method detection limits depends on instrument sensitivity and matrix effects. Therefore, it is important to monitor the instrument sensitivity to ensure the data quality through constant instrument performance. The instrument sensitivity will be monitored through the analysis of method blanks, calibration check samples, and laboratory control samples.

13. Corrective Actions

The QA/QC program contained in this QAPP will enable problems to be identified, controlled, and corrected. Potential problems may involve non-conformance with the sampling and/or analytical procedures established for the project or other unforeseen difficulties. Any persons identifying an unacceptable condition will notify the field technician, where applicable, and/or the Project Manager. The Project Manager, with assistance from the QA/QC officer, will be responsible for developing and initiating appropriate corrective action and verifying that the corrective action has been effective. For laboratory analysis, both the identified deviations and corrective actions will be documented.

Corrective actions may include repeating measurements, re-sampling and/or re-analysis of samples, and amending or adjusting project procedures. If warranted by the severity of the problem (e.g., if monitoring wells require re-sampling or if the project schedule may be affected), the agency will be notified.

14. Quality Assurance Reports

Data collection activities will be documented through the use of field forms and logbooks. These field records will be reviewed and included in the project file. The QA reports prepared by the analytical laboratory will include the appropriate analytical data; the results of the QC check samples, and a description of problems encountered and corrective actions taken. ARCADIS G&M will review these QA reports to determine the quality and limitations of the data.

15. References

U.S. Environmental Protection Agency (USEPA). 1983. Interim Guidelines and Specifications for Preparing Quality Assurance Project Plans, QAMS-005/80.

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

U.S. Environmental Protection Agency (USEPA). 2000. Code of Federal Regulations, 40 CFR, Part 136, Appendix A.

U.S. Environmental Protection Agency (USEPA). 1998. Ground Water Sampling Procedure, Low Stress (Low Flow) Purging and Sampling.

U.S. Environmental Protection Agency (USEPA). 1999. USEPA Contract Laboratory Program National Function Guidelines for Organic Data Review.

ARCADIS

Tables

Table 1. Summary of Data Quality Objectives and Levels, Kings Electronics Site, Tuckahoe, New York.

Data Collection Activities	Media	Sample Location	Number of Samples/ Data Points	Analyses	Analytical Method
Groundwater Sampling	Groundwater	Monitoring Wells/Points	Refer to Work Plan	Reduced VOCs	USEPA Method 624
				pH, DO, temperature, redox, spec. conductivity	Field instruments

Reduced VOCs Trichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, 1,1-dichloroethene, 1,1,1-tetrachloroethene, tetrachloroethene.

Table 2. Summary of Sampling Activities and Parameters, Kings Electronics Site, Tuckahoe, New York.

Sampling Location	Parameters	Number of Field Samples Per Event	MS/MSD*	Field Replicates	Field Blanks	Trip Blanks
Monitoring Wells	Reduced VOCs	Refer to Work Plan	1 per 20 field samples	1 per 20 field samples	1 per day	1 per shipment

Reduced VOCs Trichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, 1,1-dichloroethene, 1,1,1-tetrachloroethene, tetrachloroethene.

* Laboratory MS/MSD will be used.

Table 3. Quantitation Limits for Organic Parameters, Kings Electronics Site, Tuckahoe, New York.

Parameter	Quantitation Limit* Water (ug/L)
Trichloroethene	1
cis-1,2-Dichloroethene	10
trans-1,2-Dichloroethene	100
Vinyl Chloride	5
1,1-Dichloroethene	2
1,1,1-Trichloroethane	30
Tetrachloroethene	1

ug/L Micrograms per liter.
* USEPA Method 624.

Table 4. Summary of Parameters, Sample Containers, Preservatives, and Holding Times for Samples, Kings Electronics Site, Tuckahoe, New York

Parameter	Matrix	Sample Containers	Preservation	Holding Time (a)
Reduced VOCs	Groundwater	Two (2) 40-mL /septa	Cool 4 degrees Co HCL	14 Days (b)

Reduced VOCs	Trichloroethene, cis-1,2-dichloroethene, trans-1,2-dichloroethene, vinyl chloride, 1,1-dichloroethene, 1,1,1-tetrachloroethene, tetrachloroethene.
(a)	Holding time starts from time of collection.
(b)	Holding time is seven days if hydrochloric acid preservation in not utilized.
mL	Milliliter.

Attachment A

Field Forms

ARCADIS G&M

Laboratory Task Order No./P.O. No.________

CHAIN-OF-CUSTODY RECORD

Page ____ of ____

Project Number/Name ________________

Project Location ________________

Laboratory ________________

Project Manager ________________

Sampler(s)/Affiliation ________________

Sample ID/Location	Matrix	Date/Time Sampled	Lab ID	ANALYSIS / METHOD / SIZE						Remarks	Total

Sample Matrix: L = Liquid; S = Solid; A = Air

Total No. of Bottles/ Containers ____

Relinquished by: ______	Organization: ______	Date __/__/__	Time ____	Seal Intact?
Received by: ______	Organization: ______	Date __/__/__	Time ____	Yes No N/A
Relinquished by: ______	Organization: ______	Date __/__/__	Time ____	Seal Intact?
Received by: ______	Organization: ______	Date __/__/__	Time ____	Yes No N/A

Special Instructions/Remarks: ________________

Delivery Method: ☐ In Person ☐ Common Carrier ______ SPECIFY ☐ Lab Courier ☐ Other ______ SPECIFY

AG 05-0597

ARCADIS GERAGHTY & MILLER

Laboratory Task Order

Task Order No.:

ARCADIS Geraghty & Miller Office: Phone: Date:

Address: Project Number:

Laboratory Reporting Level: ☐ I ☐ II ☐ III ☐ IV ☐ Reduced ☐ GISKEY Disks

Project Name: ITT, Midland Park, New Jersey. Location:

Lab Provides Sample Containers? ☐ Yes ☐ No Date Required: Ship To:

Estimated Date Of Sample Receipt By Laboratory: Report Due:

Reports Delivered To: Number Of Reports:

Work Description:

Send Invoice To:

PHYSICAL PROPERTIES	# Water	Method	Det. Limit	# Soil	Method	Det. Limit	NON-METALLICS	# Water	Method	Det. Limit	# Soil	Method	Det. Limit
pH							Acidity						
Spec. Cond.							Alkalinity (Total)						
Hardness (total)							Carbonate						
TDS							Bicarbonate						
TSS							Bromide						
Temperature							Chloride						
Turbidity							Cyanide						
Ignitability							Fluoride						
Corrosivity							Ammonia						
Reactivity							Nitrate						
TCLP Extraction							TKN						
TCLP Complete							Nitrite						
METALS1/							Phosphorus						
Aluminum							Silica						
Antimony							Sulfate						
Arsenic							Sulfide						
Barium							Surfactants (MBAS)						
Beryllium							ORGANICS						
Cadmium							BOD						
Calcium							COD						
Chromium							TOC						
Hex Chromium							TRPH						
Copper							Phenols2/						
Iron							Pesticides/PCBs2/						
Lead							PNAs2/						
Magnesium							Org. Phos. Pest.2/						
Manganese							Dioxins						
Mercury							Chlor. Herb.2/						
Nickel							Volatile Organics						
Potassium							Semi Volatile Organics2/						
Selenium							APPENDIX IX3/						
Silver							RADIONUCLIDES						
Sodium							Gross Alpha						
Thallium							Gross Beta						
Tin							Radium 226						
Vanadium							Radium 228						
Zinc													
Priority Pollutant Metals2/													
TAL Metals2/													

Special Instructions:

AG&M Project Manager Signature:______________________________ Date:____________

AG&M QA Officer Signature:______________________________ Date:____________

Laboratory Acceptance:______________________________ Date:____________

ARCADIS GERAGHTY & MILLER
Groundwater Sampling Form

Project Number: ____________ Task: ____________ Well ID: ____________

Date: ____________ Sampled By: ____________

Sampling Time: ____________ Recorded By: ____________

Weather: ____________ Coded Replicate No.: ____________

INSTRUMENT IDENTIFICATION

	PID	Water-Level Meter	Water Quality Meter(s)
Serial #:			

PURGING INFORMATION

Casing Material: ____________ Purge Method: ____________

Casing Diameter: ____________ Volumes to be Purged: ____________

Total Depth: ____________ Total Volume Purged: ____________

Depth to Water: ____________ Pump on: ____________ Off: ____________

Water Column: ____________

Gallons/Foot: ____________

Gallons in Well: ____________

LOW FLOW PURGE FIELD PARAMETERS

Time	Minutes Elapsed	Rate (mlpm)	Gallons Purged	Turbidity (NTUs)	REDOX (mV)	pH (SI Units)	Conductivity (µmhos/cm)	Temp (°C)	Depth to Water	Dissolved O2 (ppm)	Comments

OBSERVATIONS DURING SAMPLING

Well Condition: ____________ Purge Water Disposal: ____________

Color: ____________ Odor: ____________

ARCADIS GERAGHTY & MILLER

DAILY LOG

Well(s)________ Project/No. ____ Page______ of________

Site Location____

Prepared By____

Date/Time	Description of Activities

Health and Safety Plan

Kings Electronics Site
40 Marbledale Road
Tuckahoe, New York

ARCADIS
Infrastructure, environment, buildings

PREPARED FOR

Kings Electronics Co., Inc.

ARCADIS

Health and Safety Plan

Kings Electronics Site
40 Marbledale Road
Tuckahoe, New York

Prepared for:
Kings Electronics Co., Inc.

Prepared by:
ARCADIS G&M, Inc.
1200 MacArthur Blvd.
Mahwah, NJ 07430

Tel 201 236-2233
Fax 201 236-5110

Our Ref.:
NJ000423.0002.00004

Date:
22 July 2002

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ARCADIS

Tables

ARCADIS

Figures

Appendices

1. Introduction

ARCADIS G&M, Inc. has been authorized by the Kings Electronics Co., Inc. (Kings) to conduct investigative and remedial activities at the Kings Electronics Site, located in Tuckahoe, New York. This Health and Safety Plan (HASP) has been developed to address the potential physical and chemical hazards that our workers may face while performing the planned field activities. This HASP establishes procedures to minimize worker's exposures through personal protective equipment and safe work practices. This HASP has been developed to meet the requirements of the Occupational Safety and Health Administration (OSHA) regulations, Title 29, Code of Federal Regulations, Part 1910.120 (29 CFR 1910.120), "Hazardous Waste Operations and Emergency Response." It is intended for the protection of our workers. Anyone else, such as subcontractors, client, and visitors may review our HASP and follow its procedures if they wish.

2. Responsibilities

ARCADIS G&M's on-site task leader will be designated as the Site Health & Safety Officer (SSO). The SSO will be responsible for implementing the procedures and safe work practices established in this HASP. In the event that the SSO must leave the site while the work is in progress, an alternate SSO will be designated to ensure that the HASP will continue to be followed. The SSO will report all health and safety matters to the project manager, Kevin McGuinness, who has responsibility for overseeing the planned activities. Tom Eng, health and safety manager, will be available on an as needed basis.

3. Site Description

The Site is located at 40 Marbledale Road in Tuckahoe, New York (Figure 1). The Site was first developed in the early 1900's as an icehouse. Numerous additional buildings were constructed between 1932 and 1951 during property development by O.D. Chemical Corporation. Kings has utilized the facility for wastewater pretreatment, electroplating, degreasing, and machining operations associated with their manufacturing processes. All manufacturing operations ceased in 1998.

Prior site investigations have detected the presence of chlorinated volatile organic compounds (VOCs) in the soils and groundwater of the facility. A soil excavation project was conducted in April 1999 to remove impacted soils from beneath the former degreasing area located in the northern portion of the property. It is believed that soil containing residual chlorinated VOCs may still be present beneath the floor of the former degreasing area. Extensive investigation of the groundwater has been performed throughout the site area.

4. Planned Field Activities

Planned field activities are as follows:

- Soil Boring Advancement.
- Monitoring Well Installation.
- Groundwater Sampling.
- Soil Sampling.
- Molasses Injection.

5. Hazard Evaluation

The potential hazards, physical and chemical, associated with the planned field activities for this site have been evaluated. Existing site information were used in this evaluation process. Table 1 provides a summary of the potential physical and chemical hazards.

The physical hazards associated with the planned field activities include the potential for being struck by/against equipment and debris; being splashed with potentially contaminated fluids; slipping and falling due to wet or uneven surfaces; and the potential for a fire or an explosion.

The chemical hazards associated with the planned field activities include the potential exposure to miscible chlorinated solvent constituents in groundwater and soil. Based upon this information, the following exposure pathways have been identified to minimize potential worker's exposure:

- Inhalation of vapor and gas.
- Skin absorption.
- Direct skin and eye contact.

- Accidental ingestion.

Table 2, Current Occupational Airborne Contaminant Standards and Guidelines, provides a listing of the compounds found at this site and their current occupational exposure limits.

6. Air Monitoring

Air monitoring will be conducted at this site during all planned field activities to ensure that the workers are appropriately protected from the potential physical and chemical hazards. An intrinsically safe photo-ionization detector (PID) will be used. This instrument is designed to measure trace quantities of VOCs in air and has a parts per million (ppm) sensitivity range. This instrument will be calibrated each morning, before field use, each evening following field use, and calibration records will be kept. In addition, the instrument will be checked against calibration gas periodically throughout the day to evaluate instrument drift and will be recalibrated when appropriate. Colorimetric metric tubes will also be used to measure vinyl chloride concentrations as indicated in Table 3 and discussed in Section 7. A combination meter will be used to monitor for the presence of oxygen, flammable/explosive gases and vapors, and hydrogen sulfide.

7. Action Levels

During all field activities, air monitoring using a PID will be conducted. Prior to the start of each day's activities, background readings in the immediate work area will be taken using a PID. An action level of 1 ppm needle deflection from the background concentration for a sustained period of 5 minutes in the worker's breathing zone has been established based on the potential presence of vinyl chloride. The following action level procedure (see Table 3) has been established for all planned field activities to evaluate whether actual field conditions will require an upgrade in the level of personal protection.

If the action level of 1 ppm needle deflection is exceeded in the worker's breathing zone, a colorimetric tube for vinyl chloride, will be taken to confirm whether vinyl chloride concentrations meet or exceed 1 ppm in the worker's breathing zone. If the action level is exceeded, work will be discontinued, the work area will be permitted to vent and the workers moved to an area up wind until the concentrations fall below the action level. If the concentration of vinyl chloride does not fall below the action level after 10 minutes, the work will resume with the level of protection upgraded to Level C using a full face air purifying respirator equipped with an organic vapor cartridge. Once in Level C, colorimetric tubes will be drawn every hour to monitor the presence of vinyl chloride. When this monitoring indicates that the concentration is below the action level, then downgrading to Level D is possible. If the vinyl chloride concentration meets or exceeds 10 ppm, work will be discontinued, the work area will be permitted to vent, and the workers will be moved to an area upwind until the vinyl chloride concentration falls below 10 ppm. If the vinyl chloride concentration does not fall below 10 ppm after 10 minutes, the work will be discontinued.

Should PID readings meet or exceed 25 ppm for a sustained period of 5 minutes, and it has been determined that vinyl chloride is not present, work will be discontinued, workers will be moved upwind, and the work area will be permitted to vent until PID readings are less than 25 ppm. If after 10 minutes of venting, the PID readings are still 25 ppm or greater, work can resume with workers upgraded to Level C protection. Should PID readings meet or exceed 1,000 ppm for a sustained period of 5 minutes, work will be discontinued, workers will be moved upwind, and the work area will be permitted to vent until PID readings fall below 1,000 ppm.

Air monitoring will be performed continuously for flammable/explosive gases and vapors. Should the Lower Explosive Limit (LEL) reading meet or exceed 20 percent (%) of the LEL, work will be discontinued, workers will be moved upwind, and the work area will be permitted to vent until LEL readings are less than 20 percent. Air monitoring will also be performed continuously for hydrogen sulfide (H_2S). Should the H_2S concentration meet or exceed 10 ppm, work will be discontinued, the work area will be permitted to vent, and the workers will be moved to an area upwind until the H_2S concentration falls below 10 ppm.

In addition to air monitoring in the worker's breathing zone, perimeter air monitoring will be performed for all ground intrusive activities conducted outside of the building. Perimeter air monitoring will be performed with the spirit and intent of the New York State Department of Health Generic Community Air Monitoring Plan (NYS DOH CAMP) (Appendix A).

8. Levels of Protection

Based upon the hazard evaluation results, all tasks will initially be performed in Level D protection. In the event that the established action levels are exceeded, the level of protection may be upgraded to Level C. The following is a description of the personal protective equipment required for each level:

Level D

- Hard hat (for drilling activities)
- Disposable coveralls (optional)
- Safety glasses, goggles, or face shield (for drilling activities)
- Steel-toe and shank, chemical-resistant boots
- Chemical-resistant gloves
- Hearing protection, Noise Reduction Rating (NRR) of 35 decibels

Level C

- Safety glasses, goggles, or face shield
- Hard hat
- Disposable coveralls
- Full face air purifying respirator equipped with organic vapor cartridges
- Steel-toe and shank, chemical-resistant boots
- Chemical-resistant gloves
- Hearing protection, NRR of 35 decibels

9. Safe Work Practices

- All ARCADIS G&M site personnel will be participants of the company's health and safety program. This includes 40 hours of initial training, 3 days supervised work with an experienced worker, annual 8 hour refresher training and 8 hour manager and supervisor training.
- All ARCADIS G&M site personnel are participants of the company's medical surveillance program.
- A copy of the HASP will be available for reference at the site during the planned field activities. Site visitors will be required to sign the Site Visitors Log (Appendix B).
- Dust suppression, using a water spray, will be used when needed to reduce airborne particulates during the field activities.

- A pre-entry, tailgate safety meeting will be conducted and recorded on the form in Appendix C prior to the start of each day's activities to discuss the associated hazards.
- All underground utilities and structures will be marked out and cleared before any ground intrusive work begins. This will be recorded on the form provided in Appendix D.
- The SSO will inform all subcontractors of the potential hazards associated with the site and the planned field activities. A copy of the HASP will be made available for their review.
- No eating, drinking, and smoking will be permitted in the work and support zones.
- No sources of ignition, such as matches or lighters will be permitted in the work and support zones.
- The buddy system will be used in all work areas.
- During hazardous weather conditions, such as lightning and thunder storms, work will cease immediately.

10. Site Control

Entrance to the work site is limited to authorized personnel only. The SSO will determine and identify the following areas of the work site. These areas will be divided into three zones, designated as the exclusion zone, the contamination reduction zone (CRZ), and the support zone. The SSO will also specify the equipment, operations, and personnel to occupy these controlled areas (see Figure 2).

1. Exclusion Zone (Zone 1)

The exclusion zone is the zone where contamination exists or could occur. All personnel working in an exclusion zone will wear the prescribed level of protection. An entry and exit check point will be visually defined at the periphery of the exclusion zone to regulate the flow of personnel and equipment into and out of the zone. Personnel who have not met the medical monitoring and training criteria set forth in this HASP are not permitted to enter the exclusion and contamination reduction zones.

A visually defined exclusion zone will be established around work areas in which encountering hazardous substances is probable. When established, this zone will be of sufficient size to contain all work activities and resultant waste production. The exclusion zone perimeter will be defined with cones, barricades, or barricade tape.

2. Contamination Reduction Zone (Zone 2)

The area between the exclusion zone and the support zone is the CRZ. This zone provides a transition between a contaminated area (exclusion zone) and a support zone. The CRZ serves as a buffer to further reduce the possibility of the clean support zone from becoming contaminated. It provides additional assurance that the physical transfer of contaminating substances on personnel, on equipment, or in the air is limited through a combination of decontamination, distance between exclusion and support zones, air dilution, zone restrictions, and work functions. Decontamination of personnel and sampling equipment will be performed in the contamination reduction corridor (CRC), which will be situated within the CRZ. The CRC will be established as the entry and exit points to the defined work areas, as depicted on Figure 2.

3. Support Zone (Zone 3)

This space is outside the zone of contamination. The support zone must be marked and protected against contamination from the work area. This zone serves the following functions:

- An entry for personnel, material, and equipment.
- An exit for decontaminated personnel, materials, and equipment.
- An area for rest breaks.

The relationship between each of the three zones is depicted on Figure 2. Waste materials resulting from work activities (such as contaminated protective clothing) will be containerized within the exclusion zone and properly disposed of. Only authorized visitors and investigative team members will be allowed within work areas during the field work. Site security will be performed by the SSO or his designee.

11. Decontamination

All personnel performing work tasks in the work areas must pass through the CRZ decontamination procedure, regardless of the work task or protection used. All equipment and tools used within the work area will also undergo decontamination. Final inspection of the equipment prior to leaving the work area is the responsibility of the SSO.

1. Personnel

The decontamination procedure depicted in Figure 3 will be employed for those field activities requiring Level B and Level C protection. A similar procedure, with two less stations (Stations 4 and 6), will be used by personnel requiring Level D protection.

Station 1: Segregated Equipment Drop

Equipment used in the work area (tools, monitoring equipment, radios, clipboards, etc.) will be deposited on plastic drop cloths or in different containers with plastic liners. Tools and devices will be washed/wiped in a detergent solution and rinsed with clean water, then stored or serviced for reuse. Tools and similar field equipment may require a high-temperature water/stream wash. This station may be located adjacent to the CRZ decontamination line.

Station 2: Wash and Rinse Outer Garment, Boots, and Gloves

Outer boots and gloves will be scrubbed with a decontamination solution, consisting of detergent and water. Gloves, boots, and garment will be rinsed with a hand-pump spray bottle or in a plastic bucket or tub.

Station 3: Removal of Outer Gloves

Outer gloves and any accompanying tape will be removed. Tape should be placed in a container with a plastic liner. Reusable gloves will be cleaned and stored for future use.

Station 4: Cartridge

If a worker leaves the exclusion zone to change respirator cartridges or supplied air bottles, Station 4 must be the last step in the decontamination procedure. After the worker's cartridges/bottles have been exchanged, the outer glove and boot covers are donned and joints taped, if required. The worker may then return to the exclusion zone.

Station 5: Removal of Boots and Outer Garment

Boots and outer garment will be removed. The outer, disposable, chemical-resistant garment should be deposited in a plastic-lined container. Reusable protective garments will be removed and stored for future use.

Station 6: Removal of Respiratory Protection

The respirator face piece will be removed, and the respirator will be placed in a plastic-lined container for decontamination.

2. Equipment and Vehicles

Equipment will be washed with decontamination solution (i.e., detergent and water), rinsed with clean water, and if required, steam cleaned to the satisfaction of the SSO prior to reuse. Equipment will be decontaminated in a designated area. Support vehicles will be decontaminated as deemed necessary by the SSO.

3. Decontamination Personnel

Personnel working the CRZ will wear, at a minimum, the same level of protection as the workers. In addition, face shields will be worn rather than safety glasses or goggles to protect personnel against splashing.

4. Decontamination Waste Disposal

Solid wastes (discarded protective clothing, tape, etc.) will be containerized and disposed in an approved manner.

5. Equipment Needs

The following equipment may be used during the decontamination procedure:

Station 1:

- Plastic drop cloths.
- Plastic 30- or 50-gallon containers.

Station 2:

- Hand-operated garden-type sprayers.
- Large tubs or wash containers (30- to 50-gallon capacity).
- Plastic buckets
- Brushes.
- Decontamination solution

Station 3:

- Plastic liners.
- Plastic containers (30- to 50-gallon capacity).

Station 4:

- Duct tape.
- Respirator cartridges.

Station 5:

- Plastic liners.
- Plastic containers (30- to 50-gallon capacity).
- Detergent and/or boric acid for decontamination of respirators.

Station 6:

- Plastic liners.
- Plastic containers (30- to 50-gallon capacity).
- Bench
- Rack for boots.

Other Equipment:

- Hand-operated garden-type hose sprayers or garden hose for vehicle and equipment washing and rinsing.
- Steam cleaner.
- Potable water supply.
- Wash basins.

6. Contaminant Containment

A housekeeping program will be implemented during the course of the work tasks to avoid the spread of any contaminants beyond the exclusion zone. The housekeeping program will include the following:

- Periodic policing of the work areas for debris, including paper products, cans, etc.

- Periodic changing of wash and rinse water for hands, face, and equipment.
- Periodic removal (weekly minimum) of all garbage bags and containers used to dispose of disposable clothing. Contaminated materials will be disposed in an approved manner.
- Excavated debris generated during the drilling will be removed by the owner.

12. Emergency Plan

Verbal communications may be difficult at times due to personal protective equipment and noise. A universal set of hand signals will then be used. They are as follows:

Hand gripping throat:	Can't breath
Grip partner's wrist or place hands around waist:	Leave work area immediately
Hand on top of head:	Need assistance
Thumbs up:	Okay, I'm all right
Thumbs down:	No, Negative

13. Injury Reporting

All job-related injuries and illnesses will be reported to the SSO. If medical attention is needed, the injured worker will be decontaminated, if possible, prior to leaving the site. The SSO will investigate the cause of the accident and corrective measures will be taken before the work can resume. It will be the responsibility of the SSO to complete the accident reporting form, OSHA 301, included as Appendix E for all injuries. The completed OSHA 301 should be forwarded to the office health and safety manager within six days for recording into the OSHA 200 log. In the event of a fatality or 3 or more workers hospitalized as a result of a single incident, the SSO will contact the office health and safety manager immediately for OSHA reporting purposes.

14. Emergency Telephone Numbers

Police	911
Fire	911
Ambulance	911

Hospital	914-787-1000 (Lawrence Hospital, 55 Palmer Avenue, Bronxville, New York)

15. Directions to the Hospital

1. Start out Southwest on MARBLEDALE ROAD towards MARBLE PLACE by turning left.
2. Turn RIGHT onto MAIN STREET.
3. Turn LEFT onto DEPOT SQUARE.
4. DEPOT SQUARE turns into SAGAMORE ROAD.
5. Turn RIGHT onto PONDFIELD ROAD.
6. Turn LEFT onto PALMER AVENUE.

Table 1. Potential and Chemical Hazards Associated with the Planned Field Activities.

	PHYSICAL HAZARDS					CHEMICAL HAZARDS (ROUTES OF ENTRY)		
	Struck By/Against	Slip and Fall	Noise	Splash	Flammable Gases/Vapors	Inhalation	Skin and Eye Contact	Skin Absorption
ACTIVITIES								
1. Soil Boring Advancement	X	X	X	X	X	X	X	X
2. Monitoring Well Installation	X	X	X	X	X	X	X	X
3. Groundwater Sampling	X	X	---	X	X	X	X	X
4. Soil Sampling	X	X	---	---	X	X	X	X

Table 2. Summary of Action Levels

Air Monitoring	Action Levels	Actions To Take
PID Reading	<1 ppm	Remain in Level D protection.
PID Reading	$\geq$1 ppm[1)]	Draw a vinyl chloride Drager tube.
Vinyl Chloride Tube	<1 ppm	Remain in Level D protection.
Vinyl Chloride Tube	$\geq$1 ppm	Let work area vent or upgrade to Level C protection.
Vinyl Chloride Tube	$\geq$10 ppm	Stop work and let work area vent.
PID Reading	$\geq$25 ppm[1)]	Let work area vent or upgrade to Level C protection.
PID Reading	$\geq$1,000 ppm[1)]	Stop work and let work area vent.
LEL Reading	<10%	Remain in Level D protection.
LEL Reading	$\geq$10%	Let work area vent.
H_2S Reading	<10ppm[1)]	Remain in Level D protection.
H_2S Reading	$\geq$10 ppm[1)]	Stop work and let work area vent.

PID	Photo-ionizaton detector equipped with a 10.6 eV lamp.
ppm	Parts per million.
LEL	Lower explosive limit.
H_2S Reading	Hydrogen sulfide.
%	Percent.
1)	For 5 minutes.

Table 3. Current Occupational Airborne Contaminant Standards and Guidelines.

Compound	ACGIH-TLV (ppm)		OSHA-PEL (ppm)		
	TWA	STEL	TWA	STEL	CEILING
1,1-Dichloroethane	100	--	100	--	--
cis-1,2-Dichloroethene	200	--	200	--	--
trans-1,2-Dichloroethene	200	--	200	--	--
Ethylbenzene	100	125	100	--	--
Hydrogen Sulfide	10	15	--	--	20
Methylene Chloride	50	--	25	125	--
Naphthalene	10	15	10	--	--
Tetrachloroethene	25	100	100	--	200
Toluene	50	--	200	--	300
1,1,1-Trichloroethene	350	450	350	--	--
Trichloroethene	50	100	100	--	200
Vinyl Chloride	1	--	1	5	--
Xylene	100	150	100	--	--

ACGIH	American Conference of Governmental Industrial Hygienists 2001.
OSHA	Occupational Safety and Health Administration (1989).
TLV	Threshold limit value.
PEL	Permissible exposure limit.
TWA	8-Hour time weighted average.
STEL	15-Minute short term exposure limit.
ppm	Parts per million.
--	Not established.

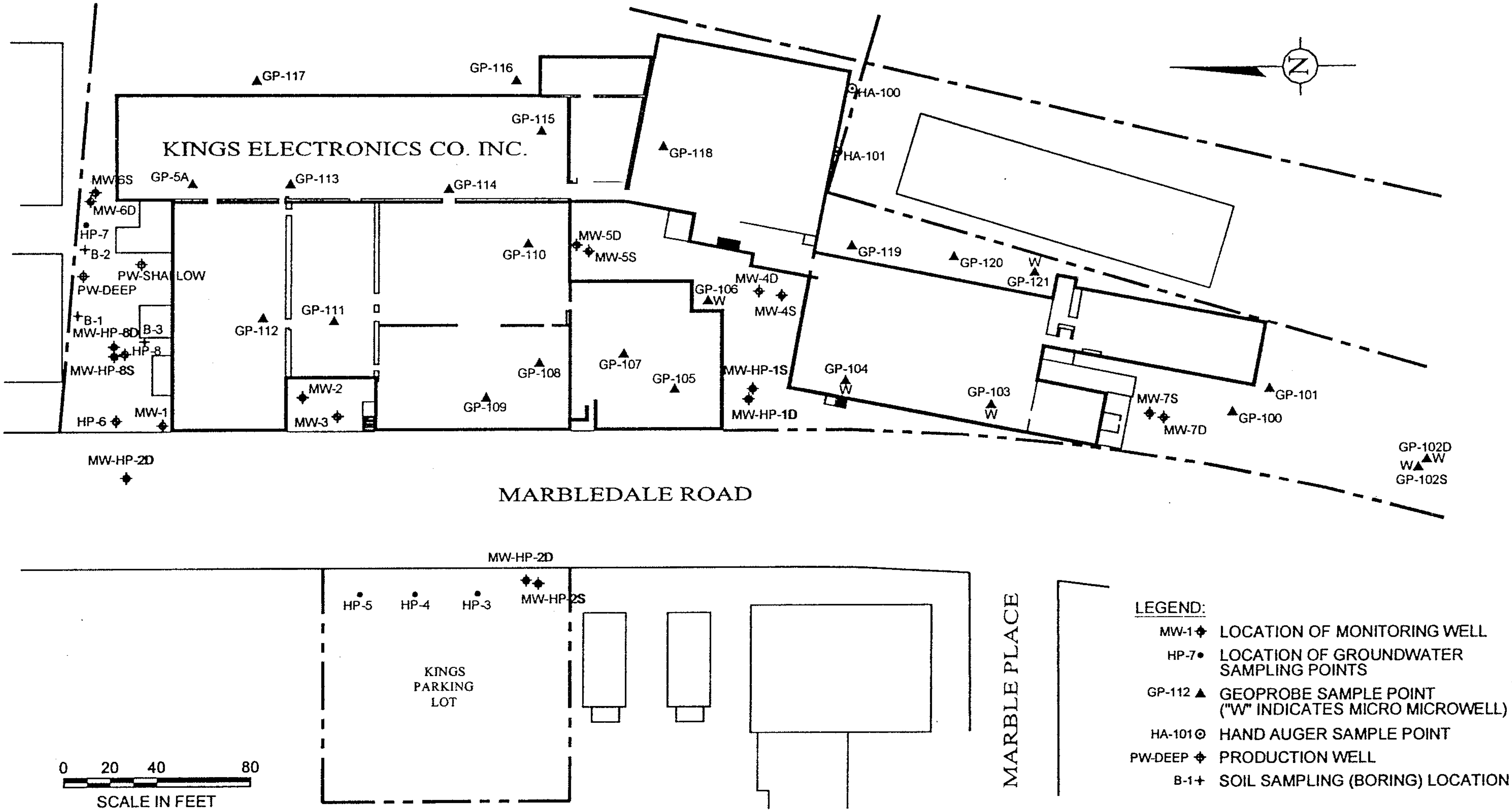
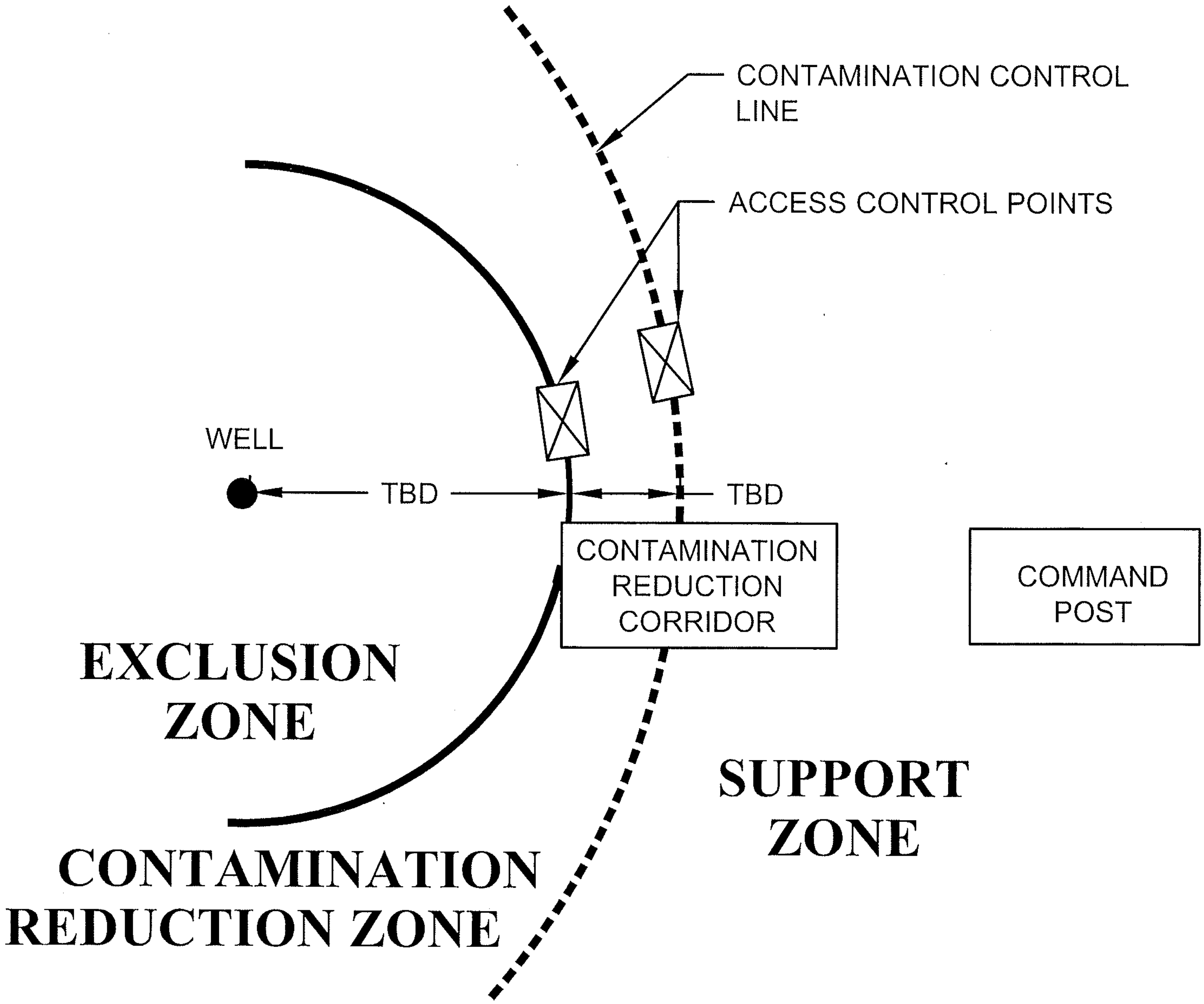


Figure 1. Site Plan

Kings Electronics Co. Inc. Tuckahoe, New York



NOTE:

TBD - LOCATION SPECIFIED TO BE DETERMINED IN FIELD.

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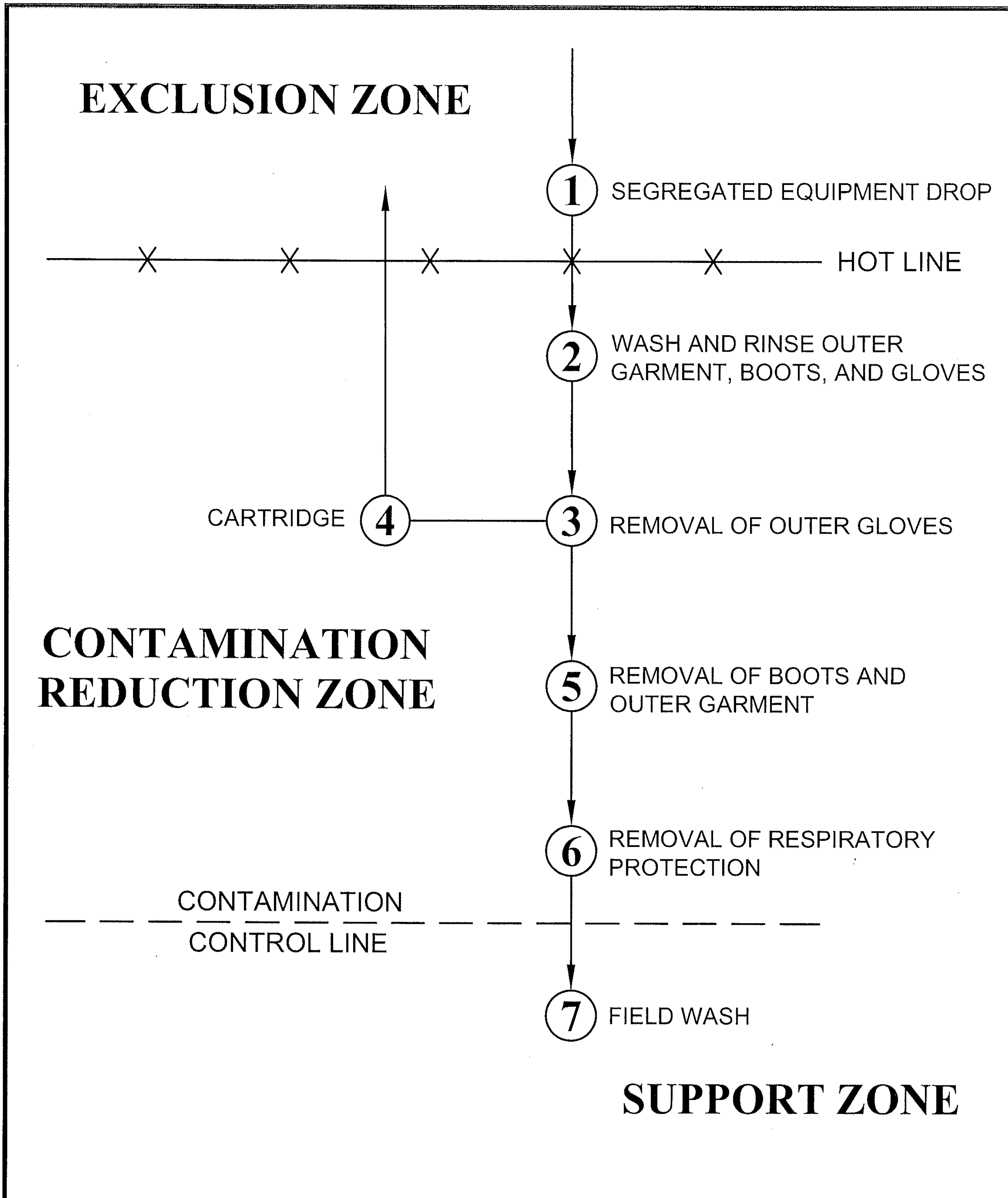
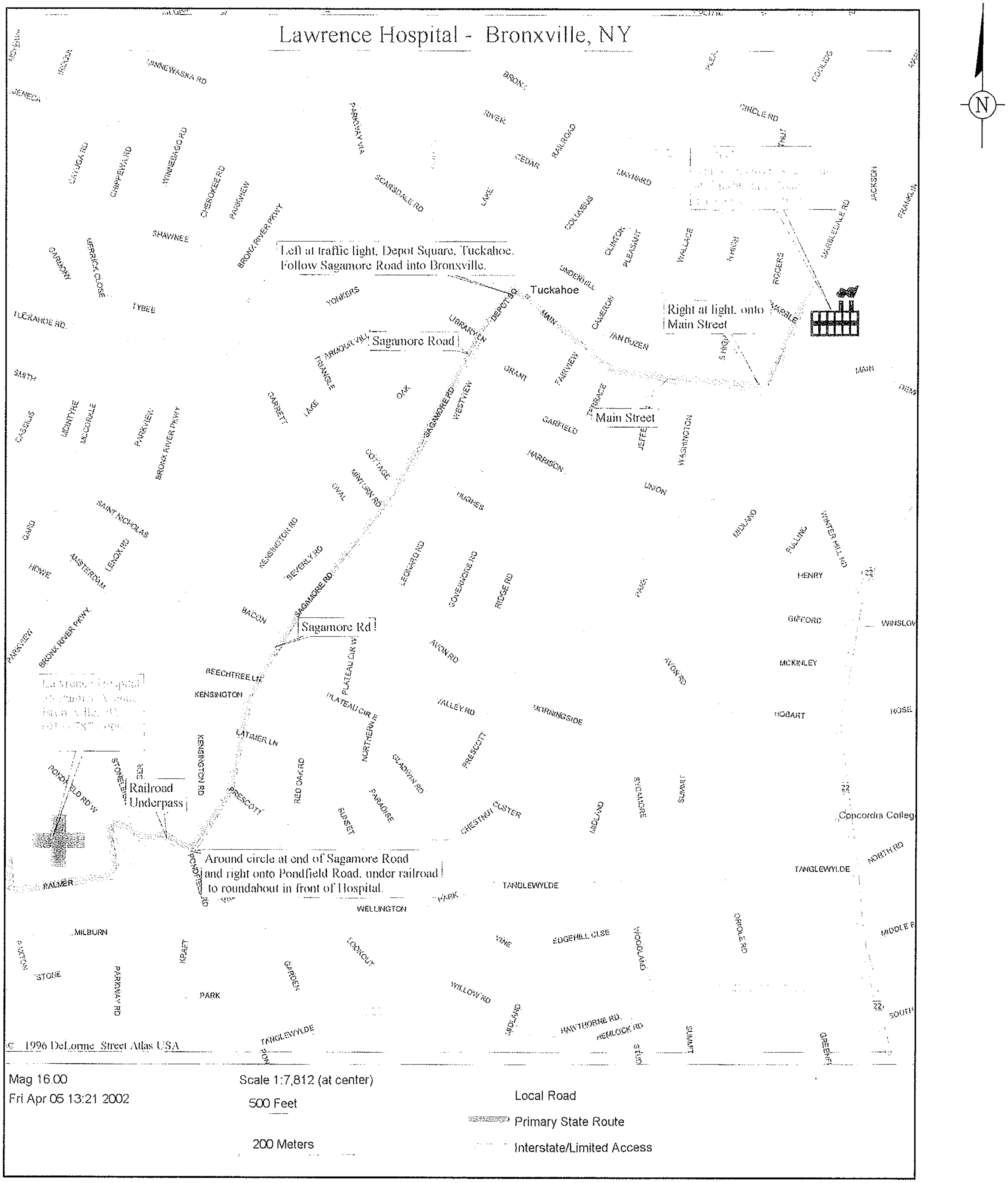
ARCADIS GERAGHTY & MILLER

DRAWN TG	DATE 01-09-02	PROJECT MANAGER	DEPARTMENT MANAGER
SCHEMATIC OF WORK ZONES		LEAD DESIGN PROF.	CHECKED
KINGS ELECTRONICS SITE TUCKAHOE, NEW YORK		PROJECT NUMBER NJ0423.002	DRAWING NUMBER 2



copyright © 20 02 / G:\Drafting\Kings\CADD\schematic.dwg	ARCADIS GERAGHTY & MILLER	DRAWN TG / DATE 01-09-02	PROJECT MANAGER	DEPARTMENT MANAGER
		DECONTAMINATION PROCEDURE	LEAD DESIGN PROF.	CHECKED
		KINGS ELECTRONICS SITE TUCKAHOE, NEW YORK	PROJECT NUMBER NJ0423.002	DRAWING NUMBER 3



copyright © 19 01	SCALE 0 800 FEET	ARCADIS GERAGHTY&MILLER	DRAWN A.G.	DATE 111201	PROJECT MANAGER	DEPARTMENT MANAGER T. ENG
			ROUTE TO HOSPITAL		LEAD DESIGN PROF. C. STOKES	CHECKED C.S.
			KINGS ELECTRONICS SITE TUCKAHOE, NEW YORK		PROJECT NUMBER NJ0423.02	DRAWING NUMBER 4

Appendix A

NYSODH Generic Community Air Monitoring Plan

New York State Department of Health
Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical-specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during <u>non-intrusive</u> activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. "Periodic" monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

<u>VOC Monitoring, Response Levels, and Actions</u>

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** basis or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less - but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and be available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m^3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m^3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m^3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m^3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

June 20, 2000

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Appendix B

Site Visitors Log

SITE VISITORS LOG

THE UNDERSIGNED VISITORS REQUIRE ENTRANCE TO THE WORK ZONES AND HAVE THOROUGHLY READ THE HEALTH AND SAFETY PLAN, UNDERSTAND THE POTENTIAL HAZARDS AT THE SITE AND THE PROCEDURES TO MINIMIZE EXPOSURE TO THESE HAZARDS.

NAME (print)	COMPANY	DATE	SIGNATURE

Appendix C

Tailgate Safety Meeting Form

TAILGATE SAFETY MEETING

Prepared By ______________________

Client ______________________ Project ______________________

Date ______________________ Project Number ______________________

Work Location ______________________

Type of Work to be Done ______________________

SAFETY TOPICS PRESENTED

Chemical Hazards ______________________

____

Physical Hazards/Underground Utilities ______________________

____

Protective Clothing/Equipment ______________________

____

Special Equipment ______________________

Emergency Procedures ______________________

____

Hospital/Clinic ______________________ Phone ( ) ______________________

Paramedic Phone ( ) ______________________

Hospital Address ______________________

Other ______________________

ATTENDEES

NAME PRINTED	**SIGNATURE**

MEETING CONDUCTED BY ______________________ ______________________

NAME PRINTED **SIGNATURE**

Appendix D

Utilities and Structure Checklist

ARCADIS GERAGHTY & MILLER

UTILITIES AND STRUCTURES CHECKLIST

Project: ______________________________ Prepared By: ______________________________

Location: ____ Date: __________________

Instructions. This checklist has to be completed by a ARCADIS Geraghty & Miller staff member as a safety measure to insure that all underground utility lines, other underground structures as well as above-ground power lines are clearly marked out in the area selected for boring or excavation. **DRILLING OR EXCAVATION WORK MAY NOT PROCEED UNTIL LINES ARE MARKED AND THIS CHECKLIST HAS BEEN COMPLETED.** Arrangements for underground utility markouts are best made at the time of the preliminary site visit to allow client and/or utility company sufficient time. Keep completed checklist and maps onsite; send copy to Project Manager.

Assignment of Responsibility. Client is responsible for having underground utilities and structures located and marked. Preferable, the utilities themselves should mark out the lines.

Drilling or Excavation Sites. Attach a map of the property showing the proposed drilling or excavation site (or if sites are widely separated, several maps) clearly indicating the area(s) checked for underground utilities or underground structures and the location of above-ground power lines.

Utilities and Structures Type	**Not Present**	**Present**	**How Marked?**[1]
Petroleum products line			
Natural gas line			
Stream line			
Water line			
Sewer line			
Storm drain			
Telephone cable			
Electric power line			
Product tank			
Septic/drain field			
Overhead power line			

[1] Flags, pain on pavement, wooden stake, etc.

Name and affiliation of person who marked out underground lines or structures

NAME	ORGANIZATION	PHONE

Emergency Procedures

Persons at site or facility to contact in case of emergency

1. ____ Phone ________________

2. ____ Phone ________________

Fire Dept.: Phone ________________________ Ambulance Phone ________________________

Utility: Phone ________________________ Utility Phone ________________________

Direction to nearest hospital (describe or attach map).

Appendix E

Accident Reporting Form, OSHA 301

OSHA's Form 301
Injury and Illness Incident Report

Attention: This form contains information relating to employee health and must be used in a manner that protects the confidentiality of employees to the extent possible while the information is being used for occupational safety and health purposes.

U.S. Department of Labor
Occupational Safety and Health Administration

Form approved OMB no. 1218-0176

This *Injury and Illness Incident Report* is one of the first forms you must fill out when a recordable work-related injury or illness has occurred. Together with the *Log of Work-Related Injuries and Illnesses* and the accompanying *Summary*, these forms help the employer and OSHA develop a picture of the extent and severity of work-related incidents.

Within 7 calendar days after you receive information that a recordable work-related injury or illness has occurred, you must fill out this form or an equivalent. Some state workers' compensation, insurance, or other reports may be acceptable substitutes. To be considered an equivalent form, any substitute must contain all the information asked for on this form.

According to Public Law 91-596 and 29 CFR 1904, OSHA's recordkeeping rule, you must keep this form on file for 5 years following the year to which it pertains.

If you need additional copies of this form, you may photocopy and use as many as you need.

Completed by ______________________

Title ______________________

Phone (_____)_______-________ Date ____/____/____

Information about the employee

1) Full name ______________________

2) Street ______________________

City ______________ State ______ ZIP ______

3) Date of birth ____/____/____

4) Date hired ____/____/____

5) ☐ Male
☐ Female

Information about the physician or other health care professional

6) Name of physician or other health care professional ______________________

7) If treatment was given away from the worksite, where was it given?

Facility ______________________

Street ______________________

City ______________ State ______ ZIP ______

8) Was employee treated in an emergency room?
☐ Yes
☐ No

9) Was employee hospitalized overnight as an in-patient?
☐ Yes
☐ No

Information about the case

10) Case number from the Log ______________ *(Transfer the case number from the Log after you record the case.)*

11) Date of injury or illness ____/____/____

12) Time employee began work ______________ AM / PM

13) Time of event ______________ AM / PM ☐ Check if time cannot be determined

14) ***What was the employee doing just before the incident occurred?*** Describe the activity, as well as the tools, equipment, or material the employee was using. Be specific. *Examples:* "climbing a ladder while carrying roofing materials"; "spraying chlorine from hand sprayer"; "daily computer key-entry."

15) ***What happened?*** Tell us how the injury occurred. *Examples:* "When ladder slipped on wet floor, worker fell 20 feet"; "Worker was sprayed with chlorine when gasket broke during replacement"; "Worker developed soreness in wrist over time."

16) ***What was the injury or illness?*** Tell us the part of the body that was affected and how it was affected; be more specific than "hurt," "pain," or sore." *Examples:* "strained back"; "chemical burn, hand"; "carpal tunnel syndrome."

17) ***What object or substance directly harmed the employee?*** *Examples:* "concrete floor"; "chlorine"; "radial arm saw." *If this question does not apply to the incident, leave it blank.*

18) ***If the employee died, when did death occur?*** Date of death ____/____/____

Public reporting burden for this collection of information is estimated to average 22 minutes per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Persons are not required to respond to the collection of information unless it displays a current valid OMB control number. If you have any comments about this estimate or any other aspects of this data collection, including suggestions for reducing this burden, contact: US Department of Labor, OSHA Office of Statistics, Room N-3644, 200 Constitution Avenue, NW, Washington, DC 20210. Do not send the completed forms to this office.

ARCADIS

Infrastructure, buildings, environment, communications

On-Site Remedial Action Work Plan Addendum

Kings Electronics Co., Inc. Site,
Tuckahoe, New York

PREPARED FOR

Kings Electronics Co., Inc.

ARCADIS

On-Site Remedial Action Work Plan Addendum

Kings Electronics Co., Inc. Site
Tuckahoe, New York

Prepared for:
Kings Electronics Co., Inc.

Prepared by:
ARCADIS G&M, Inc.
1200 MacArthur Boulevard
Mahwah
New Jersey 07430
Tel 201 236 2233
Fax 201 236 5110/5112

Our Ref.:
NJ000423.0002.00006

Date:
9 December 2002

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ARCADIS

Attachments

ATTACHMENT 1

Environmental Management, Ltd.

MEMORANDUM

TO: James Candiloro

FROM: Donald Wanamaker

DATE: November 26, 2002

CC: Kevin McGuinness and Bruce Munson

As discussed today via telecom, ARCADIS will provide a final RAWP document (circa June 4, 2002) that also includes (within an addendum to the June 4th document) all of the items identified within Mr. Andrew English's October 15, 2002 letter correspondence to Bruce Munson at Kings.

By copy of this e-mail correspondence to Kevin, ARCADIS will also include (within the addendum) any associated letters (if any) which contain design related information. It is our understanding that ARCADIS's Construction Drawings were provided to potential contractors as a "design build" package since this is a relatively simple system.

This should provide a comprehensive document that, along with the Construction Drawings – ERD System, adequately describes the On-site Remedial Action Work Plan and On-site Remedial Design.

As indicated in Mr. English's letter, the off-site community health and safety investigation issues are being addressed concurrently. My office will be submitting a Community Air Monitoring Plan shortly. In addition, and in order to further investigate potential off-site impacts, we will be submitting a map indicating the location of two downgradient groundwater monitoring wells and up to four off-site soil-gas wells. Geovation Consultants, Inc. will be completing the map along with a typical well (both groundwater and soil-gas) design shortly.

In closing, I trust that the off-site investigation issues identified above do not impact the review and approval of ARCADIS's On-site Remediation Design.

Thank you.

ATTACHMENT 2

New York State Department of Environmental Conservation
Division of Environmental Remediation
Bureau of Western Remedial Action, 11th Floor
625 Broadway, Albany, New York 12233-7017
Phone: (518) 402-9671 • **FAX:** (518) 402-9679
Website: www.dec.state.ny.us

Erin M. Crotty
Commissioner

October 15, 2002

Bruce M. Munson
Kings Electronics Co., Inc.
670 White Plains Road
Scarsdale, NY 10583

RE: Voluntary Cleanup Project
Remedial Action Work Plan
Kings Electronics, V00237-3

Dear Mr. Munson:

This letter confirms and documents the Department's approval of the Work Plan (entitled "On-Site Remedial Action Work Plan") for the subject site. The Work Plan consists of the following documents:

- On-Site Remedial Action Work Plan, dated 10/15/01
- Kings monthly progress report, dated 2/20/01
- Kings monthly progress report, dated 4/26/02
- Environmental Management LTD letter, dated 5/7/02
- Geovation letter, dated 5/9/02
- Kings monthly progress report, dated 5/10/02
- Kings monthly progress report (w/attachments), dated 7/10/02

Based upon the information and representations given in the Work Plan and previous reports prepared for the Kings Electronics site (April 1999 Soil Removal Summary Report, dated June 24, 1999; Summary of Remedial Investigative Findings, dated June 1, 2000; and Additional Soil Sampling Activities, dated March 30, 2001), the Work Plan is hereby approved.

My understanding is that the remedial design will be submitted within 60 days of this approval letter. I further understand that in conjunction with the remedial design process, to assess potential offsite impacts, two downgradient wells will be installed and a soil gas survey will be conducted .

If you have any questions or require additional information, please contact Mr. James Candiloro at (518) 402-9670 or at the address listed above.

Sincerely,

Andrew J. English

Andrew J. English, P.E.
VCP Coordinator

cc: M. Lesser
A. Quartararo
R. Pergadia
C. Costopoulus
K. Anders
D. Wanamaker (Environmental Management, Ltd)

ATTACHMENT 3

KINGS
ELECTRONICS CO., INC.
670 WHITE PLAINS ROAD | SCARSDALE, NEW YORK 10583 | 914-713-5000 | FAX 914-713-0123

July 10, 2002

CERTIFIED
RETURN RECEIPT REQUESTED

Tanya Reinhard, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, New York 12561-1696

Re: Monthly Progress Report, DEC Agreement #W3-0855-99-07
Voluntary Cleanup Program (VCP #V00237-3)
Kings Electronics Co., Inc.
40 Marbledale Road
Tuckahoe, New York 10707

Dear Ms. Reinhard:

ON-SITE ACTIVITIES THIS PAST MONTH:

In-situ Reactive Zone (IRZ) – Pilot Test Area

Attached are summary tables of the analytical results from the groundwater sampling of injection wells PTW-1 and GP-105 on June 6 and June 20, and of monitoring wells IW-2 and IW-3 on June 20. There were no injections of molasses solution on June 6. An injection of 200 gallons of molasses solution was carried out both at PTW-1 and at GP-105 on June 20.

Also included are summary tables of the most recent results from the other monitoring wells in the Pilot Test Area.

ON-SITE REMEDIAL ACTION WORK PLAN (RAWP)

Enclosed are the responses prepared by our on-site remediation consultant, ARCADIS, which address the points raised by General Revised Work Plan items 1, 2 and 4 within your June 4, 2002 letter to Kings.

Regarding Item 3 within your June 4th letter, and as our environmental consultant (EML) discussed June 9th with Dr. Anders (NYS DOH), the use of purge water was not requested as a contingency plan. It is our understanding that your conditional approval of purge water use was to potentially bioaugment the Insitu Reactive Zone with upgradient groundwater that may have acclimated a consortia of bacteria capable of dechlorinating cis-1,2 dichloroethene. Further, the On-Contact Remediation Process® contingency proposed in the February 10, 2002 Kings submittal was accepted by DEC as the contingency plan and as a possible contingency plan by DOH.

Regarding Item 5 within your June 4th letter, and as our environmental consultant (EML) discussed June 9th with Dr. Anders, in addition to locating the off-site monitoring wells during the Remedial Design process, Kings will contract for and implement a soil gas survey of the potentially impacted area downgradient and along the western edge of the sidewalk off Marbledale Road. At this time the area to be investigated via soil gas monitoring is between Marble Place and Main Street, just west of Marbledale Road.

Regarding Item 10 within Dr. Anders March 21, 2002 comments on the Draft RAWP, and as our environmental consultant (EML) discussed June 9th with her, the New York State Department of Health Generic Community Air Monitoring Plan is currently being reviewed by EML's certified industrial hygienist. During ground intrusive activities (including but not limited to the installation of injection and monitoring wells) a community air monitoring plan for both volatile organic compounds (VOCs) and dust particles will be implemented by Kings in accordance with the scope and intent of State's Generic Plan.

SILT LENS – SITE INVESTIGATION WORKPLAN

Enclosed is a report prepared by our site investigation consultant, Geovation Consultants, Inc., that completes "Task 3 – Additional Soil Sampling of TCE Source Area" found within the approved Site Investigation Workplan.

JULY ACTIVITIES ON-SITE:

ARCADIS resampled injection wells PTW-1 and GP-105 on Wednesday July 3, 2002. An injection of molasses solution was then carried out both at PTW-1 and at GP-105. Performance monitoring wells are scheduled to be reevaluated within two to three weeks.

Very truly yours,

Bruce M. Munson Dw

Bruce M. Munson
Corporate Environmental Manager

pc:

Gary A. Litwin
Director of Bureau of Environmental Exposure Investigation
New York State Department of Health
547 River Street
Troy, New York 12180-2216

Anthony Quartararo, Esq.
New York State Department of Environmental Conservation
Division of Environmental Enforcement
625 Broadway, 14th Floor
Albany, New York 12233-5500

Donald J. Wanamaker, President
Environmental Management Ltd. (EML)
41 Franck Road
Stony Point, New York 10980

Charles Goldberger, Esq.
McCullough, Goldberger & Staudt
1311 Mamaroneck Avenue
White Plains, New York 10605

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

PTW-1	4/11/02	4/25/02	5/9/02	5/22/02	6/6/02	6/20/02
Field Parameters						
DO (mg/L)	--	0.25	0.26	0.25	--	0.28
REDOX (mV)	-70.3	-163.1	-76.3	-61.1	31.5	-43.4
pH	4.96	5.29	5.17	5.4	4.27	4.74
Conductivity (mS/cm)	9.306	10.74	6.14	4.576	13.5	6.033
TOC (mg/L)	15800	13200	7190	4480	21600	10400
DOC (mg/L)	15300	11200	6400	4110	18200	6470
Molasses Ratio	NI	NI	NI	10:1	NI	NI
Total Volume Injected (gallons)	NI	NI	NI	200	NI	NI
Chlorinated VOCs						
Trichloroethene						
cis-1,2-Dichloroethene						
trans-1,2-Dichloroethene (ug/L)						
Vinyl Chloride (ug/L)						
1,1-Dichloroethene (ug/L)						
1,1,1-Trichloroethane (ug/L)						
Tetrachloroethene (ug/L)						
Biogeochemical Parameters						
Carbon Dioxide (mg/L)						
Nitrogen (mg/L)						
Methane (ug/L)						
Ethane (ng/L)						
Ethene (ng/L)						
Sulfide (mg/L)						
Ferrous Iron (mg/L)						
Dissolved Iron (ug/L)						
Total Iron (ug/L)						
Dissolved Manganese (ug/L)						
Total Manganese (ug/L)						
Alkalinity (mg/L)						
Chloride (mg/L)						
Nitrate (mg/L)						
Nitrite (mg/L)						
Sulfate (mg/L)						
Total Phosphorus (mg/L)						

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

PTW-2	1/17/02	4/11/02	4/25/02
Field Parameters			
DO (mg/L)	0.09	0.06	0.19
REDOX (mV)	-118.8	-45.6	-160.3
pH	6.85	6.61	6.67
Conductivity (mS/cm)	1.424	1.601	1.603
TOC (mg/L)	6.56	--	3.91
DOC (mg/L)	4.78	--	3.35
Chlorinated VOCs			
Trichloroethene	2890	681	897
cis-1,2-Dichloroethene	3610	3190	3310
trans-1,2-Dichloroethene	0	0	0
Vinyl Chloride	0	0	0
1,1-Dichloroethene	0	0	0
1,1,1-Trichloroethane	0	0	0
Tetrachloroethene	0	0	0
Biogeochemical Parameters			
Carbon Dioxide (mg/L)	89		150
Nitrogen (mg/L)	14		12
Methane (ug/L)	1000		3600
Ethane (ng/L)	160		34
Ethene (ng/L)	320		400
Sulfide (mg/L)	0.007		0.02
Ferrous Iron (mg/L)	25.75		7.5
Dissolved Iron (ug/L)	21600		10800
Total Iron (ug/L)			
Dissolved Manganese (ug/L)			
Total Manganese (ug/L)			
Alkalinity (mg/L)			
Chloride (mg/L)			
Nitrate (mg/L)			
Nitrite (mg/L)			
Sulfate (mg/L)	56.4		38
Total Phosphorus (mg/L)			

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

IW-1	1/16/02	4/25/02
Field Parameters		
DO (mg/L)	0.07	1.28
REDOX (mV)	-60	-150.7
pH	6.75	6.9
Conductivity (mS/cm)	1.374	0.85
TOC (mg/L)	1.45	2.83
DOC (mg/L)	1.24	2.24
Chlorinated VOCs		
Trichloroethene	35	21
cis-1,2-Dichloroethene	13.1	4.5
trans-1,2-Dichloroethene	0	0
Vinyl Chloride	0	0
1,1-Dichloroethene	0	0
1,1,1-Trichloroethane	5.89	0
Tetrachloroethene	2.53	1.74
Biogeochemical Parameters		
Carbon Dioxide (mg/L)	45	34
Nitrogen (mg/L)	17	16
Methane (ug/L)	3.1	5.5
Ethane (ng/L)	34	14
Ethene (ng/L)	180	140
Sulfide (mg/L)	0.108	0.05
Ferrous Iron (mg/L)	2.68	1.1
Dissolved Iron (ug/L)	2960	1250
Total Iron (ug/L)		
Dissolved Manganese (ug/L)		
Total Manganese (ug/L)		
Alkalinity (mg/L)		
Chloride (mg/L)		
Nitrate (mg/L)		
Nitrite (mg/L)		
Sulfate (mg/L)	44.8	33.6
Total Phosphorus (mg/L)		

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

IW-2	1/16/02	3/14/02	4/25/02	6/20/02
Field Parameters				
DO (mg/L)	0.23	0.53	0.27	0.11
REDOX (mV)	-82.5	-111	-222.8	-52.1
pH	6.62	6.72	6.83	6.38
Conductivity (mS/cm)	1.835	1.723	7.652	1.507
TOC (mg/L)	6.46	9.56	55	60.6
DOC (mg/L)	5.64	5.98	50.7	21.5
Chlorinated VOCs				
Trichloroethene	29.6		8.97	
cis-1,2-Dichloroethene	1300		190	
trans-1,2-Dichloroethene	0		0	
Vinyl Chloride	0		0	
1,1-Dichloroethene	0		0	
1,1,1-Trichloroethane	0		0	
Tetrachloroethene	0		0	
Biogeochemical Parameters				
Carbon Dioxide (mg/L)	130		84	
Nitrogen (mg/L)	12		6.3	
Methane (ug/L)	8200		11000	
Ethane (ng/L)	110		0	
Ethene (ng/L)	330		44	
Sulfide (mg/L)	0.309		0.04	
Ferrous Iron (mg/L)	6.32		14.3	
Dissolved Iron (ug/L)	38200		46000	
Total Iron (ug/L)				
Dissolved Manganese (ug/L)				
Total Manganese (ug/L)				
Alkalinity (mg/L)				
Chloride (mg/L)				
Nitrate (mg/L)				
Nitrite (mg/L)				
Sulfate (mg/L)	15.4		29.2	
Total Phosphorus (mg/L)				

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

IW-3	1/3/02	1/16/02	3/14/02	4/26/02	6/20/02
Field Parameters					
DO (mg/L)	0.27	0.07	0.26	0.2	1.58
REDOX (mV)	-89	-157.2	-152.2	-319.4	-102.6
pH	7.05	7.27	7.21	7.24	6.93
Conductivity (mS/cm)	1.518	1.333	1.381	2.004	1.534
TOC (mg/L)	113	60	30.4	96.6	37.7
DOC (mg/L)	111	48	19.9	86.3	36.8
Chlorinated VOCs					
Trichloroethene		7720		494	
cis-1,2-Dichloroethene		0		744	
trans-1,2-Dichloroethene		0		0	
Vinyl Chloride		0		28.5	
1,1-Dichloroethene		0		0	
1,1,1-Trichloroethane		0		0	
Tetrachloroethene		0		0	
Biogeochemical Parameters					
Carbon Dioxide (mg/L)		24		68	
Nitrogen (mg/L)		18		17	
Methane (ug/L)		12		35	
Ethane (ng/L)		680		120	
Ethene (ng/L)		880		10000	
Sulfide (mg/L)		0.045		0.08	
Ferrous Iron (mg/L)		1.76		8.7	
Dissolved Iron (ug/L)		2000		15100	
Total Iron (ug/L)					
Dissolved Manganese (ug/L)					
Total Manganese (ug/L)					
Alkalinity (mg/L)					
Chloride (mg/L)					
Nitrate (mg/L)					
Nitrite (mg/L)					
Sulfate (mg/L)		47.2		25.6	
Total Phosphorus (mg/L)					

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

IW-4	1/17/02	4/26/02
Field Parameters		
DO (mg/L)	0.95	0.21
REDOX (mV)	-3.6	-178.5
pH	7.14	7.35
Conductivity (mS/cm)	1.09	1.425
TOC (mg/L)	1.99	31.7
DOC (mg/L)	--	29.6
Chlorinated VOCs		
Trichloroethene	135	178
cis-1,2-Dichloroethene	0	11.5
trans-1,2-Dichloroethene	0	0
Vinyl Chloride	0	0
1,1-Dichloroethene	0	0
1,1,1-Trichloroethane	0	0
Tetrachloroethene	0	3.35
Biogeochemical Parameters		
Carbon Dioxide (mg/L)	29	52
Nitrogen (mg/L)	19	16
Methane (ug/L)	6	2.1
Ethane (ng/L)	43	33
Ethene (ng/L)	0	60
Sulfide (mg/L)	0.009	0.04
Ferrous Iron (mg/L)	0.01	0.3
Dissolved Iron (ug/L)	348	371
Total Iron (ug/L)		
Dissolved Manganese (ug/L)		
Total Manganese (ug/L)		
Alkalinity (mg/L)		
Chloride (mg/L)		
Nitrate (mg/L)		
Nitrite (mg/L)		
Sulfate (mg/L)	44.2	28
Total Phosphorus (mg/L)		

Summary Table-Groundwatei
Kings Electronics, Tuckahoe, NY

GP-104	1/16/02	2/14/02	4/11/02	4/25/02	5/21/02
Field Parameters					
DO (mg/L)	1.42	--	0.27	1.21	3.37
REDOX (mV)	74.8	98	65.2	-66.1	87.8
pH	6.74	6.63	6.7	6.8	6.94
Conductivity (mS/cm)	1.209	1166	1.312	1.241	1.098
TOC (mg/L)	10.8	5.14	2.73	2.81	2.08
DOC (mg/L)	2.92	2.86	2.62	2.45	1.96
Chlorinated VOCs					
Trichloroethene	6680			3700	
cis-1,2-Dichloroethene	343			829	
trans-1,2-Dichloroethene	0			0	
Vinyl Chloride	0			0	
1,1-Dichloroethene	0			0	
1,1,1-Trichloroethane	0			0	
Tetrachloroethene	0			0	
Biogeochemical Parameters					
Carbon Dioxide (mg/L)	53			66	
Nitrogen (mg/L)	18			15	
Methane (ug/L)	3			790	
Ethane (ng/L)	160			140	
Ethene (ng/L)	150			25000	
Sulfide (mg/L)	0.002			0.06	
Ferrous Iron (mg/L)	0.02			0.03	
Dissolved Iron (ug/L)	0			0	
Total Iron (ug/L)					
Dissolved Manganese (ug/L)					
Total Manganese (ug/L)					
Alkalinity (mg/L)					
Chloride (mg/L)					
Nitrate (mg/L)					
Nitrite (mg/L)					
Sulfate (mg/L)	69			49.2	
Total Phosphorus (mg/L)					

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

GP-105	2/14/02	3/14/02	4/11/02	5/22/02	6/6/02	6/20/02
Field Parameters						
DO (mg/L)	--	--	--	1.23	--	0.23
REDOX (mV)	--	--	--	-108	-5.6	-85.6
pH	--	--	--	5.59	5.54	5.6
Conductivity (mS/cm)	--	--	--	15.578	15.509	3.272
TOC (mg/L)	--	--	--	19200	9340	2290
DOC (mg/L)	--	--	--	18200	8330	2190
Molasses Ratio	20:1	20:1	20:1	20:1	NI	10:1
Total Volume Injected (gallons)	200	200	200	200	NI	200
Chlorinated VOCs						
Trichloroethene						
cis-1,2-Dichloroethene						
trans-1,2-Dichloroethene						
Vinyl Chloride						
1,1-Dichloroethene						
1,1,1-Trichloroethane						
Tetrachloroethene						
Biogeochemical Parameters						
Carbon Dioxide (mg/L)						
Nitrogen (mg/L)						
Methane (ug/L)						
Ethane (ng/L)						
Ethene (ng/L)						
Sulfide (mg/L)						
Ferrous Iron (mg/L)						
Dissolved Iron (ug/L)						
Total Iron (ug/L)						
Dissolved Manganese (ug/L)						
Total Manganese (ug/L)						
Alkalinity (mg/L)						
Chloride (mg/L)						
Nitrate (mg/L)						
Nitrite (mg/L)						
Sulfate (mg/L)						
Total Phosphorus (mg/L)						

Summary Table-Groundwater
Kings Electronics, Tuckahoe, NY

MW-HP-1S	1/3/02	1/17/02	2/14/02	4/11/02	4/25/02	5/21/02
Field Parameters						
DO (mg/L)	0.76	0.25	0.3	--	0.23	0.19
REDOX (mV)	-25.3	-48.7	-115	-114.6	-249.6	-76.9
pH	5.73	5.87	5.48	6.2	6.46	6.7
Conductivity (mS/cm)	4.932	5.623	4.627	3.007	1.791	1.423
TOC (mg/L)	4840	4780	3560	1120	230	51.4
DOC (mg/L)	3280	4770	3070	1070	202	45.9
Chlorinated VOCs						
Trichloroethene		0			60.6	
cis-1,2-Dichloroethene		2800			1080	
trans-1,2-Dichloroethene		0			0	
Vinyl Chloride		0			19.9	
1,1-Dichloroethene		0			0	
1,1,1-Trichloroethane		0			0	
Tetrachloroethene		0			0	
Biogeochemical Parameters						
Carbon Dioxide (mg/L)		680			260	
Nitrogen (mg/L)		5.1			5.8	
Methane (ug/L)		5100			12000	
Ethane (ng/L)		22			0	
Ethene (ng/L)		330			11000	
Sulfide (mg/L)		0.031			0.13	
Ferrous Iron (mg/L)		>75			45	
Dissolved Iron (ug/L)		1470000			138000	
Total Iron (ug/L)						
Dissolved Manganese (ug/L)						
Total Manganese (ug/L)						
Alkalinity (mg/L)						
Chloride (mg/L)						
Nitrate (mg/L)						
Nitrite (mg/L)						
Sulfate (mg/L)		59.5			194	
Total Phosphorus (mg/L)						

GEOVATION®

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8 July 2002

Bruce Munson
Kings Electronics Co., Inc.
670 White Plains Road
Scarsdale, New York 10583

Re: Additional Silt Layer Sampling and Silt Layer Summary Report
Kings Electronics Co., Inc. Tuckahoe Facility
NYSDEC Agreement #W3-0855-99-07
Voluntary Cleanup Program

Dear Mr. Munson,

Geovation Consultants, Inc. (Geovation) was contracted by Kings Electronics Co., Inc. (Kings) to perform additional soil sampling and data analysis at the Kings facility located at 40 Marbledale Rd. in Tuckahoe, NY (Figure 1). Geovation collected additional soil samples from within the silt layer and subsequently evaluated the nature and extent of impacts from volatile organic compounds (VOCs) to the silt layer as well as potential impacts to site ground water.

This document applies newly collected data and the existing body of information previously collected at the site to develop an understanding of subsurface conditions. This data, collected by many individuals employed at various companies, represents a summation of best available information on the subsurface conditions at this time. It should be acknowledged that as additional activities are performed at the site, data may be produced which will necessitate a revision to the understanding of the site conditions discussed below.

Silt Layer Sampling

Geovation collected 4 soil samples of the silt layer from within the existing large excavation located inside the northern end of the Kings facility. Silt layer samples were collected on 19 April 2002 using a hand shovel and stainless steel hand auger. The hand shovel was used to manually remove approximately twelve to eighteen inches of soil from the existing excavation sidewalls. Subsequently, silt layer samples were collected by advancing the stainless steel hand auger horizontally an additional six to twelve inches into the sidewall, resulting in samples collected from an eighteen to twenty-four inch depth into the excavation sidewalls. Silt layer samples were then transferred into laboratory-provided glassware, placed into a cooler with ice and transported to a NYSDOH certified laboratory for analysis. Samples were analyzed for total VOCs with a library search (+10) and for VOCs+10 via TCLP methodologies.

In addition, one silt layer sample was collected of the silt layer from the smaller excavation located to the north of the main excavation and submitted for analysis of total organic carbon (TOC). The silt layer at this location is not impacted above the NYSDEC recommended soil cleanup objectives (RSCOs), and this sample was collected to develop a site-specific soil cleanup objective. The results of the TOC sampling were not available at the time of the preparation of this report. These results will be provided to you within the next few weeks under separate cover.

Results of Silt Layer Sampling

The summary of the results of the silt layer sampling is provided as Table 1. Review of this table indicates that each of the samples collected exhibits concentrations of VOCs below the recommended soil cleanup objectives provided by the NYSDEC. As anticipated, the concentrations of VOCs detected by TCLP methodologies are significantly lower than the concentrations of total VOCs reported at each sampling location (Table 1). The concentration of trichloroethene detected by TCLP methodologies in each sample is well below the concentration required for this media to be classified as a hazardous waste, but above the NYSDEC ground water standards, suggesting that these soils could under certain conditions act as a minor source for additional ground water contamination.

Locations where the silt layer samples were collected and a graphical depiction of the area of impacted silt layer are provided as Figure 2. This figure is based on the data collected to date, and a prominent feature of the diagram is the area where the silt layer and other soils were previously removed from the site in April 1999. Excavated materials were subsequently stockpiled and transported off-site for proper disposal (see Cody Ehlers Group 1999, *Soil Removal Summary Report*). The remaining area of the impacted silt layer as depicted by Figure 2 is approximately 1,785 square feet located beneath numerous rooms, walls and walkways in the northern portion of the facility.

Evaluation of the Silt Layer Thickness

Geovation reviewed reports, boring logs of monitoring wells, pilot-phase remediation well logs, soil boring logs and other existing information regarding the presence and thickness of the silt layer present at the site. Table 2 provides a summary of the elevation of the bottom of the silt layer and silt layer thickness as reported in previous work. Based on the data provided in Table 2, Geovation prepared a topographic map of the lower contact of the silt layer (Figure 3) and a silt layer isopach map (Figure 4) showing the reported thickness of the silt layer across the site. While the silt layer has not been found to be a continuous subsurface feature at the site, previous investigations have suggested that this feature is most likely a relic soil horizon, and as such, it is conservative to treat this layer as if it were continuous for the purpose of estimating the volume of impacted material and the interaction of the silt layer and ground water table.

The lower contact of the silt layer, Figure 3, ranges in elevation from approximately 84 ft. at GP-109 (relative to arbitrary datum established at the site) to more than 100 ft. at GP-119 and GP-120. The silt layer lower contact primarily slopes downward to the west across the site with most of the lower elevations reported near Marbledale Road. In the area indicated to be impacted by trichloroethene (TCE), the lower contact of the silt layer is inferred to slope south-southeast (Figure 3).

The thickness of the silt layer is reported to range from nine feet (MW-7S) to one tenth of a foot (GP-120) and was not reported to be present at some locations. In general terms, the silt layer exists as a series of two elongated half- dome shaped features beneath the western portion of the Kings facility (Figure 4). In the area indicated to be impacted by trichloroethene (Figure 2), the silt layer ranges in thickness from 0.5 feet to approximately 2 feet (Figure 4).

Silt layer volume was calculated by multiplying its thickness (Figure 4) by its area (Figure 2). The area of the impacted silt layer (1,785 ft^2) times the average thickness of the silt layer within this area (1.54 ft.) results in a volume of impacted silt of 2,742 ft^3. A conversion factor for compacted earth of 115 lbs per cubic foot was utilized to approximate the weight of impacted silt, 165.5 tons or 150 metric tons (150,480 Kg).

The concentration of TCE varies within this volume. Average concentration of the area encompassed by each isoconcentration line was multiplied by the volume encompassed by the same line and the results are presented in Table 3. As indicated on Table 3, the estimated mass of TCE remaining in the silt layer (Figure 2) is approximately 292 grams (Table 3).

Previous calculations of the mass of contamination remaining in the silt layer at the site (Cody Ehlers, *April 1999 Soil Removal Summary Report*) estimated 4.5 pounds of TCE remained at the site. Comparatively, the estimate contained herein of 292 grams (0.64 pounds) is significantly less. Although a similar volume of impacted silt was estimated by Cody Ehlers (192 tons) and Geovation (166 tons), the concentration of TCE was treated differently by these two analyses. Previously, Cody Ehlers applied the TCE concentration measured at the extents of excavation to all remaining impacted soils. For the estimate provided in this document, the results of the recent silt layer sampling (Table 1) were utilized to represent the concentration of TCE in the silt layer at the excavation side walls. Previous data collected on the silt layer excavation side wall was also incorporated (i.e. CS-2). In addition, the concentration of TCE within the silt layer was considered to decrease with distance from the excavation, as is supported by silt layer sampling performed at several locations distant from the excavation (i.e., within the small excavation to the north of the main excavation, MW-10, MW-11 etc.).

The Cody Ehlers Group had previously estimated that approximately 86% of the TCE impacted soil had been removed from the site. Revision of this calculation utilizing Geovation's estimate of TCE remaining at the site indicates that approximately 98% of the TCE impacted soil has been removed. The principal difference between Cody Ehlers Group's estimate and Geovation's estimate of the mass of TCE remaining at the site is the inclusion within Geovation's calculations of the observed decrease in TCE concentration with distance from the excavation.

TCLP Silt Layer Analysis

As provided on Table 1, when Geovation collected the recent silt layer soil samples in April 2002, each sample was split and analyzed for VOCs via EPA Method 8260 and EPA Method 8260 with a Toxicity Characteristic Leaching Procedure (TCLP). Under this procedure, constituents are extracted from the waste in a manner designed to simulate the leaching action that occurs in solid waste landfills (45CFR.33110). Said differently, TCLP was developed to estimate the concentration of contaminants within an acidic (pH 5.0 plus or minus 0.2) leachate derived from a sample. The TCLP extraction process requires that the sample be diluted by a ratio of 20-to-1, and assuming that the entire mass of the contaminants present in the sample will leach out during the acidic extraction process, a dilution factor of 20 can be applied to the total contaminant concentration to provide a maximum possible contaminant concentration obtainable in the leachate. Review of Table 1 indicates that for Trichloroethene (TCE) and Tetrachloroethene (PCE), in most cases, the concentration measured by TCLP procedures is equal to or greater than 1/20 of the total contaminant analyses. The result indicates that the majority of the contamination present in the silt layer is available to leaching processes under certain conditions such as those of the simulated landfill environment.

Historical Review of Ground Water Elevation Data

Geovation reviewed available ground water elevation data measured at the site. The most complete rounds of historic ground water sampling collected are summarized on Table 3. Review of this data indicates that the highest elevation of the ground water table was recorded on 17 May 2001 by Arcadis, Geraghty & Miller (Arcadis) . Geovation prepared a ground water contour map based on this data which is provided as Figure 5. The ground water contour diagram indicates that ground water flow across the site is primarily to the south. This observation is consistent with previous evaluations of ground water flow at the site.

Comparison of the highest recorded elevations of the ground water table with the lower contact of the silt layer (Figure 3) indicates that when the water table is high, ground water at least partially saturates the silt layer in the northern and western portions of the site. Figure 6 is a representation of the estimated area where, on 17 May 2001, the ground water table was higher in elevation than the lower contact of the silt layer and portions of the silt layer were saturated with ground water. An enlarged view of the estimated portion of the silt layer partially saturated by ground water in the vicinity of excavation in the northern portion of the facility is provided as Figure 7. The extent of the impacted silt layer is also shown on Figure 7. Based on this data, portions of the impacted silt layer become saturated by ground water when the water table is elevated.

Conclusions

Geovation collected soil samples from the silt layer inside the existing excavation at the northern end of the facility. Silt layer samples were collected from a depth of 18 to 24 inches into the excavation sidewalls and subsequently analyzed for volatile organic compounds (VOCs). Concentrations of VOCs reported in the silt layer samples were below the NYSDEC recommended soil cleanup objectives (RSCOs) (Table 1), and a diagram was prepared of the estimated extent of impacted silt based on this sampling and previous data (Figure 2). The extent of the impacted silt layer based on this sampling (Figure 2) and the silt layer thickness (Figure 4) were utilized to estimate the mass of impacted silt and remaining TCE contamination. Based on the calculations summarized on Table 3, Geovation estimates that approximately 0.64 pounds of TCE remain in the silt layer beneath the facility. Comparison of this mass to previous estimates of what was removed from the site during soil excavation activities indicates that 98% of the TCE contamination has been removed from the subsurface.

Comparison of silt layer samples analyzed by EPA Method 8260 with and without a TCLP extraction indicates that the contamination present in the silt layer is available to the simulated landfill leaching process.

Geovation summarized existing ground water elevation data (Table 4) and compared the maximum recorded ground water table elevation to the elevation of the lower contact of the silt layer, as identified in existing soil boring logs and well installation logs. This comparison indicates that at times when the ground water table is elevated, ground water saturates portions of the silt layer in the northern and western areas of the site (Figures 6 & 7).

Based on this summary of information collected to date, the impacted portion of the silt layer has the potential to act as an intermittent minor source of ground water contamination (in excess of NYSDEC ground water standards) during times of elevated ground water conditions. However, the mass of TCE remaining in the silt layer has been estimated to be relatively small (0.64 pounds), is accessible to leaching and therefore is amenable to remediation processes such as enhanced reductive dechlorination (ERD).

Sincerely,

Robert Zimmer, P.G.
Vice-President

Table 1: 19 April 2002 Silt Layer Sampling Results

Kings Electronics Facility: 40 Marbledale Road, Tuckahoe, NY

Prepared for: Kings Electronics Co. Inc.

Prepared by: Geovation Consultants, Inc.

Analyte	4/19/02 W	4/19/02 W TCLP	4/19/02 N	4/19/02 N TCLP	4/19/02 E	4/19/02 E TCLP	4/19/02 S	4/19/02 S TCLP	TRIP BLANK	NYSDEC TAGM*
	ug/Kg	*ug/l*	*ug/Kg*	*ug/l*	*ug/Kg*	*ug/l*	*ug/Kg*	*ug/l*	*ug/l*	*ug/Kg*
Benzene	4.6	ND	8.3	ND	5.1	ND	0.92	ND	ND	60
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	17,620
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	24,910
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	600
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,700
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,900
Chloroform	ND	ND	ND	ND	ND	ND	1.7	ND	ND	300
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2-Dibromomethane (EDB)	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2-Dichlorobenzene	3.7	ND	ND	ND	ND	ND	ND	ND	ND	7,900
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,550
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,500
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	400
cis-1,2-Dichloroethene	2.7	ND	ND	ND	ND	ND	ND	ND	ND	NGV
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	300
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	300
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	300
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,500
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Isopropyl benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,740
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Naphthalene	ND	ND	ND	ND	ND	ND	1.6	ND	ND	13,000
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,000
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,310
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	600
Tetrachloroethene	74	6.3	120	4.5	8.2	ND	4.8	1.2	ND	1,400
Toluene	4.1	ND	5.7	ND	5.9	0.8	0.8	ND	ND	1,500
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2,4-Trichlorobenzene	2.3	ND	ND	ND	ND	ND	ND	ND	ND	3,400
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	760
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Trichloroethene	670	37	680	42	66	5	43	14	ND	700
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	340
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	2.2	ND	ND	NGV
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	120
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,200
m&p-Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,200
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Total VOC's	**761.4**	**43.3**	**814**	**46.5**	**85.2**	**5.8**	**55.02**	**15.2**	**0**	

Notes:

ND Analyzed but not detected.

NGV No guidance value listed.

* NYSDEC TAGM (Technical and Administrative Guidance Memorandum 4046) Recommended Soil Cleanup Objectives

Table 2: Silt Layer Elevation Data

Kings Electronics

Marbledale Road, Tuckahoe, NY

Analyte	Upper Contact of the Silt Layer (relative to arbitrary datum)	Lower Contact of the silt Layer (relative to arbitrary datum)	Silt Layer Thickness (feet)
HP-1S	91.4	90.4	1
MW-7S	97.33	88.33	9
MW-9S	94	93.35	0.65
MW-12	89.87	89.12	0.75
PTW-1	93.75	93.3	0.45
GP-101	92.33	91.33	1
GP-103	98.07	90.07	8
GP-104	96.58	93.58	3
GP-105	92.33	89.83	2.5
GP-108	92.62	90.62	2
GP-109	92.67	84.17	8.5
GP-110	98.56	98.06	0.5
GP-111	89.87	87.87	2
GP-112	93.72	91.72	2
GP-115	96.56	96.06	0.5
GP-119	100.81	100.56	0.25
GP-120	100.81	100.71	0.1

Notes:

Table 3: Contaminant Mass Calculations

Kings Electronics Facility: 40 Marbledale Road, Tuckahoe, NY

Prepared for: Kings Electronics Co. Inc.
Prepared by: Geovation Consultants, Inc.

Within Isoconcentration Line ug/Kg	Not Including Within Isoconcentration Line ug/Kg	Average Contaminant Concentration ug/Kg	Average Contaminant Concentration g/Kg	Silt Thickness ft.	Area Per Thickness ft^2	Volume Per Thickness ft^3	Weight of Silt at 115lbs/ft^3 lbs	Weight of Silt Kg	Weight Of TCE g	Weight Of TCE lbs
100	350	225	0.000225	0.5	173	86.50	9,947.50	4,521.59	1.02	0.0022
				1.5	711	1,066.50	122,647.50	55,748.86	12.54	0.0276
				2.25	221	497.25	57,183.75	25,992.61	5.85	0.0129
350	700	525	0.000525	0.5	36	18.00	2,070.00	940.91	0.49	0.0011
				1.5	318	477.00	54,855.00	24,934.09	13.09	0.0288
				2.25	179	402.75	46,316.25	21,052.84	11.05	0.0243
700	28,000	14,350	0.01435	0.5	0	0.00	0.00	0.00	0.00	0.0000
				1.5	0	0.00	0.00	0.00	0.00	0.0000
				2.25	147	330.75	38,036.25	17,289.20	248.10	0.5458
				Totals	**1785**	**2,878.75**	**331,056.25**	**150,480.11**	**292.15**	**0.64**

Notes:

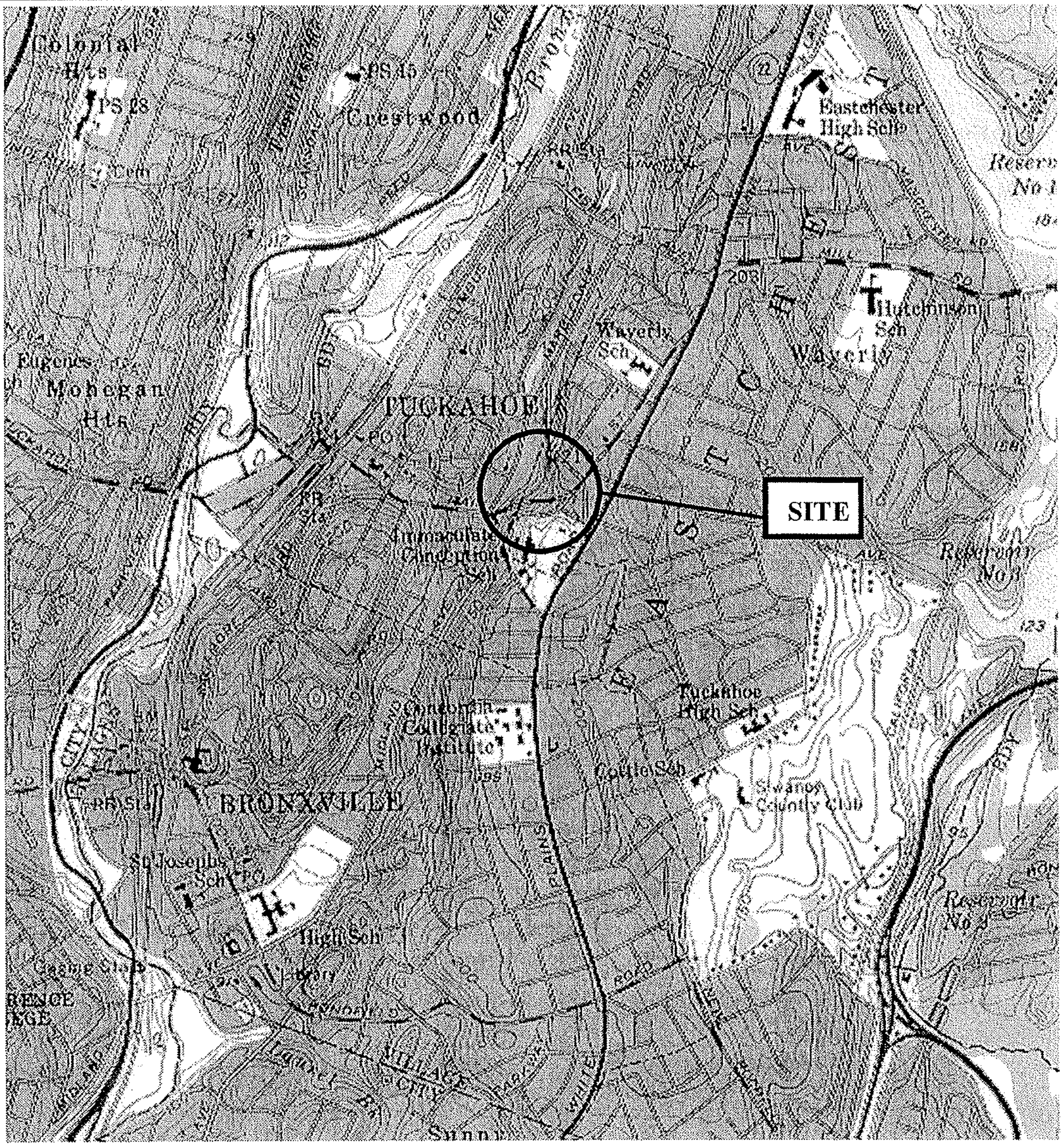
Table 4: Ground Water Elevation Data

Kings Electronics

Marbledale Road, Tuckahoe, NY

Analyte	Casing Elevation	Depth to Water 4/4/2000	Depth to Water 4/24/2000	Depth to Water 7/05/2000	Depth to Water 2/23/2001	Depth to Water 5/17/2001	Depth to Water 7/12/2001	Depth to Water 12/5/2001	Ground Water Elevation 4/4/2000	Ground Water Elevation 4/24/2000	Ground Water Elevation 7/05/2000	Ground Water Elevation 2/23/2001	Ground Water Elevation 5/17/2001	Ground Water Elevation 7/12/2001	Ground Water Elevation 12/5/2001
HP-1S	99.43	11.2	10.91	11.18	11.72	10.21	10.91	*NM*	88.23	88.52	88.25	87.71	89.22	88.52	*NM*
HP-1D	99.53	11.36	11.09	11.3	*NM*	10.32	11.02	*NM*	88.17	88.44	88.23	*NM*	89.21	88.51	*NM*
MW-HP-2S	100.65	12.11	11.86	*NM*	*NM*	11	11.74	*NM*	88.54	88.79	*NM*	*NM*	89.65	88.91	*NM*
MW-HP-2D	100.51	11.9	11.66	*NM*	*NM*	10.8	11.55	*NM*	88.61	88.85	*NM*	*NM*	89.71	88.96	*NM*
HP-6	100.47	11.22	10.93	*NM*	*NM*	*NM*	*NM*	*NM*	89.25	89.54	*NM*	*NM*	*NM*	*NM*	*NM*
MW-HP-8S	101.05	11.74	11.5	11.61	*NM*	10.49	11.28	14.73	**89.31**	**89.55**	**89.44**	*NM*	**90.56**	**89.77**	**86.49**
MW-HP-8D	101.11	11.86	11.63	11.75	*NM*	10.66	11.43	14.88	89.25	89.48	89.36	*NM*	90.45	89.68	86.23
MW-1	100.51	11.3	11.1	11.17	*NM*	10.13	10.86	*NM*	89.21	89.41	89.34	*NM*	90.38	89.65	*NM*
MW-2	100.12	10.98	10.92	10.8	*NM*	9.7	10.49	13.76	89.14	89.2	89.32	*NM*	90.42	89.63	86.36
MW-3	100.09	11.13	10.86	10.98	*NM*	9.93	10.68	13.97	88.96	89.23	89.11	*NM*	90.16	89.41	86.12
MW-4S	100.81	12.66	12.28	12.63	*NM*	11.64	12.38	15.51	88.15	88.53	88.18	*NM*	89.17	88.43	85.3
MW-4D	100.81	12.6	12.3	12.62	*NM*	11.64	12.34	*NM*	88.21	88.51	88.19	*NM*	89.17	88.47	*NM*
MW-5S	101.41	12.7	12.51	12.62	13.19	11.58	12.36	15.51	88.71	88.9	88.79	88.22	89.83	89.05	85.9
MW-5D	101.56	12.9	13.2	12.82	*NM*	11.78	12.62	14.35	88.66	88.36	88.74	*NM*	89.78	88.94	87.21
MW-6S	101.91	12.5	12.16	12.38	*NM*	11.3	12.05	15.57	**89.41**	**89.75**	**89.53**	*NM*	**90.61**	**89.86**	**86.34**
MW-6D	101.93	12.73	12.57	12.45	*NM*	11.33	12.14	15.56	89.2	89.36	89.48	*NM*	90.6	89.79	86.37
MW-7S	97.83	12.09	12.04	12.04	*NM*	11.04	11.78	14.93	85.74	85.79	85.79	*NM*	86.79	86.05	82.9
MW-7D	97.9	12.7	12.73	12.54	*NM*	11.59	12.4	15.32	85.2	85.17	85.36	*NM*	86.31	85.5	82.58
MW-9S	100.2	*NM*	*NM*	*NM*	*NM*	10.08	10.84	13.97	*NM*	*NM*	*NM*	*NM*	90.12	89.36	86.23
MW-9D	100.1	*NM*	*NM*	*NM*	*NM*	10.34	11.1	14.36	*NM*	*NM*	*NM*	*NM*	89.76	89	85.74
MW-10	103.24	*NM*	*NM*	*NM*	*NM*	12.87	13.68	16.96	*NM*	*NM*	*NM*	*NM*	**90.37**	**89.56**	**86.28**
MW-11	103.48	*NM*	*NM*	*NM*	*NM*	13.08	13.92	17.24	*NM*	*NM*	*NM*	*NM*	90.4	89.56	86.24
MW-12	103.52	*NM*	*NM*	*NM*	*NM*	13.15	13.97	17.31	*NM*	*NM*	*NM*	*NM*	**90.37**	**89.55**	**86.21**
IW-1	100.26	*NM*	*NM*	*NM*	*NM*	11.18	11.9	14.97	*NM*	*NM*	*NM*	*NM*	89.08	88.36	85.29
IW-2	99.68	*NM*	*NM*	*NM*	*NM*	10.53	11.26	14.41	*NM*	*NM*	*NM*	*NM*	89.15	88.42	85.27
IW-3	99.08	*NM*	*NM*	*NM*	*NM*	9.94	10.66	13.81	*NM*	*NM*	*NM*	*NM*	89.14	88.42	85.27
IW-4	98.62	*NM*	*NM*	*NM*	*NM*	9.52	10.22	13.35	*NM*	*NM*	*NM*	*NM*	89.1	88.4	85.27
PTW-1	99.8	*NM*	*NM*	*NM*	*NM*	10.5	11.23	14.39	*NM*	*NM*	*NM*	*NM*	89.3	88.57	85.41
PTW-2	99.9	*NM*	*NM*	*NM*	*NM*	10.7	11.39	14.23	*NM*	*NM*	*NM*	*NM*	89.2	88.51	85.67
GP-102S	98.48	14.79	14.69	14.81	*NM*	13.83	14.71	17.41	83.69	83.79	83.67	*NM*	84.65	83.77	81.07
GP-102D	98.31	15.91	14.88	*NM*	*NM*	13.97	14.82	17.53	82.4	83.43	*NM*	*NM*	84.34	83.49	80.78
GP-103	94.26	*NM*	*NM*	6.58	*NM*	5.55	6.3	9.3	*NM*	*NM*	87.68	*NM*	88.71	87.96	84.96
GP-104	94.22	*NM*	*NM*	*NM*	*NM*	5.17	5.92	9.05	*NM*	*NM*	*NM*	*NM*	89.05	88.3	85.17
GP-106	101.6	*NM*	*NM*	*Dry*	*NM*	12.2	13.06	16.15	*NM*	*NM*	*NM*	*NM*	89.4	88.54	85.45
GP-120	101.65	*NM*	*NM*	*NM*	*NM*	12.57	13.36	>15.46	*NM*	*NM*	*NM*	*NM*	89.08	88.29	<86.19
GP-121W	100.9	12.96	12.43	13.01	13.25	11.92	12.7	>14.93	*NM*	*NM*	87.89	87.65	88.98	88.2	<85.97

Notes:



SCALE 1:24000

1 ½ 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 .5 0 1 KILOMETER

N
W E
S

Source: USGS 7.5 Minute
Series Topographic Map
Mount Vernon NY 1956

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Innovative Solutions to Environmental Problems
FLORIDA, NEW YORK

Site Location Topographical Map

Kings Electronics, Tuckahoe, NY

FIGURE

1

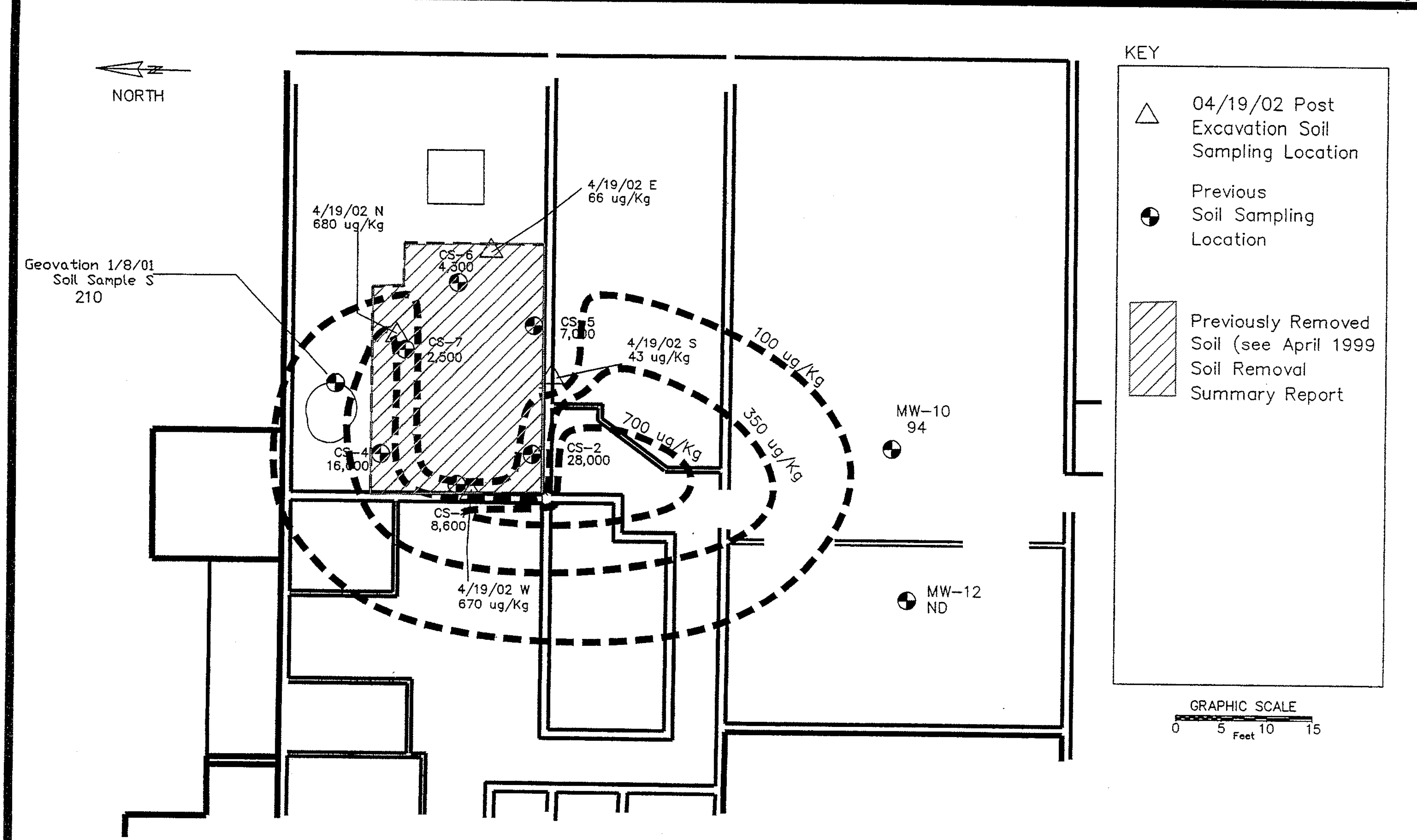

Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

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FLORIDA, NEW YORK

Iso-Concentration Diagram of TCE in Silt Layer
Concentration of TCE in ug/Kg
KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE
2

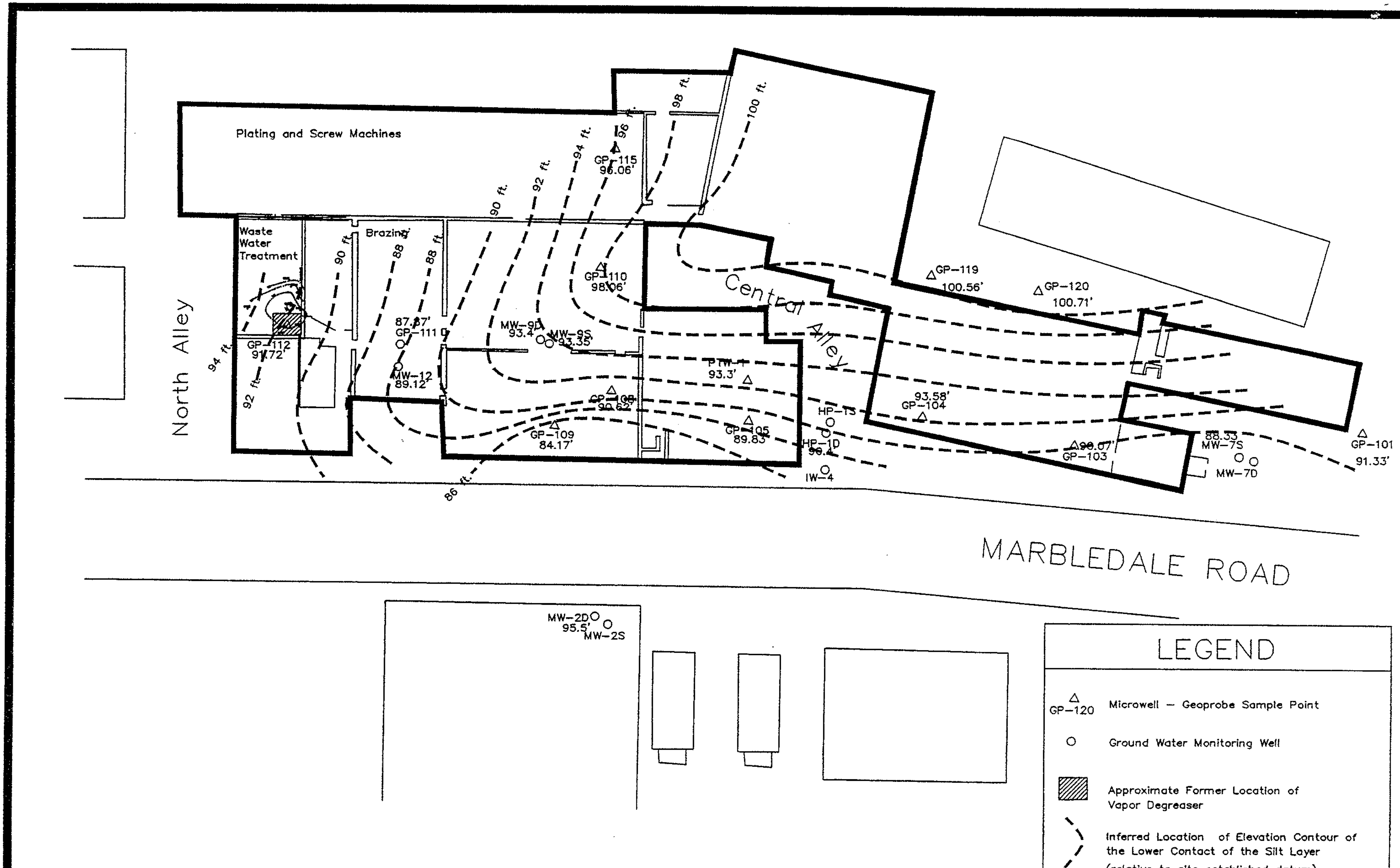

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Gram, Inc.

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Topography of the Lower Contact of the Silt Layer

Remedial Investigation

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 3

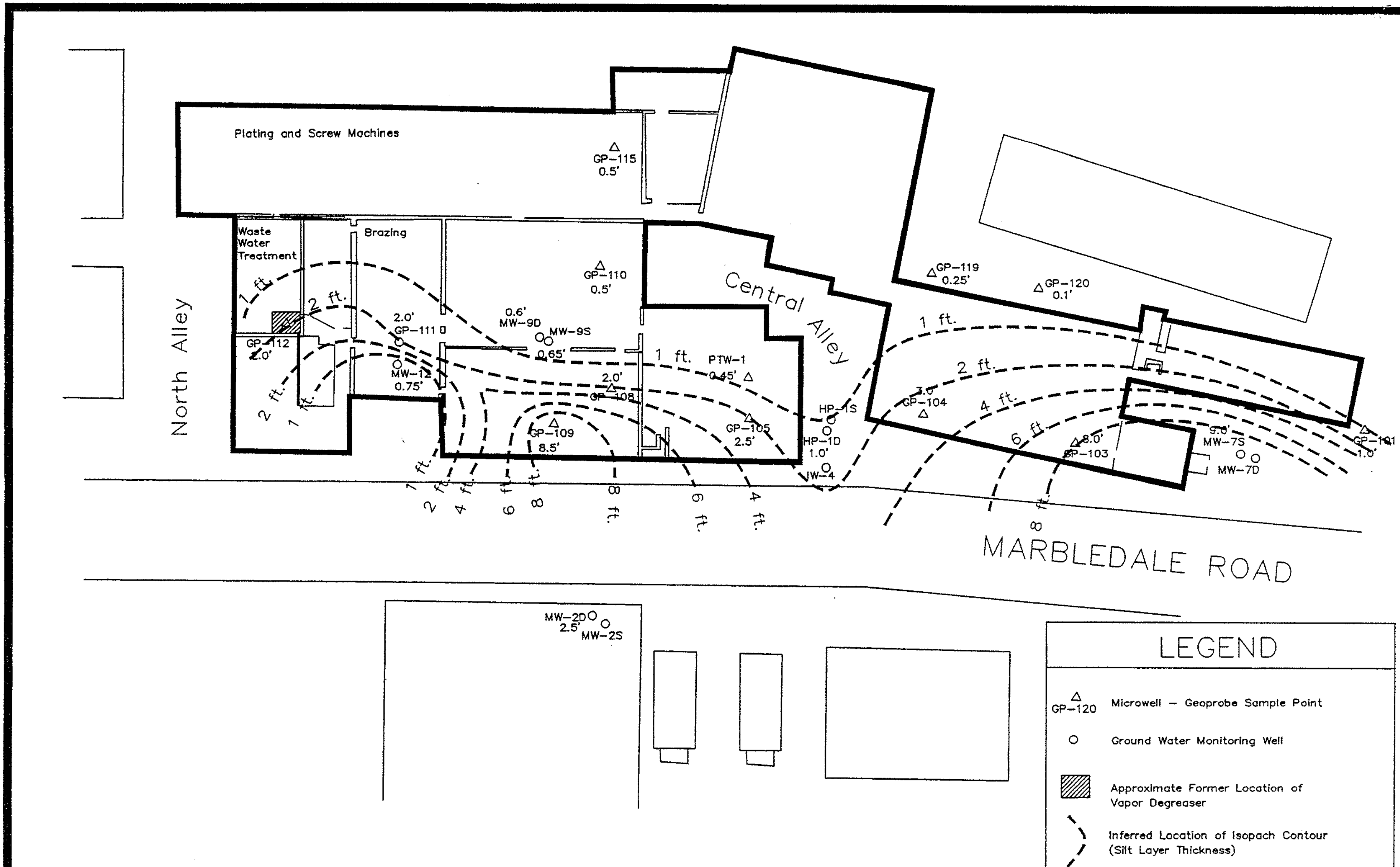

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Gram, Inc.

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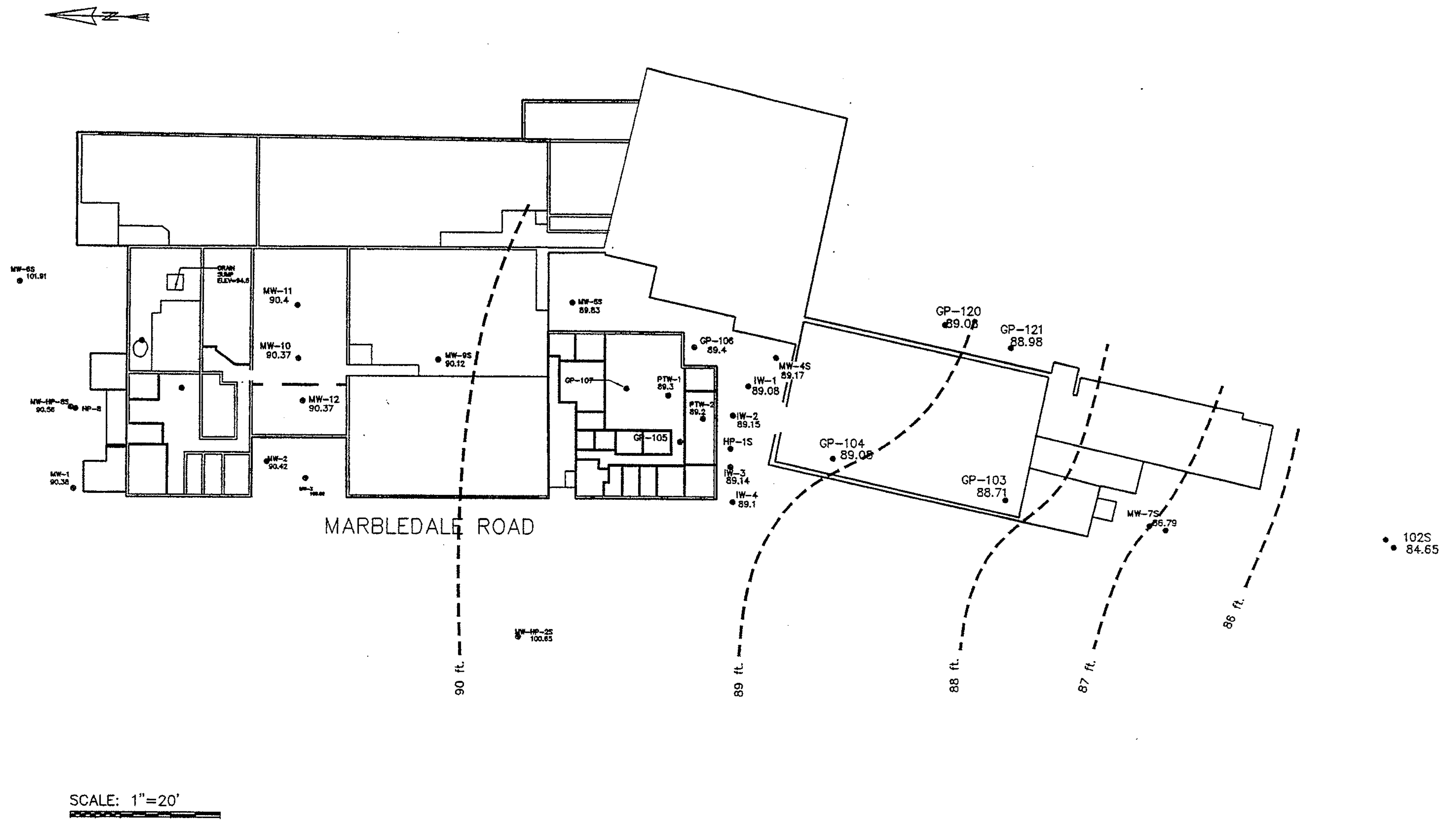
Silt Layer Isopach Map (Thickness)

Remedial Investigation

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE
4



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Ground Water Contour Diagram – 5/17/01

Remedial Investigation

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE

5

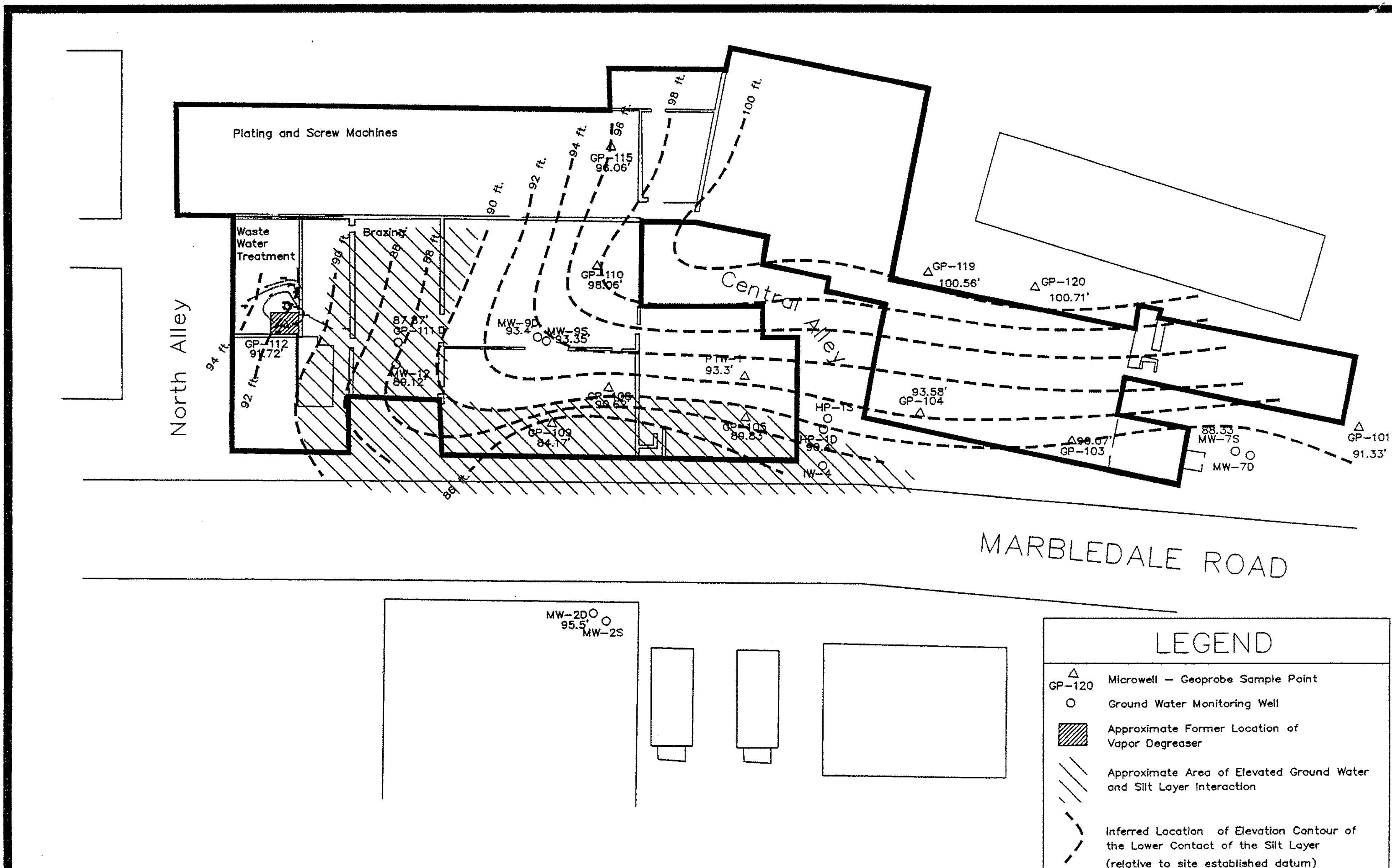

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Gram, Inc.

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Approximate Area of Elevated Ground Water and Silt Layer Interaction

Remedial Investigation

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 6

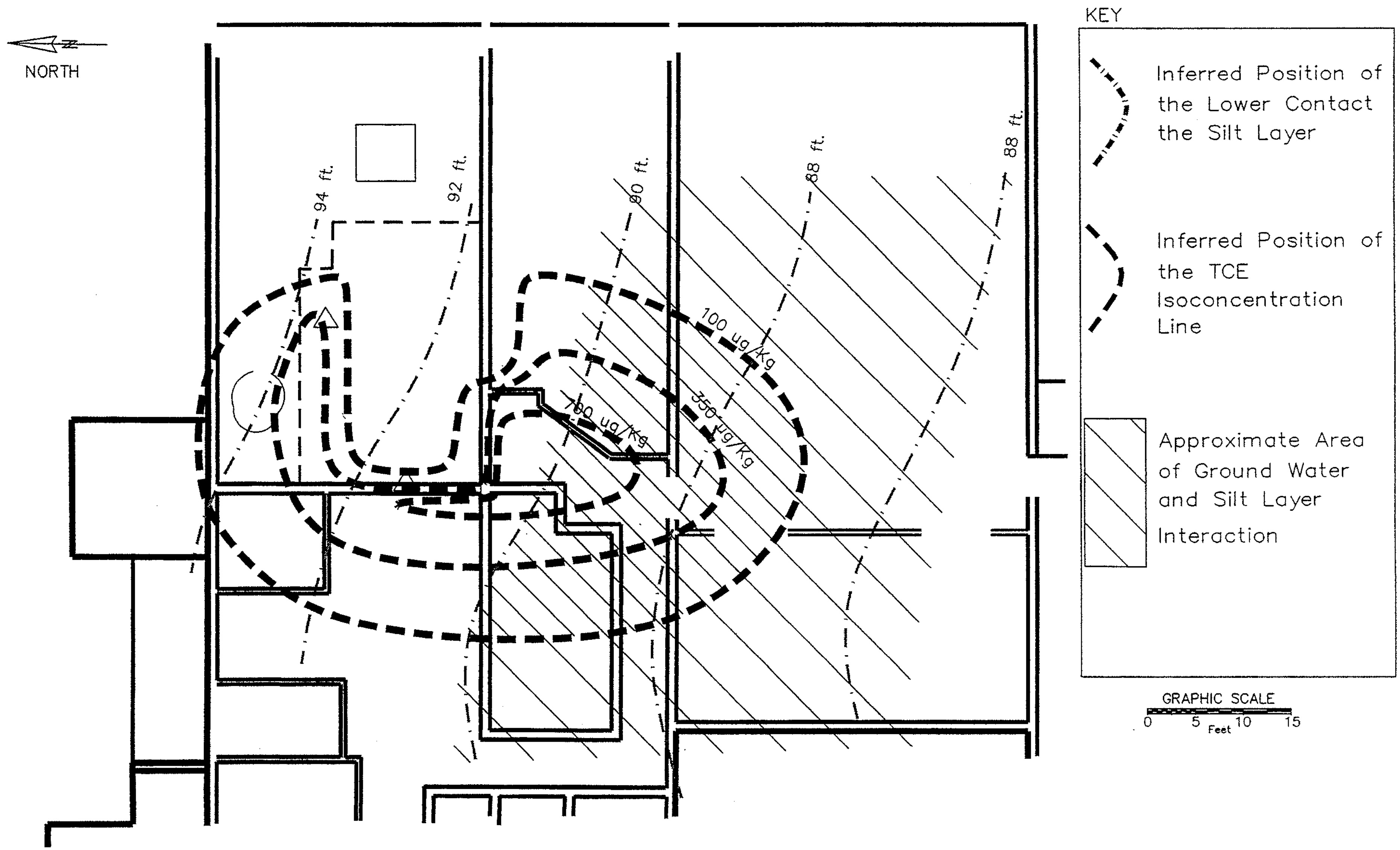

Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

GEOVATION GEOVATION CONSULTANTS, Inc. Innovative Solutions to Environmental Problems FLORIDA, NEW YORK	Approximate Area of Elevated Ground Water and Impacted Silt Layet Interaction Concentration of TCE in Soil (in ug/Kg) KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY	FIGURE 7

GEOVATION®
Geovation Consultants, Inc. • 468 Route 17A • P.O. Box 293 • Florida, NY • 10921
Phone: (845) 651-4141 • Fax: (845) 651-0040

12 July 2002

Bruce Munson
Kings Electronics Co., Inc.
670 White Plains Road
Scarsdale, New York 10583

Re: Additional Silt Layer Sampling and Silt Layer Summary Report Addendum
Kings Electronics Co., Inc. Tuckahoe Facility
NYSDEC Agreement #W3-0855-99-07
Voluntary Cleanup Program

Dear Mr. Munson,

As indicated in the *Additional Silt Layer Sampling and Silt Layer Summary Report*, this addendum provides the results of the Total Organic Carbon (TOC) sample analysis which was not available at the time the report was prepared.

As previously described, one soil sample was collected from the silt layer within the smaller excavation located to the north of the main excavation and submitted for analysis of total organic carbon. The silt layer at this location is not impacted above the NYSDEC recommended soil cleanup objectives (RSCOs), and this sample was collected to develop a site-specific soil cleanup objective for TCE.

Results of this soil sampling indicate that the TOC content of the silt layer is 2.9%. Based on this TOC content, the site-specific RSCO for Trichloroethene (TCE) within the silt layer is calculated to be 2,030 ug/kg. A copy of the original laboratory data for this analysis is attached to this addendum. The attachment also contains a copy of the original laboratory report for other sampling performed as part of the scope of work for the *Additional Silt Layer Sampling and Silt Layer Summary Report.*

Sincerely,

Robert Zimmer, P.G.
Vice-President

ARCADIS
Infrastructure, buildings, environment, communications

ARCADIS G&M, Inc.
1200 MacArthur Boulevard
Mahwah
New Jersey 07430
Tel 201 236 2233
Fax 201 236 5110
www.arcadis-us.com

Bruce M. Munson
Kings Electronics Co. Inc.
670 White Plains Road
Scarsdale, New York 10583

ENVIRONMENT

Subject:
NYSDEC Voluntary Cleanup Program Site No. W3-0855-99-07
Remedial Action Work Plan, Kings Electronics Co. Inc., Tuckahoe, New York

Date:
10 July 2002

Contact:
M. Mohiuddin

Dear Mr. Munson:

ARCADIS is providing this letter in accordance with the New York State Department of Environmental Conservation (NYSDEC) letter dated June 4, 2002 regarding the above-referenced site. In the letter, the NYSDEC requested that the On-Site Remedial Action Work Plan be signed and sealed by a professional engineer licensed to practice in the State of New York. In subsequent conversations with the NYSDEC, Kings was authorized to provide this letter, restating that the remedial action was selected with consideration of the factors outlined in Section 1.10 Part 375 of the Official Compilation of Codes, Rules and Regulations of the State of New York. These factors, and the considerations of the selected remedy are summarized below.

Compliance with Standards, Criteria, and Guidance

The evaluation of compliance with applicable or relevant and appropriate requirements (ARARs) for the remedial action includes the consideration of the following; 1) chemical-specific ARARs, 2) action-specific ARARs, and 3) location-specific ARARs. Furthermore, in the event that ARARs cannot be attained by the remedial actions, appropriate waivers justifying this deficiency must be cited. It is anticipated that the remedial action outlined will have capability in being able to meet the ARARs outlined. However, in each case, it should be recognized that compliance with ARARs, particularly contaminant specific ARARs, may be hindered by the overall limitations of the remedial technologies available due to the recalcitrant nature of the constituents present, such as chlorinated volatile organic compounds (CVOCs).

Overall Protection of Public Health and the Environment

The proposed remedial action, upon completion of implementation, would provide protection of human health and the environment. The active portions of the remedial action, combined with the ongoing natural attenuation will afford this protection. Although the constituents in the groundwater given the lack of exposure pathways present no risk, the proposed remedial action will also provide restoration of groundwater quality at the site, to the extent practicable.

Short Term Effectiveness

The evaluation of the short-term effectiveness of the remedial action included:
1) Consideration of the protection of the community during the remedial action(s);
2) The protection of workers during the construction phase of the remedial actions;
3) The environmental impacts resulting from the remedial actions, and
4) The length of time required achieving the remedial response objectives.

Protection of the Community

Short-term risks to public health associated with the remedial action are limited to earthwork and/or trenching for the installation of insitu remedial zone (IRZ) system. Dust suppression measures will be taken to control dust generated during the construction activities and to limit potential public exposure. No additional short-term risks have been identified based on the fact that all activities will be conducted on-site.

Protection of the Workers

Workers will require appropriate personal protection, during drilling, earthwork/excavating activities, and installation of the in-situ reactive zone system.

Environmental Impacts

Adverse environmental impacts are not expected during construction of the proposed remedial system.

Time Until Response Objectives are Achieved

The proposed remediation will increase the natural degradation of CVOCs in the groundwater by establishing an in-situ reactive zone. The time is dependent on the site characteristics.

Long Term Effectiveness

The evaluation of the long-term effectiveness and permanence of this action includes the following factors: 1) consideration of the magnitude of residual risks after implementation, 2) the adequacy of controls, and 3) the reliability of controls.

1) Magnitude of Residual Risks: The groundwater underlying the site is not a source of potable water, nor is it expected to be in the future. Hence, no long-term risk is associated with the action.

2) Adequacy of Controls: Monitoring will be conducted during the remedial activities at the site, including the monitoring of natural attenuation of constituents in groundwater at the site. This combination of remedial technologies is expected to meet the performance requirements for the contaminants of concern (COCs) and monitoring will continue until remedial objectives are achieved.

3) Reliability of Controls: Proper operation and maintenance of the equipment associated with the in-situ reactive zone must be maintained.

Reduction of Toxicity, Mobility and Volume with treatment

The evaluation of the reduction of toxicity, mobility, or volume for the remedial action includes consideration of:

1) The treatment process and remedy,
2) The amount of COCs destroyed or treated,
3) The reduction in toxicity, mobility, and volume of the COCs or impacted groundwater,
4) The irreversibility of the treatment, and
5) The type and quantity of treatment residual.

Treatment Process and Remedy

The CVOCs will be treated by enhanced bioremediation through establishment of an IRZ. The ability of this remedial process to treat constituents has been documented.

Amount of Hazardous Materials Destroyed or Treated

The proposed enhanced bioremediation is expected to degrade the COCs to non toxic compounds in-situ.

Irreversibility of Treatment

The proposed remediation technique is generally irreversible and will permanently remove constituents from the impacted groundwater. Permanent treatment of groundwater will be achieved through IRZ, which breaks down constituents, such as CVOCs, to less toxic forms. In addition, ongoing natural attenuation of groundwater impacts will also provide permanent treatment.

Type and Quantity of Treatment Residual

Residuals are not expected in the proposed remedial technique.

Feasibility

Technical Feasibility

The evaluation of the technical feasibility of implementing this remedial action includes;

1) Ability to Construct Technologies: Remedial action will involve the installation of injection wells for the IRZ technology and, possibly, a storage and distribution system for the injection substrate. All construction activities associated with this remedial action will take place on the site and are technically feasible.

2) Reliability of Technologies: This treatment technology is a proven treatment method for removing organic constituents from groundwater. Additional monitoring will be required to monitor the in-situ processes (i.e., natural attenuation as well as IRZ) for removal of constituents from the groundwater over time. However, available industry data indicates these in-situ techniques are reliable if properly applied..

3) Ease of Undertaking Additional Remedial Action: Under this remedial action, system expansions or modifications would be feasible. Based on system performance, the remedies may be modified to achieve the Remedial Action Objectives.
4) Monitoring Requirements: A periodic groundwater monitoring program will be implemented to monitor the overall effectiveness of the remedy as well as to evaluate COC removal via natural attenuation.

Feasibility – Administrative Feasibility

The proposed remedial action will require continued performance monitoring.

Feasibility – Availability of Services and Materials

The evaluation of the availability of services and materials for implementing this remedial action includes consideration of 1) the availability of treatment, storage capacity, and disposal services, 2) the availability of necessary equipment and specialists, and 3) the availability of prospective technologies.

1) Availability of Treatment, Storage Capacity, and Materials: Holding and storage tanks for the molasses may be required.
2) Availability of Equipment and Specialists: Minimal specialized contractors or training would be required for this remedial action.
3) Availability of Selected Technology: The selected remedial action utilizes readily available equipment and materials.

Community Acceptance

This is an in-situ technology with minimum disturbance. This technology is usually accepted by the community.

As a professional engineer, licensed to practice by the State of New York, I certify that the remedial action contained within the On-Site Remedial Action Work Plan, was selected with consideration of the factors outlined in Section 1.10 Part 375 of the Official Compilation of Codes, Rules and Regulations of the State of New York as summarized in this letter.

If you have any questions or require anything additional, please feel free to contact me or Kevin McGuinness at (201) 236-2233.

Sincerely,

ARCADIS Engineers & Architects of New York, P.C.

Moh Mohiuddin, Ph.D., P.E., DEE
NY PE #074527-1

Copies:
D. Wanamaker, Environmental Management, Ltd.
K. McGuinness

ATTACHMENT 4

KINGS
ELECTRONICS CO., INC.
670 WHITE PLAINS ROAD | SCARSDALE, NEW YORK 10583 | 914-793-5000 | FAX 914-793-5092

May 10, 2002

CERTIFIED
RETURN RECEIPT REQUESTED

Tanya Reinhard, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, New York 12561-1696

Re: Monthly Progress Report, DEC Agreement #W3-0855-99-07
Voluntary Cleanup Program (VCP #V00237-3)
Kings Electronics Co., Inc.
40 Marbledale Road
Tuckahoe, New York 10707

Dear Ms. Reinhard:

ON-SITE ACTIVITIES THIS PAST MONTH:

In-situ Reactive Zone (IRZ) – Pilot Test Area

Attached are summary tables of the analytical results from the groundwater sampling of injection well PTW-1 (GP-105 and GP-107 continue to be dry) and selected pilot study performance monitoring wells conducted by ARCADIS on Thursday, March 28, and Thursday, April 11, 2002. **Note**: only PTW-1 was sampled on both days.

An injection of 200 gallons of molasses solution was performed at GP-105 on April 11, 2002. There were no injections on March 28.

On Thursday, April 25, 2002, seven monitoring wells were sampled for biogeochemical parameters and volatile organics. Results will be reviewed and validated for quality assurance when received by ARCADIS. PTW-1 was also sampled for DOC/TOC. GP-105 and GP-107 were dry. No injections were performed.

Purge Water Use as a Molasses Diluent

Results from the resampling, on April 11, of monitoring well MW-2 are also attached. Total chlorinated volatile organic compounds (CVOC) concentration within MW-2 remain well below those encountered in the pilot test area (see PTW-2). As reported last month, ARCADIS is refining their proposed method of extracting and using purge water from this well as a molasses diluent, taking into consideration the concern expressed by Dr. Anders (see Item #18 of her March 21, 2002 letter).

Since total CVOC concentration is well below the IRZ area, purge water from MW-2 will be used as a molasses diluent during the next injection, pending favorable biogeochemical parameters within the IRZ.

Silt Lens

As discussed within Kings May 7, 2002 letter and in order to address Dr. Anders comment #8 of the March 21st letter, enclosed please find replacement pages for Appendix B of the On-Site Remedial Action Work Plan, and Appendix B of Geovation's Additional Site Investigation Activities Report, February 8, 2002, correcting the silt lens trichloroethene (TCE) concentration reported for sample CS-2.

Regarding Dr. Anders comment #9 concerning "on-site soil contamination" please refer to Kings May 7th letter relating to operable units and investigation of the silt lens.

Off-Site Groundwater Contamination

In order to address Dr. Anders comments #5, #6 and #7 as well as your Work Plan issue #8 and Remedial Design issue #2 of your March 18 response related to the On-site RAWP, please see the enclosed "Preliminary Regional Ground Water Characterization Report" dated May 9, 2002 prepared by Geovation Consultants, Inc.

In addition, and as reported within Kings May 7th letter regarding "operable units", the two off-site sentinel wells are, at this time, planned to be on the west side of Marbledale Road, south of Marble Place and north of Main Street. Based on Kings meeting with Village of Tuckahoe officials, one monitoring well will be inside the Park fence, close to Marbledale Road (see Figure 2 of Geovation report – tentative location between GS-1 and GCI-7). A second monitoring well will be upgradient of this well, west of Marbledale Road, and between the Park and Marble Place (see Figure 2 – tentative location between GS-5 and GS-3).

MAY ACTIVITIES:

ARCADIS resampled injection well PTW-1 on Thursday May 9th. Performance monitoring wells are scheduled to be reevaluated within two weeks. A molasses injection at PTW-1, GP-105 or GP-107 that may utilize MW-2 purge water as a diluent, pending favorable biogeochemical parameters, may be performed at that time.

As earlier reported within our letter of May 7, Kings expects to have received Geovation's silt lens report by June 15, 2002. Based on this report, further discussion relating to the need for institutional controls to prevent future exposures to this residual soil contamination may be appropriate.

Very truly yours,

Bruce M. Munson

Bruce M. Munson
Corporate Environmental Manager

Enclosures:

- Summary Tables … GP-105, PTW-1, PTW-2, MW-HP-15, GP-104 and MW-2
- Replacement pages
- Geovation "Preliminary Regional Ground Water Characterization Report"

pc:

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Director of Bureau of Environmental Exposure Investigation
New York State Department of Health
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Troy, New York 12180-2216

Anthony Quartararo, Esq.
New York State Department of Environmental Conservation
Division of Environmental Enforcement
625 Broadway, 14th Floor
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Donald J. Wanamaker, President
Environmental Management Ltd. (EML)
41 Franck Road
Stony Point, New York 10980

Charles Goldberger, Esq.
McCullough, Goldberger & Staudt
1311 Mamaroneck Avenue
White Plains, New York 10605

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

GP-105	2/14/02	3/14/02	4/11/02
Field Parameters			
DO (mg/L)	--	--	--
REDOX (mV)	--	--	--
pH	--	--	--
Conductivity (mS/cm)	--	--	--
TOC (mg/L)	--	--	--
DOC (mg/L)	--	--	--
Chlorinated VOCs			
Trichloroethene			
cis-1,2-Dichloroethene			
trans-1,2-Dichloroethene			
Vinyl Chloride			
1,1-Dichloroethene			
1,1,1-Trichloroethane			
Tetrachloroethene			
Biogeochemical Parameters			
Carbon Dioxide (mg/L)			
Nitrogen (mg/L)			
Methane (ug/L)			
Ethane (ng/L)			
Ethene (ng/L)			
Sulfide (mg/L)			
Ferrous Iron (mg/L)			
Dissolved Iron (ug/L)			
Total Iron (ug/L)			
Dissolved Manganese (ug/L)			
Total Manganese (ug/L)			
Alkalinity (mg/L)			
Chloride (mg/L)			
Nitrate (mg/L)			
Nitrite (mg/L)			
Sulfate (mg/L)			
Total Phosphorus (mg/L)			
Molasses Ratio	20:1	20:1	20:1
Total Volume Injected (gallons)	200	200	200

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

PTW-1	2/14/02	2/28/02	3/14/02	3/28/02	4/11/02
<u>Field Parameters</u>					
DO (mg/L)	--	--	0.26	--	--
REDOX (mV)	--	-223.7	-62.3	45.7	-70.3
pH	--	4.84	5.28	4.64	4.96
Conductivity (mS/cm)	--	9.279	10.75	8.492	9.306
TOC (mg/L)	--	2230	13800	14400	15800
DOC (mg/L)	--	1970	12700	12100	15300
<u>Chlorinated VOCs</u>					
Trichloroethene					
cis-1,2-Dichloroethene					
trans-1,2-Dichloroethene (ug/L)					
Vinyl Chloride (ug/L)					
1,1-Dichloroethene (ug/L)					
1,1,1-Trichloroethane (ug/L)					
Tetrachloroethene (ug/L)					
<u>Biogeochemical Parameters</u>					
Carbon Dioxide (mg/L)					
Nitrogen (mg/L)					
Methane (ug/L)					
Ethane (ng/L)					
Ethene (ng/L)					
Sulfide (mg/L)					
Ferrous Iron (mg/L)					
Dissolved Iron (ug/L)					
Total Iron (ug/L)					
Dissolved Manganese (ug/L)					
Total Manganese (ug/L)					
Alkalinity (mg/L)					
Chloride (mg/L)					
Nitrate (mg/L)					
Nitrite (mg/L)					
Sulfate (mg/L)					
Total Phosphorus (mg/L)					
Molasses Ratio	WATER	NI	20:1	NI	NI
Total Volume Injected (gallons)	100	NI	200	NI	NI

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

PTW-2	1/17/02	4/11/02
Field Parameters		
DO (mg/L)	0.09	0.06
REDOX (mV)	-118.8	-45.6
pH	6.85	6.61
Conductivity (mS/cm)	1.424	1.601
TOC (mg/L)	6.56	--
DOC (mg/L)	4.78	--
Chlorinated VOCs		
Trichloroethene	2890	681
cis-1,2-Dichloroethene	3610	3190
trans-1,2-Dichloroethene	0	0
Vinyl Chloride	0	0
1,1-Dichloroethene	0	0
1,1,1-Trichloroethane	0	0
Tetrachloroethene	0	0
Biogeochemical Parameters		
Carbon Dioxide (mg/L)	89	
Nitrogen (mg/L)	14	
Methane (ug/L)	1000	
Ethane (ng/L)	160	
Ethene (ng/L)	320	
Sulfide (mg/L)	0.007	
Ferrous Iron (mg/L)	25.75	
Dissolved Iron (ug/L)	21600	
Total Iron (ug/L)		
Dissolved Manganese (ug/L)		
Total Manganese (ug/L)		
Alkalinity (mg/L)		
Chloride (mg/L)		
Nitrate (mg/L)		
Nitrite (mg/L)		
Sulfate (mg/L)	56.4	
Total Phosphorus (mg/L)		

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

MW-HP-1S	1/3/02	1/17/02	2/14/02	4/11/02
Field Parameters				
DO (mg/L)	0.76	0.25	0.3	--
REDOX (mV)	-25.3	-48.7	-115	-114.6
pH	5.73	5.87	5.48	6.2
Conductivity (mS/cm)	4.932	5.623	4.627	3.007
TOC (mg/L)	4840	4780	3560	1120
DOC (mg/L)	3280	4770	3070	1070
Chlorinated VOCs				
Trichloroethene		0		
cis-1,2-Dichloroethene		2800		
trans-1,2-Dichloroethene		0		
Vinyl Chloride		0		
1,1-Dichloroethene		0		
1,1,1-Trichloroethane		0		
Tetrachloroethene		0		
Biogeochemical Parameters				
Carbon Dioxide (mg/L)		680		
Nitrogen (mg/L)		5.1		
Methane (ug/L)		5100		
Ethane (ng/L)		22		
Ethene (ng/L)		330		
Sulfide (mg/L)		0.031		
Ferrous Iron (mg/L)		OR		
Dissolved Iron (ug/L)		1470000		
Total Iron (ug/L)				
Dissolved Manganese (ug/L)				
Total Manganese (ug/L)				
Alkalinity (mg/L)				
Chloride (mg/L)				
Nitrate (mg/L)				
Nitrite (mg/L)				
Sulfate (mg/L)		59.5		
Total Phosphorus (mg/L)				

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

GP-104	1/16/02	2/14/02	4/11/02
Field Parameters			
DO (mg/L)	1.42	--	0.27
REDOX (mV)	74.8	98	65.2
pH	6.74	6.63	6.7
Conductivity (mS/cm)	1.209	1166	1.312
TOC (mg/L)	10.8	5.14	2.73
DOC (mg/L)	2.92	2.86	2.62
Chlorinated VOCs			
Trichloroethene	6680		
cis-1,2-Dichloroethene	343		
trans-1,2-Dichloroethene	0		
Vinyl Chloride	0		
1,1-Dichloroethene	0		
1,1,1-Trichloroethane	0		
Tetrachloroethene	0		
Biogeochemical Parameters			
Carbon Dioxide (mg/L)	53		
Nitrogen (mg/L)	18		
Methane (ug/L)	3		
Ethane (ng/L)	160		
Ethene (ng/L)	150		
Sulfide (mg/L)	0.002		
Ferrous Iron (mg/L)	0.02		
Dissolved Iron (ug/L)	0		
Total Iron (ug/L)			
Dissolved Manganese (ug/L)			
Total Manganese (ug/L)			
Alkalinity (mg/L)			
Chloride (mg/L)			
Nitrate (mg/L)			
Nitrite (mg/L)			
Sulfate (mg/L)	69		
Total Phosphorus (mg/L)			

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

MW-2	7/29/98	4/6/00	7/5/00	7/12/01	2/28/02	4/11/02
Field Parameters						
DO (mg/L)		0.47	0.86	1.07	1.02	0.22
REDOX (mV)		130	157.4	90.5	-2.1	132.8
pH		6.43	6.41	6.5	5.69	6.31
Conductivity (mS/cm)			0.593	0.756	0.926	0.746
TOC (mg/L)			19.4			
DOC (mg/L)			14.1			
Chlorinated VOCs						
Trichloroethene	260	90.8		9	79.8	24.8
cis-1,2-Dichloroethene	270	56		7	101	17.8
trans-1,2-Dichloroethene	2.4	1.3		0	0	0
Vinyl Chloride	160	16		2	9.19	0
1,1-Dichloroethene	7.2	0		0	0	0
1,1,1-Trichloroethane		1.4		0	0	0
Tetrachloroethene	1.9	3.5		0	1.22	1.43
Biogeochemical Parameters						
Carbon Dioxide (mg/L)			60.86		120	
Nitrogen (mg/L)					13	
Methane (ug/L)			0.624		140	
Ethane (ng/L)			1914		440	
Ethene (ng/L)			1372		2000	
Sulfide (mg/L)			0.006		0	
Ferrous Iron (mg/L)			0.01		3.51	
Dissolved Iron (ug/L)			0		10000	
Total Iron (ug/L)			21.6		10000	
Dissolved Manganese (ug/L)			555		1170	
Total Manganese (ug/L)			502		1160	
Alkalinity (mg/L)			138		228	
Chloride (mg/L)			43.3		139	
Nitrate (mg/L)			5.06		0	
Nitrite (mg/L)			0		0	
Sulfate (mg/L)			105		36.7	
Total Phosphorus (mg/L)					0.057	
Acetic Acid					0	
Butyric Acid					0	
Propianic Acid					0	
Pyruvic Acid					0	

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May 7, 2002

Tanya Reinhard, Project Manager
New York State Department of Environmental Conservation (DEC)
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, New York 12561-1696

Re: Voluntary Cleanup Program (VCP) # V00237-3
DEC Agreement #W3-0855-99-07
Kings Electronics Co., Inc.
40 Marbledale Road
Tuckahoe, New York 10707

Dear Ms. Reinhard:

As we discussed this morning regarding "operable units", Kings on-site Remedial Action Work Plan (RAWP) is, by design, addressing only the enhanced in-situ bioremediation of on-site groundwater recommended by ARCADIS.

Investigation of the silt lens, which has always been reported to be above the groundwater table, is not yet complete and may need to be considered a separate operable unit. As reported earlier, the source (i.e., degreaser) area was excavated, through the silt lens, to the water table. Analytical results of soils below and above the silt lens (i.e., from within the excavation hole) have consistently met (i.e., have been reported below) recommended soil cleanup objectives. Kings Site Investigation Workplan (expanded by letter correspondence) has been the vehicle to communicate silt lens/soil findings to DEC. This letter correspondence (along with Kings next, i.e., May 10th, progress report) is our response to Dr. Anders comments #8 and #9 of her March 21, 2002 letter addressed to you.

Since the silt lens cannot be further excavated (within a reasonable cost) and it has been extensively studied in order to determine if this relatively thin natural soil layer acted as a barrier for trichloroethylene (TCE) migration beneath the building, a decision to recommend institutional controls may be warranted at sometime in the future. In the meantime, Kings respectfully requested (April 26, 2002) that DEC and Department of Health (DOH) proceed with the review of the amended on-site RAWP provided by ARCADIS prior to receiving the silt lens investigation report (expected to be completed June 15th, 2002).

Environmental Management, Ltd. (EML), as consultant to Kings, has been verbally assured by ARCADIS that if the silt lens residual contamination was a concern to successfully remediate the on-site groundwater, they (ARCADIS) would have recommended an applicable and appropriate treatment technology for that additional media.

Concerning off-site groundwater issues, ARCADIS has only been authorized (to date) to develop and implement an on-site groundwater remedial strategy. As earlier reported to DEC, Kings has already implemented the off-site investigation and plume delineation, has already discussed this issue with Village of Tuckahoe officials, and is using various resources (ARCADIS, Geovation Consultants Inc., public records, etc.) to delineate the contaminant plume (including any westerly component) and flow pattern along Marbledale Road. A report summarizing the known information about the off-site contaminant plume is expected to be submitted by May 10th, 2002. At this time, and based partly on our meeting of December 13, 2001, Kings is planning the installation of two sentinel wells in order to monitor the extent and rate of contaminant degradation within the off-site downgradient groundwater plume. Timing for the installation of said wells is within sixty (60) days of Kings receiving an approved on-site RAWP.

In summary, and as reported within Kings April 26, 2002 correspondence, both of these issues (silt lens and off-site investigation/plume delineation) are being separately managed by Kings and, therefore, Kings respectfully requested both DEC and DOH review the amended on-site RAWP as written by ARCADIS. It is our understanding that after addressing both DEC and DOH comments on the draft on-site RAWP, the on-site RAWP could be approved <u>prior</u> to receiving results of the additional investigation activities involved in the silt lens and the off-site investigation/plume delineation issues. Design of a full-scale on-site groundwater treatment system is not affected by either issue.

Kings will continue managing both activities (silt lens and off-site issues) during ARCADIS's design and implementation of the on-site remediation work (once approved). Based on their last submittal, ARCADIS has proposed to complete and submit the remedial design within sixty (60) days of approval of the on-site RAWP.

In closing, both Kings and the potential purchaser are anxiously awaiting the approved on-site RAWP.

Please advise.

Very truly yours,

Environmental Management, Ltd.

Donald J Wanamaker

Donald J. Wanamaker
President

cc: Bruce Munson
Corporate Environmental Manager
Kings Electronics Co., Inc.

Krista M. Anders, Ph.D.
Assistant Sanitary Engineer
State of New York Department of Health

GEOVATION®

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09 May 2002

Bruce Munson
Kings Electronics Co., Inc.
670 White Plains Road
Scarsdale, New York 10583

Re: Preliminary Regional Ground Water Characterization Report
Kings Electronics Co., Inc. Tuckahoe Facility
NYSDEC Agreement #W3-0855-99-07
Voluntary Cleanup Program

Dear Mr. Munson,

Geovation Consultants, Inc. (Geovation) was contracted by Kings Electronics Co., Inc. (Kings) to review existing information regarding the regional ground water quality and flow regime in the area of the Kings facility located at 40 Marbledale Rd. in Tuckahoe, NY. Geovation reviewed standard USGS Topographic maps of the area to predict regional shallow ground water flow paths and reviewed ground water data collected from monitoring wells and temporary well points to evaluate on-site and offsite ground water quality. As has been previously reported, the hydrogeologic interpretation which follows is specific to the shallow unconfined water table aquifer. Ground water flow in deeper and/or confined units is not addressed by this document.

Regional Ground Water Flow Paths

Geovation reviewed both the most recent, 1995, and historical 1956 *Mount Vernon*, United States Geological Survey (USGS) 7.5 minute topographic maps which include the area of the Kings Electronics facility (N4052.5-W7345/7.5). Comparison of these maps indicates little change in the information presented in the vicinity of the site. In general, these maps provide a 10 foot contour interval of the area and show relatively steep sided ridges and valleys trending from north-to-south to northeast-southwest.

The Kings facility is located in an approximately north-south trending valley (elevation 120 feet msl.) located between north-south ridges which rise to an elevation of more than 170 ft. msl. to the west and 230 ft. msl. to the east. Figure 1 depicts the approximate outline of the Kings facility overlain onto the historical 1956 *Mount Vernon* USGS topographic map. This figure clearly shows the north-south/northeast-southwest trending valley in which the Kings facility is located and the flanking topographic ridges. Also provided on the figure are the calculated shallow ground water contour lines based on data collected in

December 2001, previously reported in Geovation's 6 February 2002 *Additional Site Investigation Activities* report and provided as Figure 4. Based on the topography provided on this (circa 1956) map and the previously calculated shallow ground contour lines, Geovation predicted the ground water flow paths for the valley in which the Kings facility is located. Predicted ground water flow paths are shown on Figure 1 as bold blue lines.

Predicted ground water flow lines and previously calculated ground water contours are consistent in this interpretation of regional ground water flow. The ground water flow path drawn down the center of the valley is located approximately mid-way between the 120 foot contour lines marking the eastern and western extents of the valley. The valley itself expresses a moderate to shallow dip in the southerly direction. Ground water flow paths are predicted to run perpendicular to topographic and ground water contour lines. The predicted flow paths show ground water flow from the ridges downward to the east and west toward the center of the valley and southerly flow down the valley itself. This interpretation of ground water flow is consistent with previous interpretations of ground water flow at the site.

This traditional interpretation of ridge/valley ground water flow consists of ground water flow down the valley fed by ground water flow towards the center of the valley from each flanking ridge, thus there is a component of ground water flow toward the center of the valley from each side. As shown in Figure 1, the Kings facility is primarily located on the eastern side of the valley and it is likely that water miscible contamination released at the facility would remain in the eastern or central portion of the valley due to the predicted eastward flow of groundwater off the ridge located to the west.

Analysis of Existing Ground Water Data

Geovation reviewed ground water data from off-site temporary boreholes collected in June 2001 and December 2001, as well as ground water data from permanent on-site ground water monitoring wells collected during this same time period. Although the data was collected on different dates over an approximate 6 month time period, this analysis of regional ground water quality was performed to review the largest possible data set and maintain consistency with the database of information collected at the site to-date.

The database utilized for this analysis is summarized and provided as Table 1. Table 1 includes ground water quality data collected at each sampling location, the date the sampling was performed and the results of ratio calculations subsequently used as part of the data analysis. Total VOCs were plotted on a site diagram to evaluate the approximate extent of impacted ground water as indicated by this dataset (Figure 2). For convenience, a total VOC isoconcentration line of 100 ug/l was utilized to demarcate the outer extent of impacted ground water. This figure suggests that impacted ground water forms a long slender subsurface feature approximately 800 ft. long and 125 ft. wide. The long-narrow shape of this ground water plume is likely to have been greatly affected by the location of the site within a steeply-sided narrow valley (Figure 1).

Review of the composition of total VOCs at each sampling location suggested that some locations west of the site may be influenced by an off-site source of tetrachloroethene (PCE). The PCE concentration reported at each sampling location was plotted (Figure 3) and an evaluation of PCE was performed. Based on the interpretation of the ground water data provided on Figure 3, it appears that an off-site source of PCE has impacted a large area to the west of the Kings facility. In addition, two small localized areas of PCE-impacted ground water exist on-site. In order to further investigate the presence of a potential off-site contributor to PCE concentrations in samples collected in the western portion of the study area, Geovation calculated the ratio of PCE to TCE (Table 1) and prepared a diagram of the results of this calculation (Figure 4).

As indicated on Figure 4, the ratio of PCE to TCE is significantly different in the eastern and western portions of this valley. Ground water collected from the eastern portion of the valley, such as those samples collected on the Kings property, consistently exhibit a PCE-to-TCE ratio of less than one, whereas ground water samples collected from the western portion of the valley exhibit PCE-to-TCE ratios greater than one. This observed difference in the spatial distribution of the PCE-to-TCE ratio supports the data interpretation presented in Figure 3 and suggests that the ratio of PCE-to-TCE is a means to distinguish PCE contamination with either an on-site or offsite origin.

Furthermore, comparison of the PCE-to-TCE diagram (Figure 4) with the predicted ground water flow lines (Figure 1) indicates that the demarcation PCE-to-TCE contour line of "1" is approximately located at the centerline of the hydrogeologic valley. This association of a topographic eastern and western side of the valley and a distinct chemical difference observed in the eastern and western half of the valley mutually support each other and the conclusion that ground water samples collected in the western portion of the study area have been impacted by an off-site contributor.

It may be noted on Figure 1 that the centerline of the hydrogeologic valley is approximately located at the position of Marbledale Road (in the vicinity of the Kings facility). In addition, the ground water monitoring data (Figure 4) provides additional information suggesting that this centerline is approximately parallel and slightly to the west of Marbledale Road through this area.

Discussion

As reported in the *Handbook of Environmental Degradation Rates*, (Howard, et. al, 1991), the aqueous aerobic and anaerobic half-lives for the biodegradation of each of these compounds (PCE and TCE) are similar. Based on their similar half-lives, the ratio of these compounds is expected to remain relatively consistent within groundwater from the same source. PCE may degrade to TCE. By means of this process the ratio of PCE-to-TCE will decrease over time and down gradient distance. Review of Figure 4 does not indicate a decrease in this ratio relative to down or cross gradient distance from the Kings facility. It is acknowledged that water/organic carbon partition coefficient (K_{oc}) for PCE is approximately two-to-three times that of the K_{oc} for TCE . As a result of its higher K_{oc}, PCE is more apt to absorb onto organic carbon than TCE. This process could change the PCE to TCE ratio (decreasing the ratio value) in ground water in proportion to down gradient distance (assuming migration through a matrix containing organic carbon). Comparison of down and cross gradient portions of impacted ground water (Figure 2) with the PCE-to-TCE ratio diagram (Figure 4) indicates that such a relationship does not exist. In fact, the PCE-to-TCE ratio starts off very low in the source areas on the Kings property and increases to the west, the opposite of what might be expected if PCE were being preferentially absorbed by the organic content of overburden materials.

Based on the information presented above, differences reported in the proportions of TCE and PCE in samples collected in the study area can not be attributed to either; (i) preferential biodegradation of either compound or (ii) preferential absorption of either compound into the organic fraction of the overburden material. Analysis of the PCE concentration and ratio of PCE to TCE is an effective means to distinguish PCE contamination with either an on-site or off-site origin. The application of this hydrogeological relationship to existing site data indicates that the PCE contamination reported at sampling locations GS-12, HP-2S, GS-9, CGI-7, CGI-10 and CGI-11 is derived primarily from an off-site source.

Sincerely,

Robert Zimmer, P.G.
Vice-President

REFERENCES

Howard, Philip H., Boethling, Robert S., Jarvis, William F., Meylan, William M., and Edward M. Michalenko. 1991, *Handbook of Environmental Degradation Rates*. Heather T. Printup Editot, Lewis Publishers

TABLE 1

Ground Water Monitoring Data - Volatile Organic Compounds

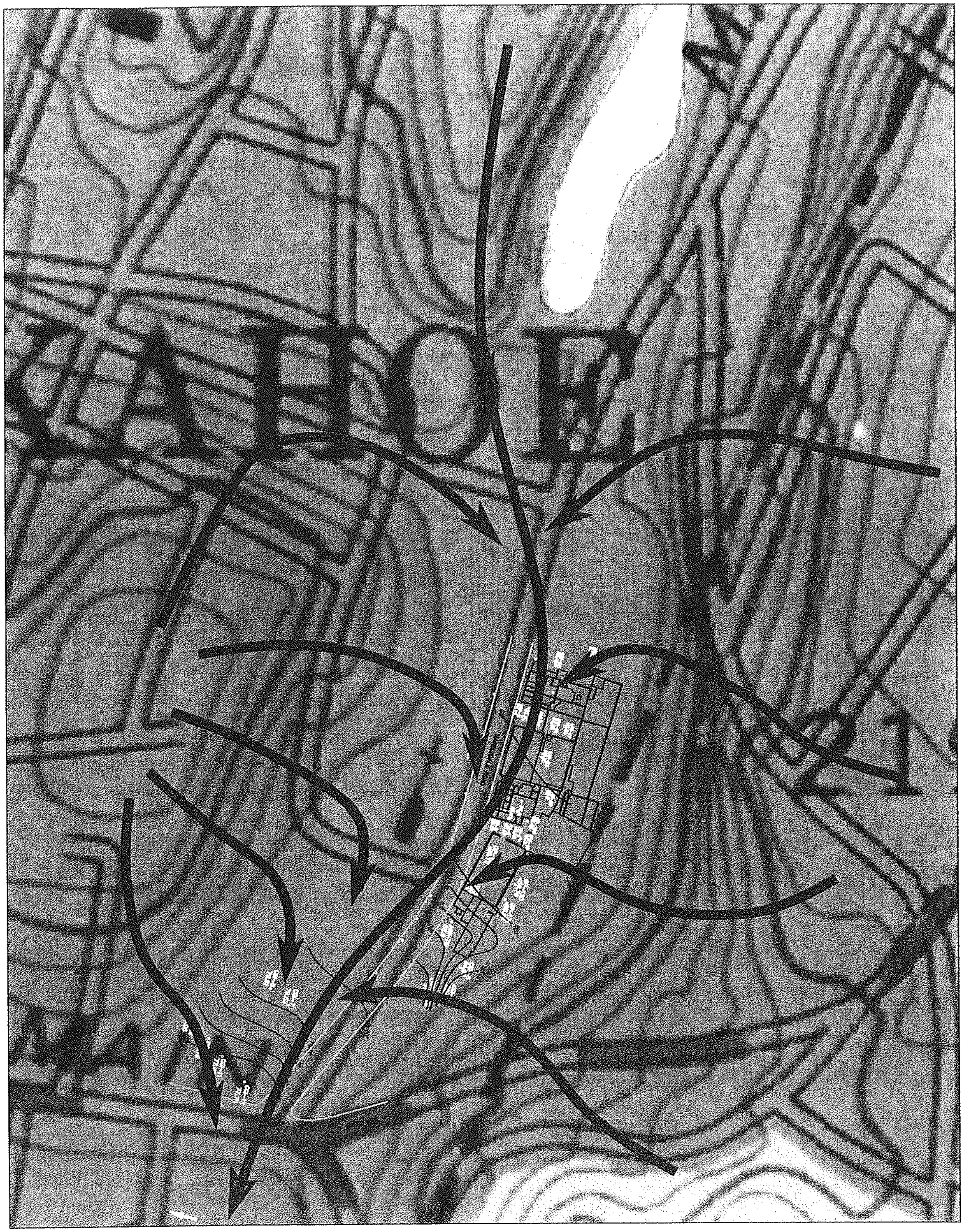
Kings Electronics Co, Inc.

Sampling Dates As Specified

Sample No.	Sampling Date	Total VOCs ug/l	PCE/TCE Ratio	PCE ug/l	TCE ug/l	cis-1,2,DCE ug/l	VC ug/l	MtBE ug/l	Chloroform ug/l	1,1-DCA ug/l	1,1,1-TCA ug/l	BTEX ug/l
PTW-1	06/14/01	1,200.0	---	ND	ND	1,200.0	ND	ND	ND	ND	ND	ND
PTW-1	06/27/01	1,620.0	0.00	ND	20.0	1,600.0	ND	ND	ND	ND	ND	ND
PTW-2	06/14/01	2,522.0	0.02	22.0	1,200.0	1,300.0	ND	ND	ND	ND	ND	ND
PTW-2	06/27/01	3,980.0	0.00	ND	480.0	3,500.0	ND	ND	ND	ND	ND	ND
IW-1	05/31/01	92.0	0.03	2.0	68.0	19.0	ND	ND	ND	ND	3.0	ND
IW-1	06/27/01	98.0	0.05	4.0	75.0	13.0	ND	ND	ND	ND	6.0	ND
IW-2	06/14/01	1,667.0	0.02	17.0	860.0	790.0	ND	ND	ND	ND	ND	ND
IW-2	07/13/01	2,836.0	0.02	36.0	1,500.0	1,300.0	ND	ND	ND	ND	ND	ND
IW-3	06/14/01	493.0	0.00	ND	460.0	33.0	ND	ND	ND	ND	ND	ND
IW-3	07/13/01	436.0	0.00	ND	410.0	26.0	ND	ND	ND	ND	ND	ND
IW-4	05/31/01	6,253.0	0.00	ND	6,200.0	53.0	ND	ND	ND	ND	ND	ND
IW-4	06/27/01	7,241.0	0.00	ND	7,200.0	41.0	ND	ND	ND	ND	ND	ND
HP-1S	06/14/01	5,134.0	0.01	34.0	3,900.0	1,200.0	ND	ND	ND	ND	ND	ND
GP-104	07/13/01	3,900.0	0.00	ND	1,500.0	2,400.0	ND	ND	ND	ND	ND	ND
MW-2	07/12/01	18.0	0.00	ND	9.0	7.0	2.0	ND	ND	ND	ND	ND
MW-12	07/12/01	1,229.0	0.04	27.0	630.0	550.0	22.0	ND	ND	ND	ND	ND
MW-10	07/12/01	360.0	0.04	10.0	230.0	110.0	ND	ND	ND	ND	10.0	ND
MW-11	07/12/01	58.0	0.06	3.0	49.0	6.0	ND	ND	ND	ND	ND	ND
MW-6S	08/09/01	95.0	0.09	7.0	76.0	ND	ND	ND	ND	ND	12.0	ND
MW-9D	07/12/01	428.0	0.02	8.0	420.0	ND	ND	ND	ND	ND	ND	ND
MW-9S	07/12/01	10,380.0	---	ND	9,400.0	840.0	140.0	ND	ND	ND	ND	ND
HP-2D	07/12/01	61.0	29.50	59.0	2.0	ND	ND	ND	ND	ND	ND	ND
HP-2S	07/12/01	45.0	4.86	34.0	7.0	4.0	ND	ND	ND	ND	ND	ND
MW-7D	07/12/01	22.0	0.00	ND	22.0	ND	ND	ND	ND	ND	ND	ND
MW-7S	07/12/01	27.0	0.00	ND	21.0	6.0	ND	ND	ND	ND	ND	ND
MW-2S	07/12/01	18.0	0.00	ND	9.0	7.0	2.0	ND	ND	ND	ND	ND
GP-102D	07/12/01	58.0	0.00	ND	52.0	6.0	ND	ND	ND	ND	ND	ND
GP-102S	07/12/01	361.0	0.00	ND	300.0	61.0	ND	ND	ND	ND	ND	ND
GP-104	07/13/01	3,900.0	0.00	ND	1,500.0	2,400.0	ND	ND	ND	ND	ND	ND
HP-1D	07/12/01	97.0	0.06	5.0	84.0	8.0	ND	ND	ND	ND	ND	ND
HP-1S	07/13/01	4,700.0	0.00	ND	3,400.0	1,300.0	ND	ND	ND	ND	ND	ND
GP-105	06/27/01	4,500.0	0.00	ND	3,200.0	1,300.0	ND	ND	ND	ND	ND	ND
GS-13	06/27/01	14.9	0.10	1.1	11.0	2.2	ND	0.7	ND	ND	ND	ND
GS-12	06/27/01	14.7	1.56	6.4	4.1	2.7	ND	1.4	ND	ND	ND	ND
GS-11	06/27/01	6.9	0.36	1.4	3.9	0.6	ND	ND	1.0	ND	ND	ND
GS-10	06/27/01	527.1	0.03	6.4	239.0	275.0	ND	4.3	ND	2.3	ND	ND
GS-9	06/27/01	58.5	7.19	46.5	6.5	4.3	ND	0.7	0.5	ND	ND	ND
GS-8	06/27/01	100.3	0.28	18.2	66.1	14.0	ND	1.2	0.8	ND	ND	ND
GS-7	06/27/01	678.2	0.02	12.5	565.0	95.4	ND	5.3	ND	ND	ND	ND
GS-6	06/27/01	514.5	0.03	6.8	215.0	208.0	78.6	4.4	ND	1.8	ND	ND
GS-5	06/27/01	1,026.6	0.03	24.9	891.0	105.0	ND	5.7	ND	ND	ND	ND
GS-4	06/27/01	171.0	0.03	3.9	121.0	43.1	ND	1.2	1.0	ND	0.8	ND
GS-3	06/27/01	666.1	0.02	10.3	498.0	154.0	ND	3.8	ND	ND	ND	ND
GS-2	06/27/01	544.5	0.01	3.8	276.0	239.0	22.2	3.5	ND	ND	ND	ND
GS-1	06/27/01	983.6	0.03	11.0	417.0	378.0	170.0	7.6	ND	ND	ND	ND
GCI-5	12/04/01	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
GCI-6	12/04/01	ND	---	ND	ND	ND	ND	ND	ND	ND	ND	ND
GCI-7	12/04/01	41.6	2.08	16.0	7.7	7.3	ND	2.1	0.6	2.2	5.7	ND
GCI-8	12/04/01	7.1	---	ND	ND	ND	ND	ND	1.5	ND	ND	5.6
GCI-9	12/04/01	9.1	---	ND	ND	ND	ND	ND	ND	ND	ND	9.1
GCI-10	12/04/01	5.8	1.23	1.6	1.3	1.2	ND	1.7	ND	ND	ND	ND
GCI-11	12/04/01	13.1	1.58	3.8	2.4	2.6	ND	2.7	ND	0.7	0.9	ND
GCI-12	12/04/01	38.5	0.35	1.3	3.7	18.0	4.8	4.6	ND	1.2	1.0	3.9

Notes:

ND Analyzed for but not detected

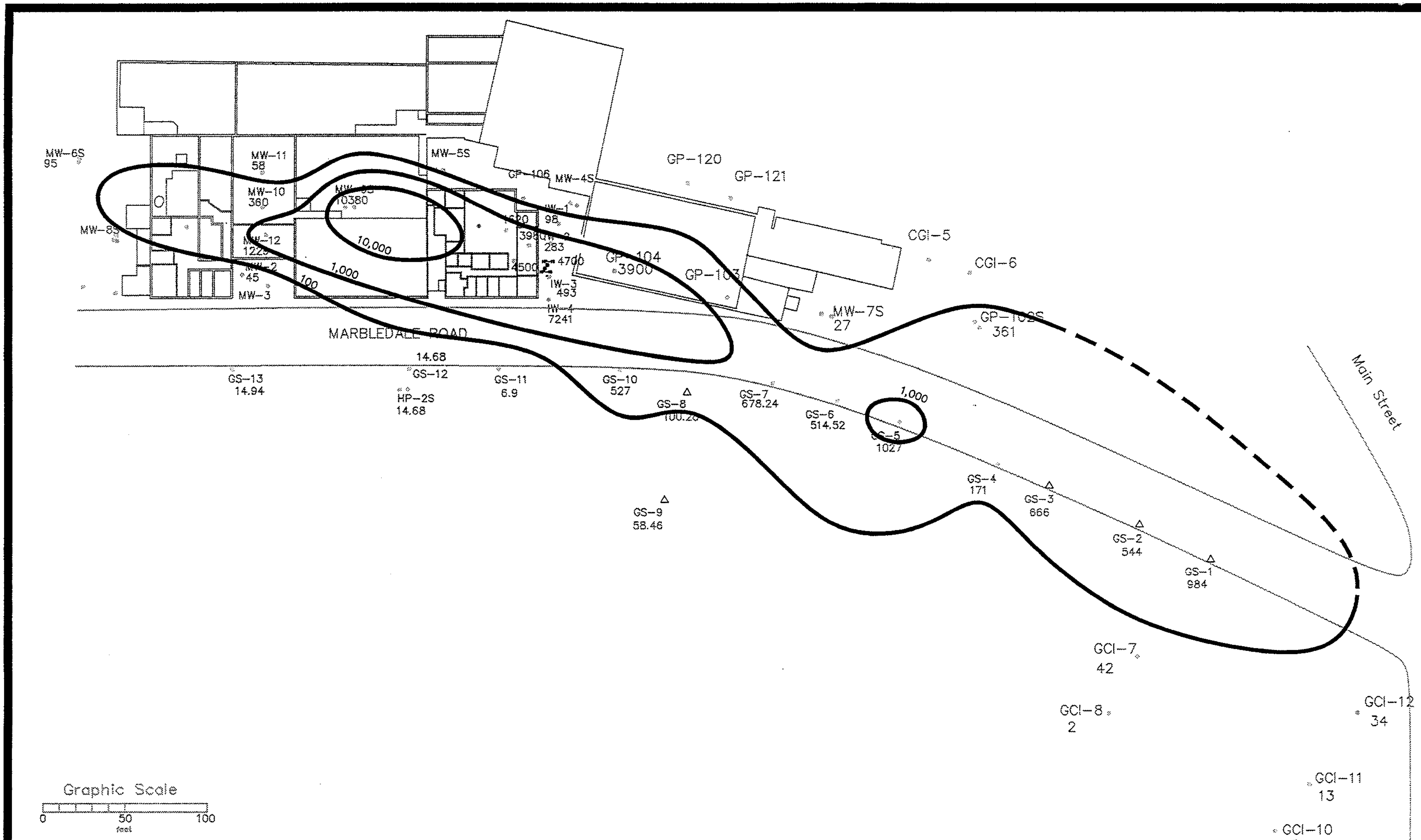


Predicted Ground Water Flow Path

Approximate Location of Kings Electonics Facility

Source: Mount Vernon, NY Quadrangle, 1956 N4052.5–W7345/7.5

GEOVATION GEOVATION CONSULTANTS, Inc. Innovative Solutions to Environmental Problems FLORIDA, NEW YORK	Predicted Ground Water Flow Paths Baesd on Region Topography Preliminary Regional Ground Water Characterization Report KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY	FIGURE 1



Location of Curb-Line for Marbledale Road and Main Street Approximate

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Gram, Inc.

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Innovative Solutions to Environmental Problems

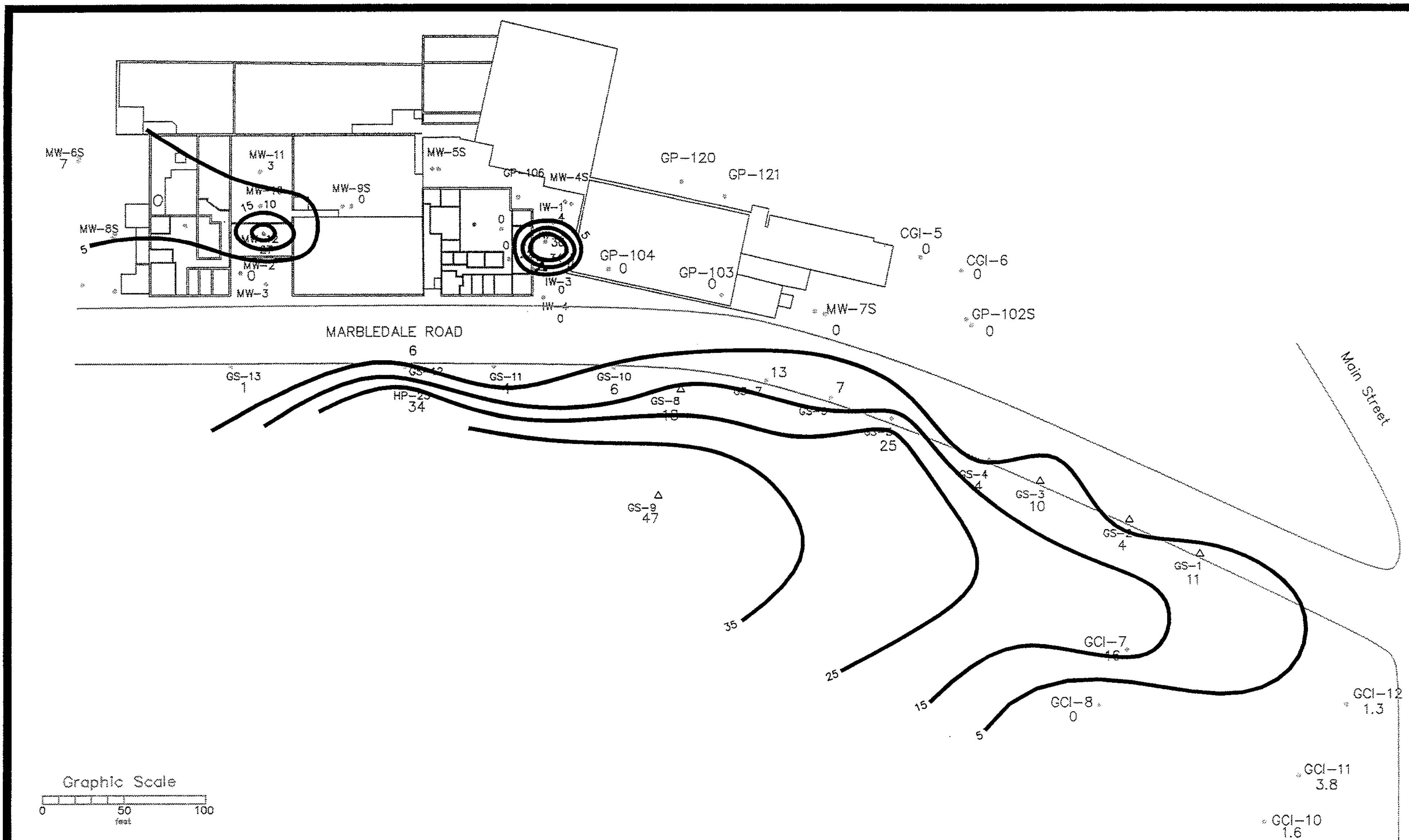
FLORIDA, NEW YORK

Total VOCs in Ground Water (based on Table 1 data-set)

Preliminary Regional Ground Water Characterization Report

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

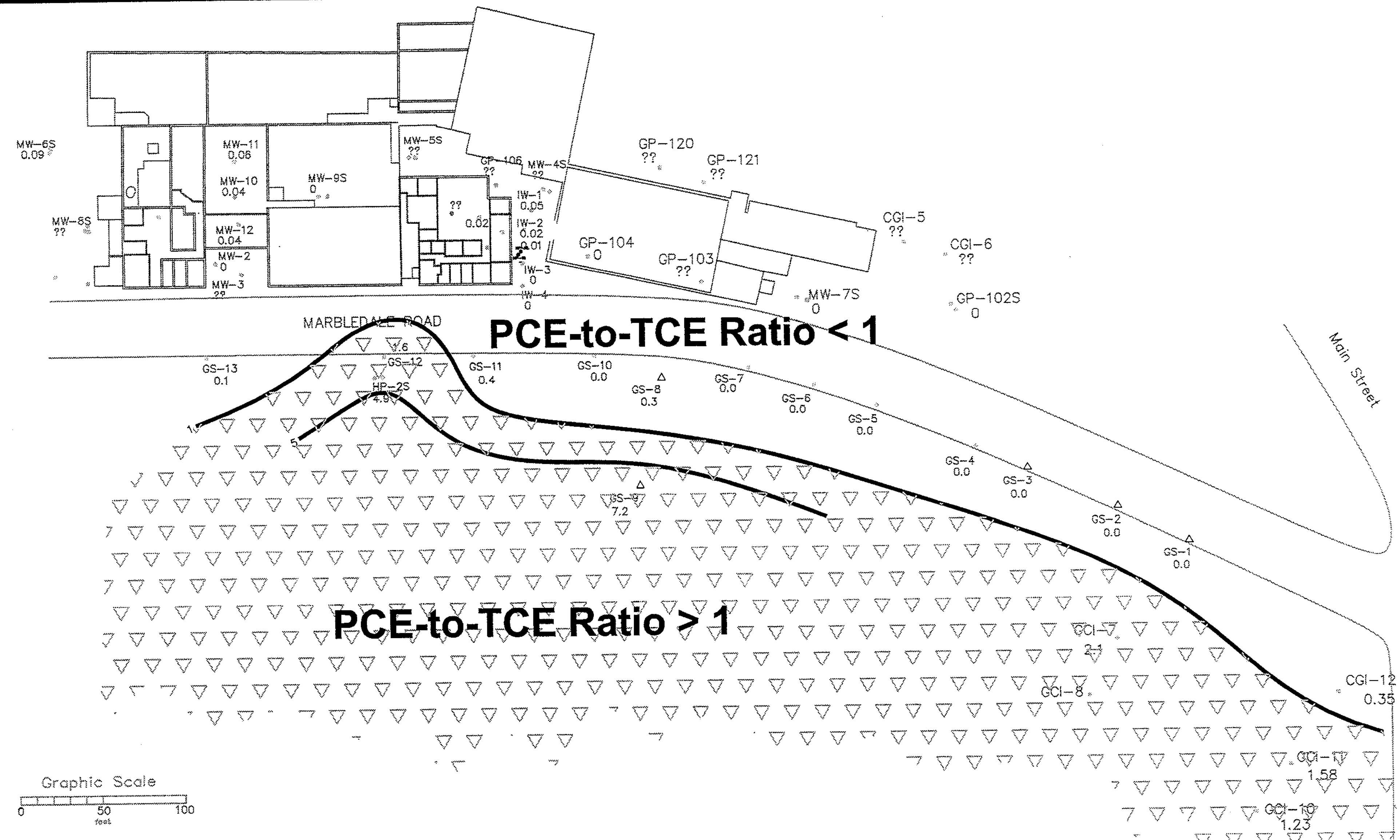
FIGURE 2



Location of Curb-Line for Marbledale Road and Main Street Approximate

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Gram, Inc.

GEOVATION CONSULTANTS, Inc. Innovative Solutions to Environmental Problems FLORIDA, NEW YORK	Total PCE in Ground Water (based on Table 1 data-set) Preliminary Regional Ground Water Characterization Report KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY	FIGURE 3



Location of Curb-Line for Marbledale Road and Main Street Approximate

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Gram, Inc.

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Innovative Solutions to Environmental Problems

FLORIDA, NEW YORK

Ratio of PCE to TCE (based on Table 1 Data-Set)

Preliminary Regional Ground Water Characterization Report

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 4

ATTACHMENT 5

KINGS
ELECTRONICS CO., INC.
670 WHITE PLAINS ROAD | SCARSDALE, NEW YORK 10583 | 914-793-5000 | FAX 914-793-5092

April 26, 2002

Tanya Reinhard, Project Manager
New York State Department of Environmental Conservation (DEC)
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, New York 12561-1696

Re: Voluntary Cleanup Program (VCP) # V00237-3
DEC Agreement #W3-0855-99-07
Kings Electronics Co., Inc.
40 Marbledale Road
Tuckahoe, New York 10707

Dear Ms. Reinhard:

As requested within your March 18, 2002 correspondence (and including Dr. Anders, NYS DOH, March 21, 2002 comments addressed to you), enclosed are replacement pages for the On-Site Remedial Action Work Plan (OSRAWP), Health and Safety Plan (HASP), and the Quality Assurance Project Plan (QAPP) that address all of the issues raised by DEC and DOH (Department of Health) concerning each of those plans.

Please Note: Kings Electronics Co., Inc. (Kings) has been addressing both the On-site Soil Contamination and Off-site Groundwater Contamination issues (see Dr. Anders comments) within an expanded scope Site Investigation Work Plan. Kings respectfully requests that both of these issues continue to be addressed with that understanding. In that regard, we hope to provide detailed reports within the next two weeks addressing the comments raised regarding both issues (i.e., Dr. Anders #5-9 and your Work Plan issue #8 and Remedial Design issue #2).

In order to keep only one working document for each plan (OSRAWP, HASP, and QAPP) we are providing replacement pages that need to be incorporated into the documents you already have. Some or all of the documents you already have are spiral bound. If this is a problem please advise. Our intent is not to have old versions of each document taking up valuable file space.

Specifically:

The text portion of each document is reprinted entirely. The Work Plan package contains a revised Table 5, new Tables 6 & 7, and a revised Figure 7. The HASP package includes a new map and directions to Lawrence Hospital. The QAPP package includes Tables 1 through 6. Table 1 & 2 are new, Tables 3, 4, 5, 6 are the former 1, 2, 3, 4.

Very truly yours,

Bruce M. Munson

Bruce M. Munson
Corporate Environmental Manager

pc:

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Charles Goldberger, Esq.
McCullough, Goldberger & Staudt
1311 Mamaroneck Avenue
White Plains, New York 10605

ATTACHMENT 6

KINGS
ELECTRONICS CO., INC.
670 WHITE PLAINS ROAD | SCARSDALE, NEW YORK 10583 | 914-793-5000 | FAX 914-793-5092

CERTIFIED
RETURN RECEIPT REQUESTED

February 10, 2002

Tanya Reinhard, Project Manager
New York State Department of Environmental Conservation
Division of Environmental Remediation
21 South Putt Corners Road
New Paltz, New York 12561-1696

Re: Monthly Progress Report, DEC Agreement #W3-0855-99-07
Voluntary Cleanup Program (VCP)
Kings Electronics Co., Inc.
40 Marbledale Road
Tuckahoe, New York 10707

Dear Ms. Reinhard:

In response to the Department of Environmental Conservation's comments on Kings' proposed *On-Site Remedial Action Work Plan*, as enumerated in your letter of December 19, 2001, Kings offers the following:

1. Enclosed is a report, *Additional Site Investigation Activities*, prepared by Geovation Consultants, Inc. (Geovation), the first section of which delineates the additional soil sampling carried out in the former degreaser area on November 13. Combined with the previous sampling performed in the soil horizons **below and above the silt lens**, results indicate that soil remaining at the facility, above and below the silt layer, do not require further excavation or remediation.

   As described, an additional soil sample of the silt layer from outside the impacted area will be collected and analyzed for total organic carbon (TOC) in order to determine a silt lens specific soil cleanup objective based on a soil organic carbon content greater than one per cent within the natural silt lens located beneath the building within the unsaturated zone above the water table. Previous sampling performed within the silt lens indicates trichloroethene concentrations are above the predetermined (Technical and Administrative Guidance Memorandum - TAGM #4046) Recommended Soil Cleanup Objectives (RSCO).

2. See Figure 4 in the above referenced report for an on-site and off-site groundwater contour map based on elevations taken on-site and off-site on December 5.

3. A time related set of cleanup goals, as provided by ARCADIS, is summarized on their attached Table 1. As reported by ARCADIS, goals have been developed for a network of wells from throughout the site which have a history of "significant" impact. These wells,

along with other up, side and downgradient delineation points will be monitored throughout the remediation effort. As shown, a degradation rate was developed and applied to each point to generate the cleanup goals. The degradation rate was calculated by using site-specific data from the pilot test. The water-quality data for monitoring points PTW-1, PTW-2, MW-HP-1S and GP-104 were plotted, starting with pretest results and all subsequent data through the pilot test. Once the data were graphed for each point, a best-fit exponential trend line was applied. From each trend line a degradation rate, specific to each monitoring point, was calculated. This method was applied to each of these points for both TCE and for total chlorinated volatile organic compounds (TVOCs). The resulting degradation rates were averaged to generate site-specific degradation rates for both TCE and TVOCs and resulting cleanup goals as summarized on Table 1.

4. If the agreed-upon cleanup goals are exceeded by 20% for three consecutive years, an appropriate contingency plan will be implemented. As written, the *On-Site Remedial Action Work Plan* (RAWP) prepared by ARCADIS included, as a contingency, the implementation of bioaugmentation. Application of this contingency will be considered, along with all other options, to implement a remedy appropriate to the site-specific conditions at the time. Kings has requested and received a proposal for applying a proprietary On-Contact Remediation Process®, provided by another remediation contractor, as a contingency to ARCADIS's contingency. It is Kings' current understanding and belief, however, that the ARCADIS RAWP will provide a successful remedy and meet the above stated time related goals.

5. Performance monitoring, as detailed in section 4.5 of the RAWP, will be performed on the network of monitoring wells shown on the attached drawing, Proposed Monitoring Program Well Network, 1/11/02, by ARCADIS. The network may be adjusted, with prior NYSDEC approval, as the remediation is undertaken, to ensure that appropriate data is collected.

6. The second section of *Additional Site Investigation Activities*, enclosed, describes the groundwater investigations carried out by Geovation on December 4 and 5, both off-site within the village park located some 300 feet southwest of Kings and on-site at the southeastern extremity of Kings property. In Geovation's opinion, the sampling results suggest a limit to the southern and western extent of impacted groundwater.

7. The area of impacted groundwater will be treated uniformly by the system detailed in the RAWP. While the proposed injection wells will be screened in the upper portion of the water table, the resulting in-situ remediation zone (IRZ) is anticipated to extend deeper. The migration of the IRZ will be the result of the injections being performed under pressure, as well as from aquifer mixing.

   The proposed monitoring program includes wells screened in the deeper zones. If water-quality improvements are not demonstrated in these areas, appropriate alternatives (e.g., deep well injection) will be proposed and implemented after approval by NYSDEC.

8. The exact schedule for the remedial design is dependent upon the approval of the RAWP. The scope, and the resultant schedule, may be affected by the resolution of issues raised by NYSDEC and NYSDOH. In general, design will be completed within 90 days of receipt of approval of the RAWP. A detailed schedule be provided immediately upon RAWP approval.

9. The Quality Assurance Project Plan is being submitted under separate cover.

10. The Health and Safety Plan is being submitted under separate cover.

11. During the *On-Site Remedial Action Work Plan* implementation, and off-site investigation/monitoring activities, data will continue to be reported to NYSDEC & NYSDOH on a monthly basis.

ON-SITE ACTIVITIES THIS PAST MONTH:

Attached are summary tables of the analytical results from the groundwater sampling of injection well PTW-1 (GP-105 & GP-107 continue to be dry) and selected pilot study performance monitoring wells conducted by ARCADIS on Thursday, January 3, 2002, and Wednesday/Thursday, January 16/17, 2002. An injection of 200 gallons of molasses solution was performed at PTW-1 on January 3 and again on January 18, 2002.

On January 31, PTW-1 was again sampled; GP-105 & GP-107 were dry. Results will be reviewed and validated for quality assurance when received by ARCADIS. No injection of molasses was performed since the TOC results from January 17 indicate that there is an adequate carbon load to sustain reducing conditions.

FEBRUARY ACTIVITIES:

Performance monitoring wells are scheduled to be reevaluated within the next two weeks.

In closing, we bring to your attention that the three month extension of the IRZ O&M activities has expired. Based on ARCADIS's response to your comment #8, Kings respectfully requests a six month extension of the IRZ O&M activities previously approved by DEC.

Very truly yours,

Bruce M. Munson

Bruce M. Munson
Corporate Environmental Manager

Enclosure

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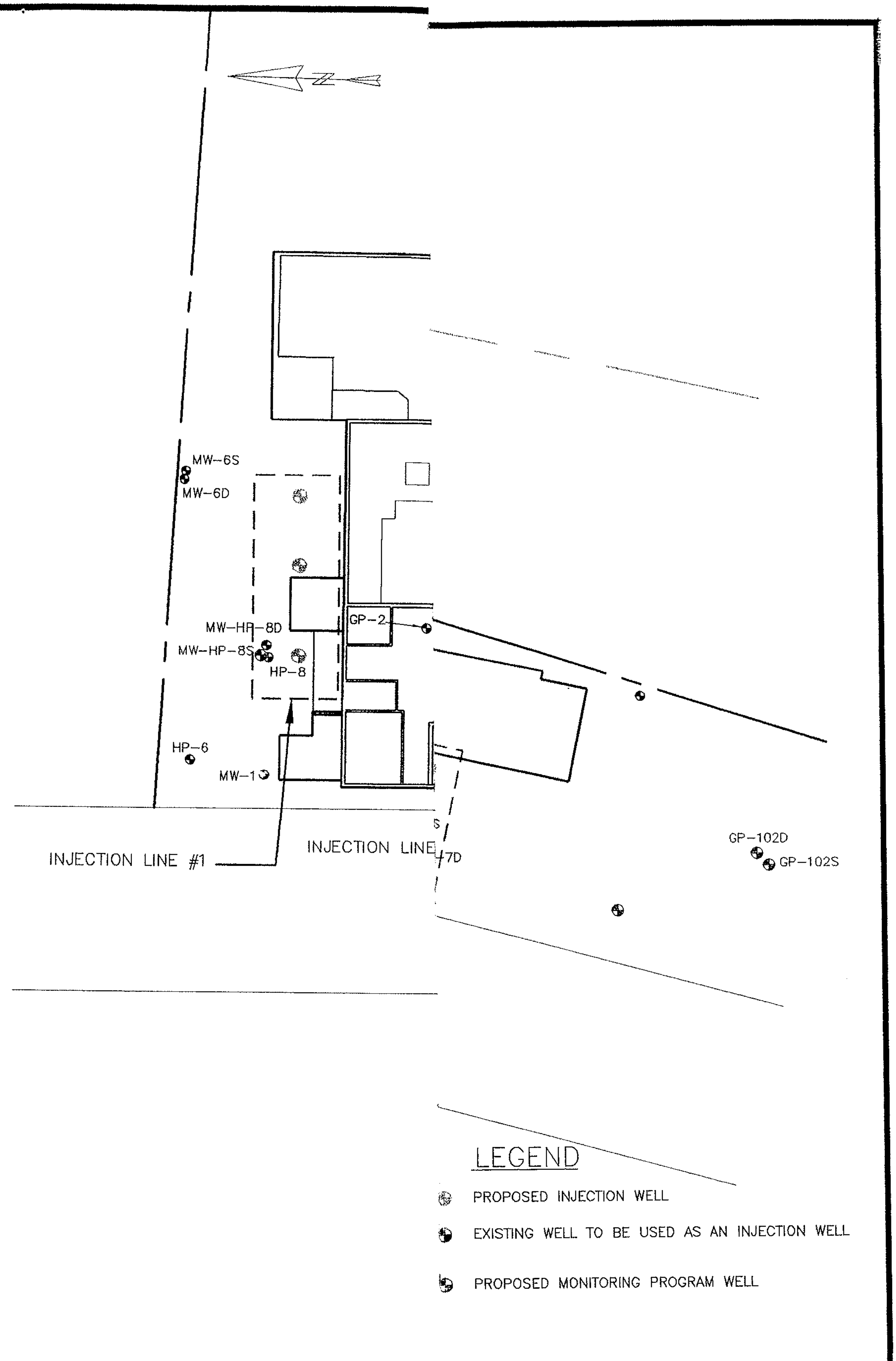
ARCADIS GERAGHTY & MILLER

Table 1. List of Monitoring Wells and Time Related Cleanup Goals for the Remedial Action, Kings Electronics Site, Tuckahoe, New York.

Well ID	Constituent	Estimated Concentration (ug/L) at Startup		1 Year	2 Year	3 Year	4 Year
			Estimated TCE Degradation Rate:	-0.007275	-0.007275	-0.007275	-0.007275
			Estimated TVOC Degradation Rate:	-0.0019	-0.0019	-0.0019	-0.0019
MW-9S	Trichloroethene	9400		661	46	<5	<5
	Total VOCs	10380		5188	2593	1296	648
PTW-2	Trichloroethene	2500		176	12	<5	<5
	Total VOCs	4428		2213	1106	553	276
GP-104	Trichloroethene	1500		105	7	<5	<5
	Total VOCs	4200		2099	1049	524	262
GP-102S	Trichloroethene	300		21	<5	<5	<5
	Total VOCs	361		180	<100	<100	<100
MW-5S	Trichloroethene	23		<5	<5	<5	<5
	Total VOCs	31		<100	<100	<100	<100

ug/L Micrograms per liter.



SOURCE: PARTIAL PLOT PLAN, KINGS ELECTRONICS, BY ROB IAR
AND JOSEPH M. PICARDI, P.L.S., SITE PLAN, JULY 23, 1

DATE 01/11/02	PROJECT MANAGER K.MCGUINESS	DEPARTMENT MANAGER T.ENG
TORING PROGRAM NETWORK	LEAD DESIGN PROF.	CHECKED E.RODRIGUEZ
	PROJECT NUMBER NJ00423.002	DRAWING NUMBER

G:\Drafting\Kings\CADD\PROP WELL NETWORK.dwg Jan. 15, 2002

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Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

PTW-1	1/3/02	1/17/02
Field Parameters		
DO (mg/L)	0.61	0.44
REDOX (mV)	-103.3	-312.5
pH	6.47	5.09
Conductivity (mS/cm)	1.812	9.244
TOC (mg/L)	48.2	11200
DOC (mg/L)	37.7	11100
Chlorinated VOCs		
Trichloroethene	0	
cis-1,2-Dichloroethene	1920	
trans-1,2-Dichloroethene (ug/L)	1.74	
Vinyl Chloride (ug/L)	3.5	
1,1-Dichloroethene (ug/L)	2	
1,1,1-Trichloroethane (ug/L)	0	
Tetrachloroethene (ug/L)	0	
Biogeochemical Paramers		
Carbon Dioxide (mg/L)		
Nitrogen (mg/L)		
Methane (ug/L)		
Ethane (ng/L)		
Ethene (ng/L)		
Sulfide (mg/L)		
Ferrous Iron (mg/L)		
Dissolved Iron (ug/L)		
Total Iron (ug/L)		
Dissolved Manganese (ug/L)		
Total Manganese (ug/L)		
Alkalinity (mg/L)		
Chloride (mg/L)		
Nitrate (mg/L)		
Nitrite (mg/L)		
Sulfate (mg/L)		
Total Phosphorus (mg/L)		
Molasses Ratio	10:1	10:1
Total Volume Injected (gallons)	200	200

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

PTW-2	1/17/02
Field Parameters	
DO (mg/L)	0.09
REDOX (mV)	-118.8
pH	6.85
Conductivity (mS/cm)	1.424
TOC (mg/L)	6.56
DOC (mg/L)	4.78
Chlorinated VOCs	
Trichloroethene	2890
cis-1,2-Dichloroethene	3610
trans-1,2-Dichloroethene	0
Vinyl Chloride	0
1,1-Dichloroethene	0
1,1,1-Trichloroethane	0
Tetrachloroethene	0
Biogeochemical Paramers	
Carbon Dioxide (mg/L)	89
Nitrogen (mg/L)	14
Methane (ug/L)	1000
Ethane (ng/L)	160
Ethene (ng/L)	320
Sulfide (mg/L)	0.007
Ferrous Iron (mg/L)	25.75
Dissolved Iron (ug/L)	21600
Total Iron (ug/L)	
Dissolved Manganese (ug/L)	
Total Manganese (ug/L)	
Alkalinity (mg/L)	
Chloride (mg/L)	
Nitrate (mg/L)	
Nitrite (mg/L)	
Sulfate (mg/L)	56.4
Total Phosphorus (mg/L)	

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

IW-1	1/16/02
Field Parameters	
DO (mg/L)	0.07
REDOX (mV)	-60
pH	6.75
Conductivity (mS/cm)	1.374
TOC (mg/L)	1.45
DOC (mg/L)	1.24
Chlorinated VOCs	
Trichloroethene	35
cis-1,2-Dichloroethene	13.1
trans-1,2-Dichloroethene	0
Vinyl Chloride	0
1,1-Dichloroethene	0
1,1,1-Trichloroethane	5.89
Tetrachloroethene	2.53
Biogeochemical Paramers	
Carbon Dioxide (mg/L)	45
Nitrogen (mg/L)	17
Methane (ug/L)	3.1
Ethane (ng/L)	34
Ethene (ng/L)	180
Sulfide (mg/L)	0.108
Ferrous Iron (mg/L)	2.68
Dissolved Iron (ug/L)	2960
Total Iron (ug/L)	
Dissolved Manganese (ug/L)	
Total Manganese (ug/L)	
Alkalinity (mg/L)	
Chloride (mg/L)	
Nitrate (mg/L)	
Nitrite (mg/L)	
Sulfate (mg/L)	44.8
Total Phosphorus (mg/L)	

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

IW-2	1/16/02
Field Parameters	
DO (mg/L)	0.23
REDOX (mV)	-82.5
pH	6.62
Conductivity (mS/cm)	1.835
TOC (mg/L)	6.46
DOC (mg/L)	5.64
Chlorinated VOCs	
Trichloroethene	29.6
cis-1,2-Dichloroethene	1300
trans-1,2-Dichloroethene	0
Vinyl Chloride	0
1,1-Dichloroethene	0
1,1,1-Trichloroethane	0
Tetrachloroethene	0
Biogeochemical Paramers	
Carbon Dioxide (mg/L)	130
Nitrogen (mg/L)	12
Methane (ug/L)	8200
Ethane (ng/L)	110
Ethene (ng/L)	330
Sulfide (mg/L)	0.309
Ferrous Iron (mg/L)	6.32
Dissolved Iron (ug/L)	38200
Total Iron (ug/L)	
Dissolved Manganese (ug/L)	
Total Manganese (ug/L)	
Alkalinity (mg/L)	
Chloride (mg/L)	
Nitrate (mg/L)	
Nitrite (mg/L)	
Sulfate (mg/L)	15.4
Total Phosphorus (mg/L)	

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

IW-3	1/3/02	1/16/02
Field Parameters		
DO (mg/L)	0.27	0.07
REDOX (mV)	-89	-157.2
pH	7.05	7.27
Conductivity (mS/cm)	1.518	1.333
TOC (mg/L)	113	60
DOC (mg/L)	111	48
Chlorinated VOCs		
Trichloroethene		7720
cis-1,2-Dichloroethene		0
trans-1,2-Dichloroethene		0
Vinyl Chloride		0
1,1-Dichloroethene		0
1,1,1-Trichloroethane		0
Tetrachloroethene		0
Biogeochemical Paramers		
Carbon Dioxide (mg/L)		24
Nitrogen (mg/L)		18
Methane (ug/L)		12
Ethane (ng/L)		680
Ethene (ng/L)		880
Sulfide (mg/L)		0.045
Ferrous Iron (mg/L)		1.76
Dissolved Iron (ug/L)		2000
Total Iron (ug/L)		
Dissolved Manganese (ug/L)		
Total Manganese (ug/L)		
Alkalinity (mg/L)		
Chloride (mg/L)		
Nitrate (mg/L)		
Nitrite (mg/L)		
Sulfate (mg/L)		47.2
Total Phosphorus (mg/L)		

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

IW-4	1/17/02
Field Parameters	
DO (mg/L)	0.95
REDOX (mV)	-3.6
pH	7.14
Conductivity (mS/cm)	1.09
TOC (mg/L)	1.99
DOC (mg/L)	--
Chlorinated VOCs	
Trichloroethene	135
cis-1,2-Dichloroethene	0
trans-1,2-Dichloroethene	0
Vinyl Chloride	0
1,1-Dichloroethene	0
1,1,1-Trichloroethane	0
Tetrachloroethene	0
Biogeochemical Paramers	
Carbon Dioxide (mg/L)	29
Nitrogen (mg/L)	19
Methane (ug/L)	6
Ethane (ng/L)	43
Ethene (ng/L)	0
Sulfide (mg/L)	0.009
Ferrous Iron (mg/L)	0.01
Dissolved Iron (ug/L)	348
Total Iron (ug/L)	
Dissolved Manganese (ug/L)	
Total Manganese (ug/L)	
Alkalinity (mg/L)	
Chloride (mg/L)	
Nitrate (mg/L)	
Nitrite (mg/L)	
Sulfate (mg/L)	44.2
Total Phosphorus (mg/L)	

Summary Table - Groundwater

Kings Electronics, Tuckahoe, NY

MW-HP-1S	1/3/02	1/17/02
Field Parameters		
DO (mg/L)	0.76	0.25
REDOX (mV)	-25.3	-48.7
pH	5.73	5.87
Conductivity (mS/cm)	4.932	5.623
TOC (mg/L)	4840	4780
DOC (mg/L)	3280	4770
Chlorinated VOCs		
Trichloroethene		0
cis-1,2-Dichloroethene		2800
trans-1,2-Dichloroethene		0
Vinyl Chloride		0
1,1-Dichloroethene		0
1,1,1-Trichloroethane		0
Tetrachloroethene		0
Biogeochemical Paramers		
Carbon Dioxide (mg/L)		680
Nitrogen (mg/L)		5.1
Methane (ug/L)		5100
Ethane (ng/L)		22
Ethene (ng/L)		330
Sulfide (mg/L)		0.031
Ferrous Iron (mg/L)		OR
Dissolved Iron (ug/L)		1470000
Total Iron (ug/L)		
Dissolved Manganese (ug/L)		
Total Manganese (ug/L)		
Alkalinity (mg/L)		
Chloride (mg/L)		
Nitrate (mg/L)		
Nitrite (mg/L)		
Sulfate (mg/L)		59.5
Total Phosphorus (mg/L)		

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

MW-HP-1D	1/17/02
Field Parameters	
DO (mg/L)	0.27
REDOX (mV)	105.3
pH	7.26
Conductivity (mS/cm)	1.353
TOC (mg/L)	1.64
DOC (mg/L)	1.26
Chlorinated VOCs	
Trichloroethene	59.7
cis-1,2-Dichloroethene	4.89
trans-1,2-Dichloroethene	0
Vinyl Chloride	0
1,1-Dichloroethene	0
1,1,1-Trichloroethane	1.47
Tetrachloroethene	4.13
Biogeochemical Paramers	
Carbon Dioxide (mg/L)	17
Nitrogen (mg/L)	16
Methane (ug/L)	1.2
Ethane (ng/L)	12
Ethene (ng/L)	0
Sulfide (mg/L)	0.038
Ferrous Iron (mg/L)	0.03
Dissolved Iron (ug/L)	0
Total Iron (ug/L)	
Dissolved Manganese (ug/L)	
Total Manganese (ug/L)	
Alkalinity (mg/L)	
Chloride (mg/L)	
Nitrate (mg/L)	
Nitrite (mg/L)	
Sulfate (mg/L)	48.4
Total Phosphorus (mg/L)	

Summary Table - Groundwater
Kings Electronics, Tuckahoe, NY

GP-104	1/16/02
Field Parameters	
DO (mg/L)	1.42
REDOX (mV)	74.8
pH	6.74
Conductivity (mS/cm)	1.209
TOC (mg/L)	10.8
DOC (mg/L)	2.92
Chlorinated VOCs	
Trichloroethene	6680
cis-1,2-Dichloroethene	343
trans-1,2-Dichloroethene	0
Vinyl Chloride	0
1,1-Dichloroethene	0
1,1,1-Trichloroethane	0
Tetrachloroethene	0
Biogeochemical Paramers	
Carbon Dioxide (mg/L)	53
Nitrogen (mg/L)	18
Methane (ug/L)	3
Ethane (ng/L)	160
Ethene (ng/L)	150
Sulfide (mg/L)	0.002
Ferrous Iron (mg/L)	0.02
Dissolved Iron (ug/L)	0
Total Iron (ug/L)	
Dissolved Manganese (ug/L)	
Total Manganese (ug/L)	
Alkalinity (mg/L)	
Chloride (mg/L)	
Nitrate (mg/L)	
Nitrite (mg/L)	
Sulfate (mg/L)	69
Total Phosphorus (mg/L)	

GEOVATION®

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Phone: (845) 651-4141 • Fax: (845) 651-0040

06 February 2002

Bruce Munson
Kings Electronics Co., Inc.
670 White Plains Road
Scarsdale, New York 10583

Re: Additional Site Investigation Activities
Kings Electronics Co., Inc. Tuckahoe Facility
NYSDEC Agreement #W3-0855-99-07
Voluntary Cleanup Program

Dear Mr. Munson,

Geovation Consultants, Inc. (Geovation) was contracted by Kings Electronics Company, Inc. (Kings) to perform additional soil and groundwater sampling at the Kings facility located at 40 Marbledale Rd. in Tuckahoe, NY. As recommended in Appendix B of Kings' 10/25/01 Work Plan (Evaluation of Soil Sampling Performed in the Former Area of the Vapor Degreaser and the Evaluation of the Chlorinated Organic Compound Concentration within the Silt Layer), additional post excavation soil samples were collected from within the existing excavation (ie. former degreaser area) in the north portion of the facility. Supplemental ground water samples were also collected from the southeastern portion of the facility and from within a village park located off-site to the southwest and downgradient of the facility. This document provides a summary of additional soil and ground water sampling results as determined by Geovation.

Post Excavation Soil Sampling (Northern Portion of Facility)

As recommended in Appendix B of the 10/25/01 Work Plan and in accordance with Exhibit C (Standard Operating Procedures for Field Data Collection) of Voluntary Cleanup Program Agreement # W3-0855-99.7, Geovation collected additional post-excavation soil samples within the existing excavation in the northern portion of the facility. This area inside the building was previously excavated to remediate contaminated soils down to the existing water table and is located in the area beneath the former location of a degreaser operation. Additional soil sampling was performed to complete data gaps remaining in the evaluation of in-place soils in this area.

On 11 November 2001, soil samples were collected from above the existing natural silt layer, within the silt layer and below the silt layer at the locations shown on Figures 1, 2 and 3. Soil samples were collected by manually removing approximately 18-to-24 inches of soil from the excavation sidewalls with a shovel. A stainless steel hand auger was then horizontally inserted into the exposed undisturbed soil and a soil core was collected from an additional 6-to-12 inches into previously undisturbed soil. The stainless steel hand auger was decontaminated in between sampling locations using an Alconox™ wash and potable water rinse. A sub-sample of the soil core was then transferred from the hand auger into laboratory-provided glassware and placed into a cooler with ice. Samples were then transported under chain-of-custody to Severn Trent Laboratories, Inc. (NYSDOH cert# 10142) for analysis. Soil samples collected from above and below the silt layer were analyzed for volatile organic compounds (VOCs) with a library search, and soil samples collected from within the silt layer were analyzed for total organic carbon (TOC) content.

Results of Soil Sampling Above and Below Silt Layer. Results of the soil samples collected from above and below the silt layer are summarized on Table 1. Results of this sampling indicate that the concentration of contaminants measured in the excavation side walls (not previously sampled) are below the NYSDEC RSCOs. Combined with the previous sampling performed in each of these soil horizons, results indicate that soil remaining at the facility, above and below the silt layer, do not require further excavation or remediation.

Results of Soil Sampling Within the Silt Layer. Three soil samples were collected from within the silt layer and analyzed for TOC to establish a site-specific RSCO for contaminants within the silt layer. Results of this soil sampling are provided on Table 2. The average TOC content of the silt layer in the area of the former degreaser is 1.5%. Based on this TOC content, the site-specific RSCO for Trichloroethene (TCE) within the silt layer can be calculated to be 1,050 ug/kg. Comparison of this site-specific RSCO with the concentration of TCE previously measured on the sidewalls of the excavation indicates that the concentration of TCE within the silt layer adjacent to the excavation is above the calculated site-specific RSCOs.

Subsequent to the sampling event, during discussions with the NYSDEC project manager regarding the development of site-specific RSCOs, Kings learned that the soil samples collected to represent the TOC content of a soil should be collected from outside the impacted area. Based on this understanding, an additional sample of the silt layer will be collected from outside the existing excavation for TOC content analysis and the site-specific RSCOs recalculated.

Supplemental Ground Water Sampling

On 4 December 2001, Geovation collected additional ground water samples in order to determine if adjacent manufacturing properties east of Kings contribute to ground water contamination and to determine the off-site extent of the contaminant plume. Samples were taken at the southeastern portion of the facility and within a village park located off-site and to the southwest of the Kings' facility. Selected ground water sampling locations are provided on Figure 4. Off-site (ie. village park) ground water sampling was performed to assess the down gradient and westward extent of impacted ground water previously identified beneath Marbledale Road (see 9-10-01 monthly report to NYSDEC).

Ground water samples were collected through temporary small-diameter PVC wells, installed using direct push methodologies. Immediately after the temporary wells were installed, a small volume of ground water (approximately one bailer volume) was purged from each well and subsequently, a sample was collected. Samples were brought to the surface in dedicated, small-diameter polyethylene bailers, gently transferred to laboratory-provided glassware and placed into a cooler with ice. Subsequently, the samples were transported under chain-of-custody to Severn Trent Laboratories, Inc. (NYSDOH cert# 10142) for analysis for volatile organic compounds (VOCs) including a library search.

Results of Ground Water Sampling (Southeastern Portion of Facility). Results of the analysis of ground water samples collected from the southeastern portion of the facility (GCI-GP5 & GCI-GP6) are summarized on Table 3. Review of these results indicates that detectable concentrations of VOC parameters are not present in ground water in this area and the ground water meets the New York State Department of Environmental Conservation, division of Water, Technical and Operational Guidance Series (TOGs) No. 1.1.1 ground water standards and guidance values.

Results of Ground Water Sampling (Village Park). Results of the ground water sampling performed within the village park are also summarized on Table 3. Results indicate that concentrations of contaminants measured in two of the six temporary monitoring wells are above the NYSDEC TOGs 1.1.1 standards and guidance values. The two temporary monitoring wells determined to have contaminants exceeding the TOGs 1.1.1 standards (GCI-GP7 & GCI-GP12) were located in the portion of the park closest to Marbledale Road (Figure 4). Comparison of the results of this ground water sampling to the previous results obtained along Marbledale Road (see 9-10-01 monthly report to NYSDEC) suggests that impacted ground water does not extend significantly to the south or west of those areas previously identified. Ground water in the southern most downgradient location (GCI-GP12) exceeded TOGs 1.1.1 standards only for cis,1-2 dichloroethene, while the ground water collected at location GCI-GP7 exceeded TOGs 1.1.1 values for cis,1-2 dichloroethene, tetrachloroethene, 1,1,1 trichloroethane, and trichloroethene.

Ground Water Elevation Measurements

As described above, groundwater samples obtained on-site within the southeastern portion of the facility and off-site southwest of the facility in a village park were collected through temporary small-diameter PVC wells. After the ground water samples were collected, the temporary small-diameter wells were left in place overnight. The following day each was surveyed and a measurement was collected of the depth to ground water. The elevation of the top of each temporary well casing was surveyed to the nearest thousandth of a foot and ground water elevations were collected from the temporary wells and numerous existing on-site (ie. permanent) wells. Based on these measurements the water table elevation was calculated for each point measured and a ground water contour diagram prepared. Calculated elevations of the water table at each location measured 5 December 2001 are provided on Table 4. A ground water contour diagram prepared based on this data is provided as Figure 4. Review of this figure indicates the ground water flow at the site is primarily in a southerly direction with a localized small-scale strong westerly component in the vicinity of ground water monitoring point GP-102. This overall pattern of ground water flow is consistent with that previously reported at the site.

Conclusions

Based on the information presented in this report, the following conclusions are warranted:

- Four additional soil samples were collected above the existing natural silt layer from the side walls of the excavation (ie. laterally) beneath the former degreaser area in the northern portion of the facility. Results of analytical testing of these soil samples combined with the previous testing of the excavation side walls indicates that soil remaining above the silt layer is in compliance with the recommended site soil cleanup objectives established by NYSDEC TAGM 4046.

- Four additional soil samples were collected below the existing natural silt layer from the side walls of the excavation (ie. laterally) beneath the former degreaser area in the northern portion of the facility. Results of analytical testing of these soil samples combined with the previous testing of the excavation side walls indicates that soil remaining below the silt layer is in compliance with the recommended site soil cleanup objectives established by NYSDEC TAGM 4046.

- Three additional soil samples were collected from within the silt layer and analyzed for total organic carbon (TOC) to establish site specific soil cleanup objectives for the silt layer. Taking into account the organic content of the silt layer, the concentration of trichloroethene present in the silt layer exceeds the site specific calculated soil cleanup objectives. Additional sampling of the silt layer, for TOC, will be performed outside the impacted area, and the site-specific RSCOs will be recalculated based on the unimpacted soil TOC content.

- Two ground water samples were collected from temporary wells installed on-site within the southeastern portion of the facility. Analytic results of ground water testing in this area indicates that volatile organic compounds are not present above the concentrations established in NYSDEC TOGs 1.1.1.

- Six ground water samples were collected from temporary wells installed off-site within a village park located to the south and west of the King's facility at the intersection of Main Street and Marbledale Road. Analytical testing of ground water from two (out of six) of the temporary wells was reported to contain concentrations of one or more chlorinated volatile organic compounds above the concentrations established in NYSDEC TOGs 1.1.1. Both temporary wells were located close to Marbledale Road.

- Water table elevations were measured in temporary wells and most of the existing permanent on-site wells. Based on these measurements a ground water contour diagram was prepared. This diagram indicates that ground water flow is primarily to the south with a localized small-scale strong westerly component in the vicinity of ground water monitoring point GP-102

- Based on the direction of ground water flow discussed above, the ground water samples collected in the village park were located down gradient of ground water samples previously collected along Marbledale Road, and sample results (ie. samples collected in the park) suggest a limit to the southern and western extent of impacted ground water.

Sincerely,

Robert Zimmer, P.G.
Vice-President

Table 1

DEGREASER-AREA ADDITIONAL POST-EXCAVATION VOC SOIL SAMPLING RESULTS

Kings Electronics

Sample Date: 11/13/01

Analyte	GCI-B1-ASL	GCI-B2-ASL	GCI-B3-ASL	GCI-B4-ASL	GCI-B5-BSL	GCI-B6-BSL	GCI-B7-BSL	GCI-B8-BSL	FIELD BLANK	TRIP BLANK	NYSDEC TAGM*
	Concentration of VOC (ug/kg)										
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	60
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	17,620
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	24,910
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	600
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,700
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,900
Chloroform	ND	1.8	ND	ND	ND	15	ND	ND	ND	ND	300
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2-Dibromomethane (EDB)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	7,900
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,550
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	8,500
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	200
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	400
cis-1,2-Dichloroethene	ND	ND	ND	ND	ND	1.0 J	ND	ND	ND	ND	300 [1]
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	300
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	300
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	300
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5,500
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Isopropyl benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,740
4-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,570
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	100
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	13,000
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	14,000
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,310
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	600
Tetrachloroethene	28	ND	0.65 J	3.9	0.71 J	13	ND	11	ND	ND	1,400
Toluene	ND	ND	ND	0.61 J	ND	0.8 J	ND	ND	ND	ND	1,500
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3,400
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	760
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Trichloroethene	37	2	20	150	1.8	54	ND	90	ND	ND	700
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	340
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	120
o-Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,200
m&p-Xylenes	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1,200
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
Total VOC's	**65**	**3.8**	**20**	**153.9**	**1.8**	**82**	**0**	**101**	**0**	**0**	
Total TIC's	12	22	0	12	0	361.2	16	13	5.6	0	
Total VOC's + TIC's	77	25.8	20	165.9	1.8	443.2	16	114	5.6	0	

Notes:

ND Analyzed but not detected.

12 Concentration exceeds TAGM objectives.

NGV No guidance value listed.

1 No TAGM objective for *cis*-DCE, so standard for *trans*-DCE is being used.

* NYSDEC TAGM (Technical and Administrative Guidance Memorandum) Recommended Soil Cleanup Objectives

Table 2

DEGREASER-AREA ADDITIONAL POST-EXCAVATION TOC SOIL SAMPLING RESULTS

Kings Electronics
Sample Date: 11/13/01

Sample	GCI-B9-SL	GCI-B10-SL	GCI-B11-SL
	Total Organic Carbon (%)		
TOC (%)	**1.39**	**1.84**	**1.28**

Notes:

* NYSDEC TAGM 4046 (Technical and Administrative Guidance Memorandum) Recommended Soil Cleanup Objectives

Table 3

ADDITIONAL ON-SITE AND OFF-SITE (PARK) VOC GROUND WATER SAMPLING RESULTS

Kings Electronics

Sample Date: 12/4/01

Analyte	GCI-GP5	GCI-GP6	GCI-GP7	GCI-GP8	GCI-GP9	GCI-GP10	GCI-GP11	GCI-GP12	FIELD BLANCK	TRIP BLANK	TOGs 1.1.1
	Concentration of VOC (ug/kg)										
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.00
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50.00
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50.00
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50.00
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
n-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Chloroform	ND	ND	0.61J	1.5	ND	ND	ND	ND	ND	ND	7.00
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	50.00
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
1,2-Dibromomethane (EDB)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.00
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.00
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	3.00
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
1,1-Dichloroethane	ND	ND	2.2	ND	ND	ND	0.72J	1.2	ND	ND	5.00
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.60
1,1-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
cis-1,2-Dichloroethene	ND	ND	7.3	ND	ND	1.2	2.6	18	ND	ND	5.00
trans-1,2-Dichloroethene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.00
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.40
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.40
Ethylbenzene	ND	ND	ND	0.75J	1.2	ND	ND	0.56J	ND	ND	5.00
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.50
Isopropyl benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
4-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
p-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Methylene chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Methyl-tert-butyl-ether (MTBE)	ND	ND	2.1	ND	ND	1.7	2.7	4.6	ND	ND	10.00
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	10.00
n-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	930.00
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
Tetrachloroethene	ND	ND	16	ND	ND	1.6	3.8	1.3	ND	ND	5.00
Toluene	ND	ND	ND	0.94J	2.2	ND	ND	0.65J	ND	ND	5.00
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NGV
1,1,1-Trichloroethane	ND	ND	5.7	ND	ND	ND	0.91J	1	ND	ND	5.00
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	1.00
Trichloroethene	ND	ND	7.7	ND	ND	1.3	2.4	3.7	ND	ND	5.00
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	5.00
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.04
1,2,4-Trimethylbenzene	ND	ND	ND	1.3	4	ND	ND	1.3	ND	ND	5.00
1,3,5-Trimethylbenzene	ND	ND	ND	ND	1	ND	ND	ND	ND	ND	5.00
Vinyl chloride	ND	ND	ND	ND	ND	ND	ND	4.8	ND	ND	2.00
o-Xylene	ND	ND	ND	1.2	1.5	ND	ND	0.88J	ND	ND	5.00
m&p-Xylenes	ND	ND	ND	2.7	4.2	ND	ND	1.8	ND	ND	5.00
1,2-Dibromo-3-chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0.04
Total VOC's	ND	ND	41.6	8.4	14.1	5.8	13.1	39.8	ND	ND	

Notes:

ND	Analyzed but not detected.
12	Concentration exceeds TOGS standards andor guidance values.
NGV	No guidance value listed.

Table 4
WATER TABLE ELEVATION DATA
Kings Electronics

Measurment Point	Surveyed Elevation	Measured Depth to Ground Water	Water Table Elevation
MW-6S	101.91	15.57	86.34
HP-8S	101.22	14.73	86.49
MW-11	103.48	17.24	86.24
MW-10	103.24	16.96	86.28
MW-12	103.52	17.31	86.21
MW-2	100.12	13.76	86.36
MW-3	100.09	13.97	86.12
MW-9S	100.2	13.97	86.23
MW-5S	101.41	15.51	85.9
PTW-1	99.8	14.39	85.41
PTW-2	99.9	14.23	85.67
GP-106	101.6	16.15	85.45
MW-4S	100.81	15.51	85.3
IW-1	100.26	14.97	85.29
IW-2	99.68	14.41	85.27
IW-3	99.08	13.81	85.27
IW-4	98.62	13.35	85.27
GP-104	94.22	9.05	85.17
GP-120	101.65	dry	<86.19
GP-121	100.9	dry	<85.97
GP-103	94.26	9.3	84.96
MW-7S	97.83	14.93	82.9
GCI-5	101.13	16.46	84.67
GCI-6	100.83	15.24	85.59
GP-102S	98.48	17.41	81.07
GCI-7	98.18	18.65	79.53
GCI-8	98.32	18.51	79.81
GCI-9	98.7	20.65	78.05
GCI-10	98.61	20.43	78.18
GC-11	98.24	20.25	77.99
GCI-12	98.06	20.32	77.74

Notes:

Measurement Locations Provided on Figure 4

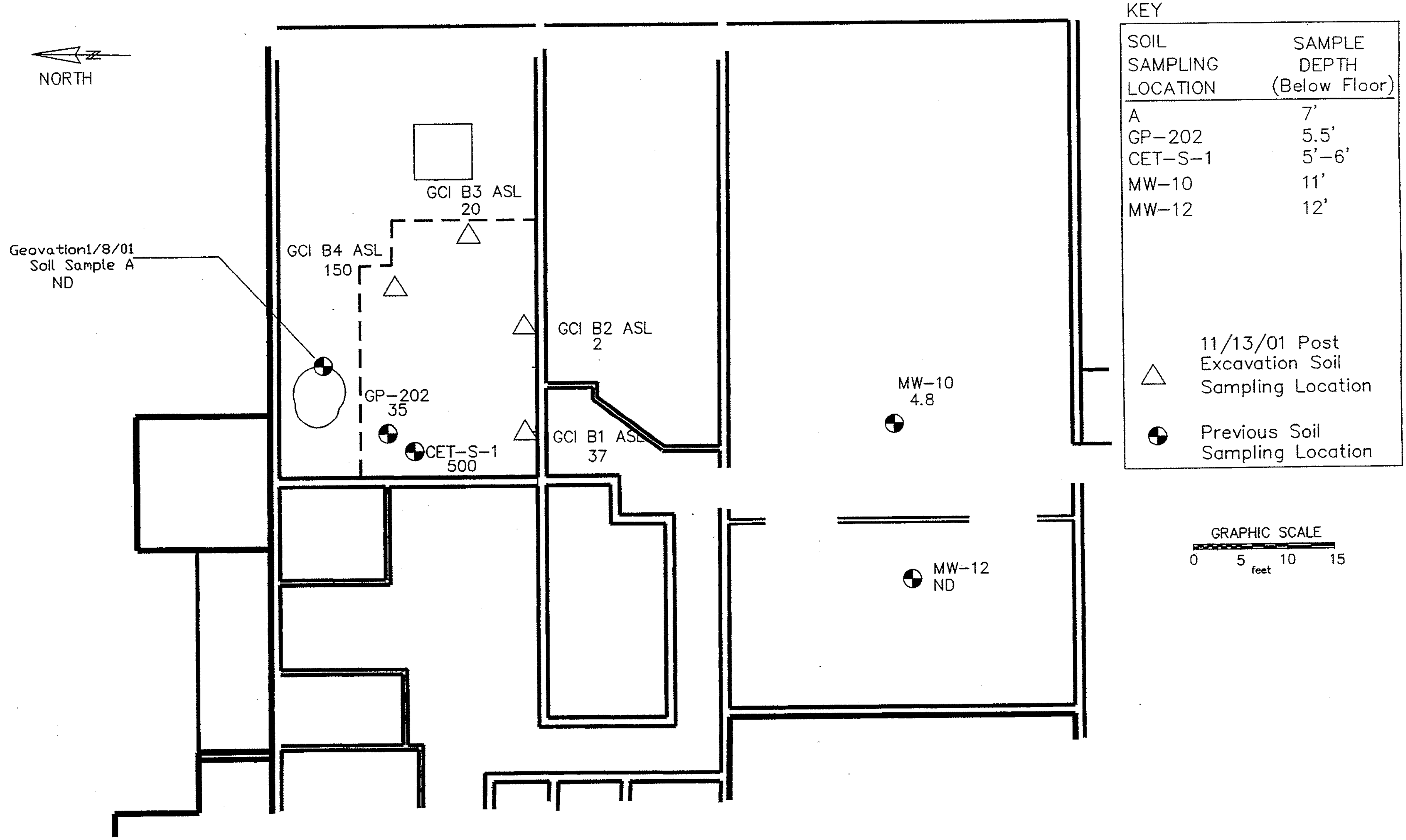


Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

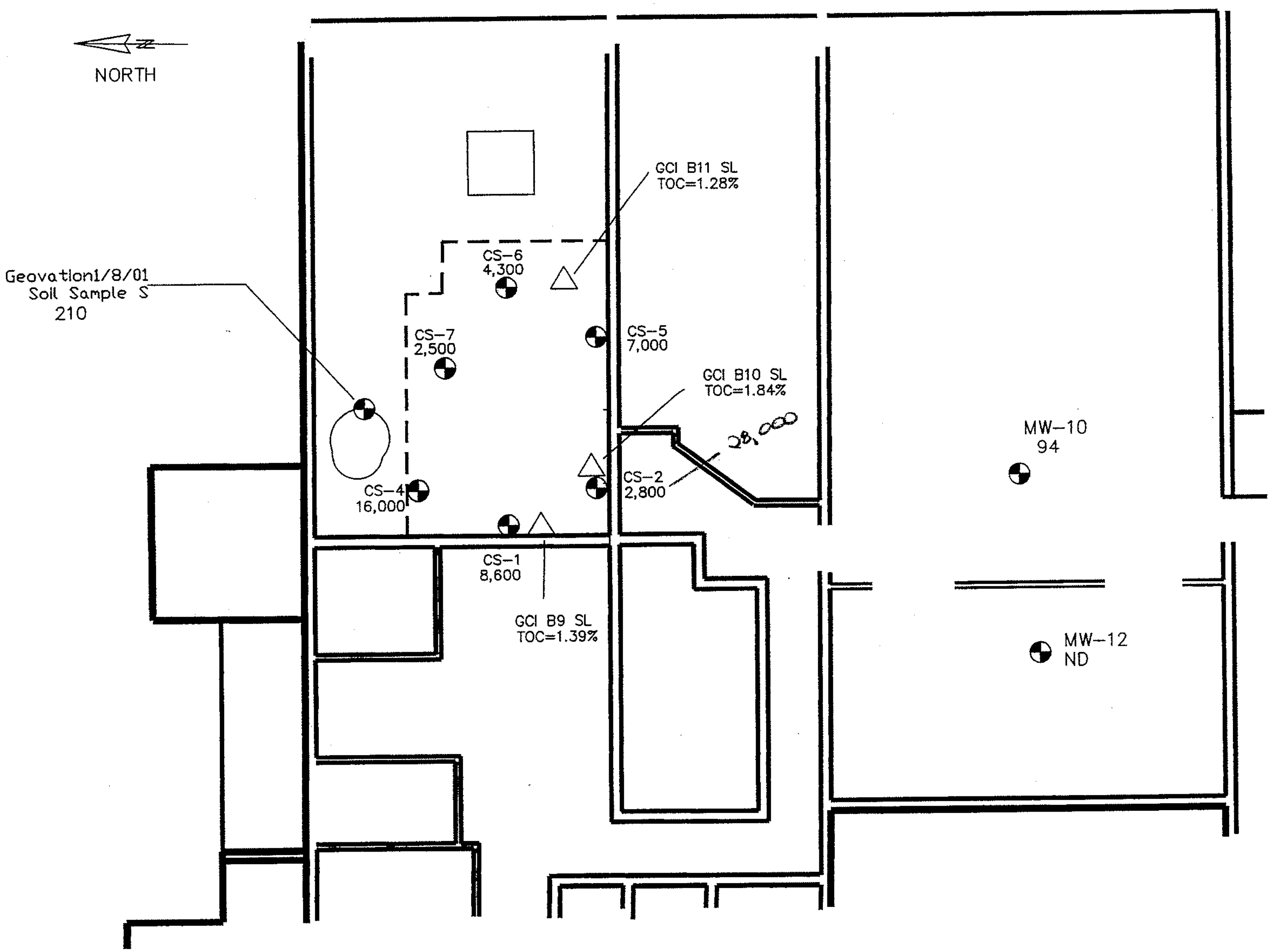
GEOVATION GEOVATION CONSULTANTS, Inc.
Innovative Solutions to Environmental Problems
FLORIDA, NEW YORK

Former Degreaser Area --- Soil Sampling ABOVE the Silt Layer

Concentration of TCE in Soil (in ug/Kg)

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 1



KEY

SOIL SAMPLING LOCATION	SAMPLE DEPTH (Below Floor)
S	7.25'
CS-2	6.5'
CS-4	6.5'
CS-5	6.5'
CS-6	6.5'
CS-7	6.5'
CS-1	6.5'
MW-10	11'-11.5'
MW-12	11.5'-12.5
CS-3	7.5'

△ 11/13/01 Post Excavation Soil Sampling Location

Previous Soil Sampling Location

GRAPHIC SCALE
0 5 10 15
Feet

Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

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FLORIDA, NEW YORK

Former Degreaser Area --- Soil Sampling WITHIN the Silt Layer

Concentration of TCE in Soil (in ug/Kg)

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE

2

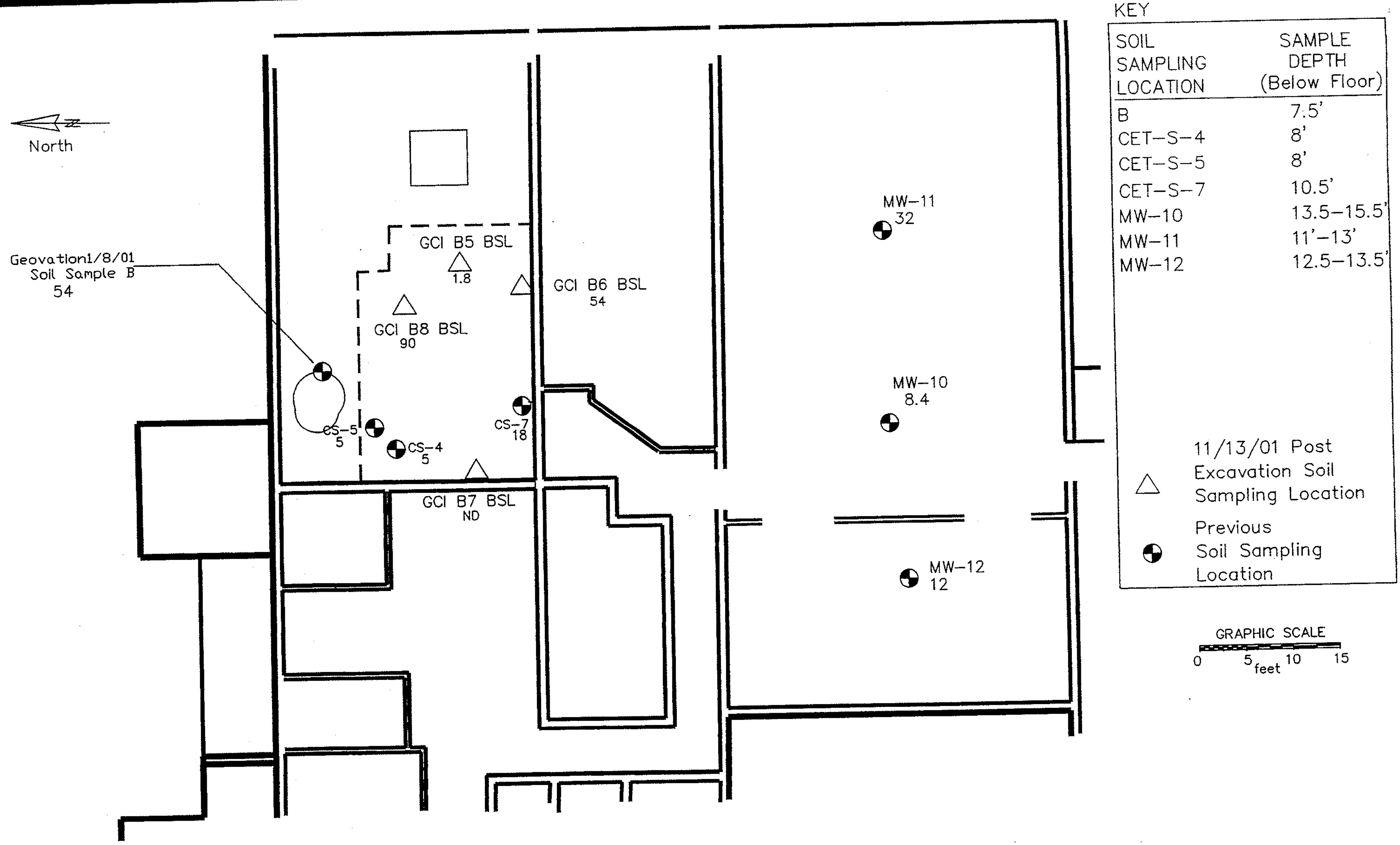

Figure based on: 3 Aug 2001 Partial Plan Prepared for Kings Electronics.....Rob Iaropoli, L.S.

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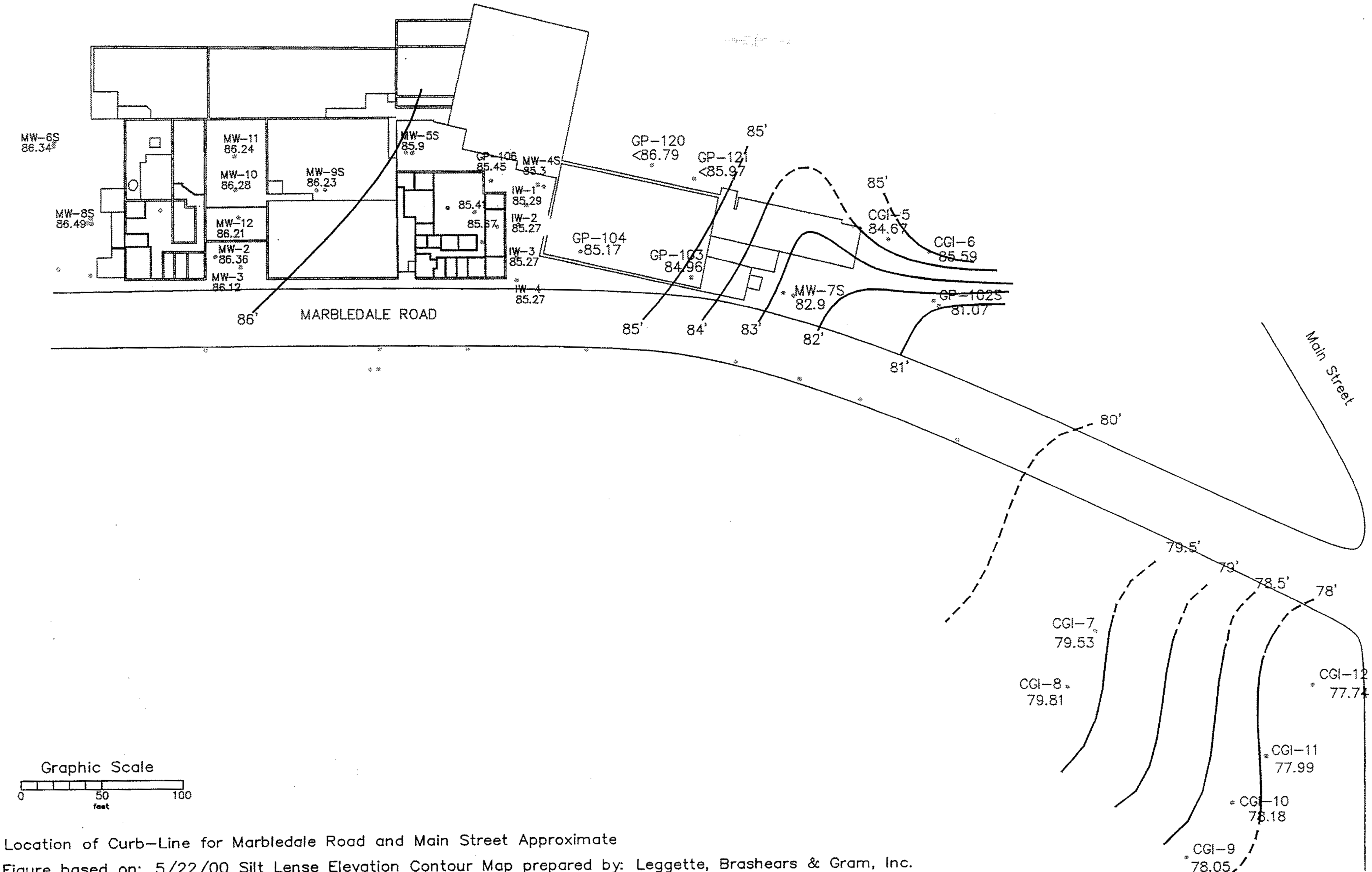
FLORIDA, NEW YORK

Former Degreaser Area --- Soil Sampling BELOW the Silt Layer

Concentration of TCE in Soil (in ug/Kg)

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 3



Location of Curb-Line for Marbledale Road and Main Street Approximate

Figure based on: 5/22/00 Silt Lense Elevation Contour Map prepared by: Leggette, Brashears & Gram, Inc.

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GEOVATION CONSULTANTS, Inc.
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FLORIDA, NEW YORK

Ground Water Contour Diagram 12-5-01

Contour Interval = 1 foot (unless otherwise noted)

KINGS ELECTRONICS CO, INC. 40 MARBLEDALE RD. TUCKAHOE, NY

FIGURE 4

ARCADIS

Appendix C

As-Built Drawings for In-Situ Bioremediation System

LEGEND

IW-12 INJECTION WELL

MW-7S INJECTION WELL (FORMER MONITORING WELL)

GP-103 PERFORMANCE MONITORING WELL

MW-7D MONITORING WELL

CENTRALIZED INJECTION MANHOLE

(M) STORMWATER MANHOLE

CATCH BASIN

SITE BOUNDARY

S SANITARY SEWER

ST STORM SEWER

E UNDERGROUND ELECTRICAL LINE

HDPE INJECTION LINE

VENT LINE

ENGINEERING DESIGN:

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Monitoring Wells	Total Depth (ft bgs/floor surface)	Screen Length (ft)	Location
On-site Performance Monitoring Wells			
GP-103R	16.0	10	Inside - Unit #0045
GP-104R	16.0	10	Inside - Electric Room
MW-6S	20.0	10	Outside
MW-9S	20.0	10	Inside - Hallway
MW-9D	40.0	10	Inside - Hallway
MW-13R	21.0	10	Outside
PTW-1	19.0	10	Inside - Office Area
On-site Monitoring Wells			
MW-HP-1D	40.0	10	Outside
MW-5S	20.0	5	Outside
MW-6D	48.5	10	Outside
MW-7D	20.0	10	Outside
MW-HP-8D	58.0	10	Outside
PTW-2	17.0	10	Inside - Office Area

Injections Wells	Total Depth (ft bgs/floor surface)	Screen Length (ft)	Location
Injection Line 1			
IW-5	20.5	10	Outside
IW-6	21.0	10	Outside
MW-HP-8S	20.0	10	Outside
MW-1	20.0	10	Outside
Injection Line 2			
MW-10	23.5	10	Inside - Unit #1200
MW-11	23.5	10	Inside - Unit #1208
MW-12	23.5	10	Inside - Unit #1188
MW-2	20.0	10	Inside - Unit #1068
Injection Line 3			
IW-8	19.5	10	Inside - Hallway
IW-9	21.0	10	Inside - Unit #1018
IW-10	20.0	10	Inside - Unit #1040
IW-11	21.0	10	Outside
Injection Line 4			
GP-106R2	20.0	10	Outside
IW-1	20.5	10	Outside
IW-2	20.5	10	Outside
IW-3	20.5	10	Outside
IW-4	20.5	10	Outside
Injection Line 5			
IW-12	16.0	10	Inside - Unit #0013
IW-13	16.0	10	Inside - Unit #0068
IW-14	21.5	10	Outside
Injection Line 6			
IW-15R	20.0	10	Outside
IW-16	21.0	10	Outside
MW-7S	20.0	10	Outside

0 20' 40'
GRAPHIC SCALE

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Professional Engineer's Name: MOH MOHIUDDIN, PHD, PE, BCEE
Professional Engineer's No.: 074527
State: NY | Date Signed: | Project Mgr.: MM
Designed by: ER | Drawn by: JG | Checked by: MM

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ARCADIS OF NEW YORK, INC.

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APPENDIX C

AS-BUILT REMEDIAL SYSTEM LAYOUT PLAN

ENVIRONMENTAL

ARCADIS Project No. NJ000423.00005.0003
Date: SEPTEMBER 11, 2008

ARCADIS
1 INTERNATIONAL BLVD
SUITE 406
MAHWAH, NEW JERSEY 07495
TEL. 201.684.1410

C1

CITY: DIV/GROUP: DB: LD: PIC: PM: TM: LYR:ON=*;OFF=*REF*
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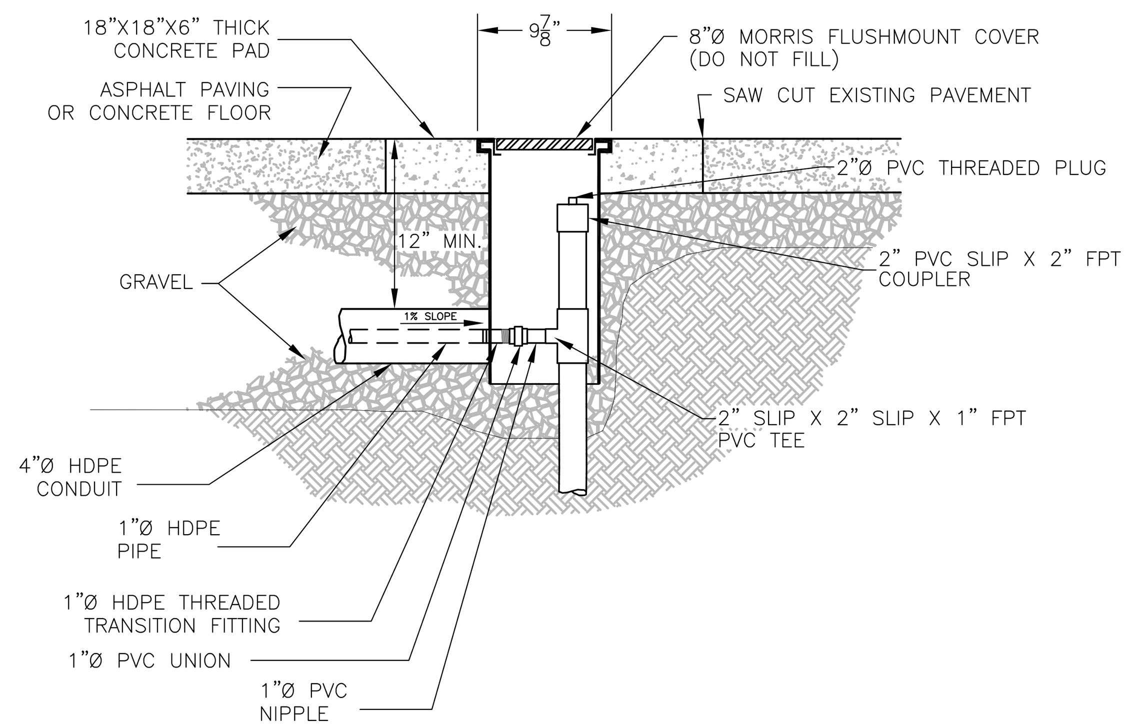
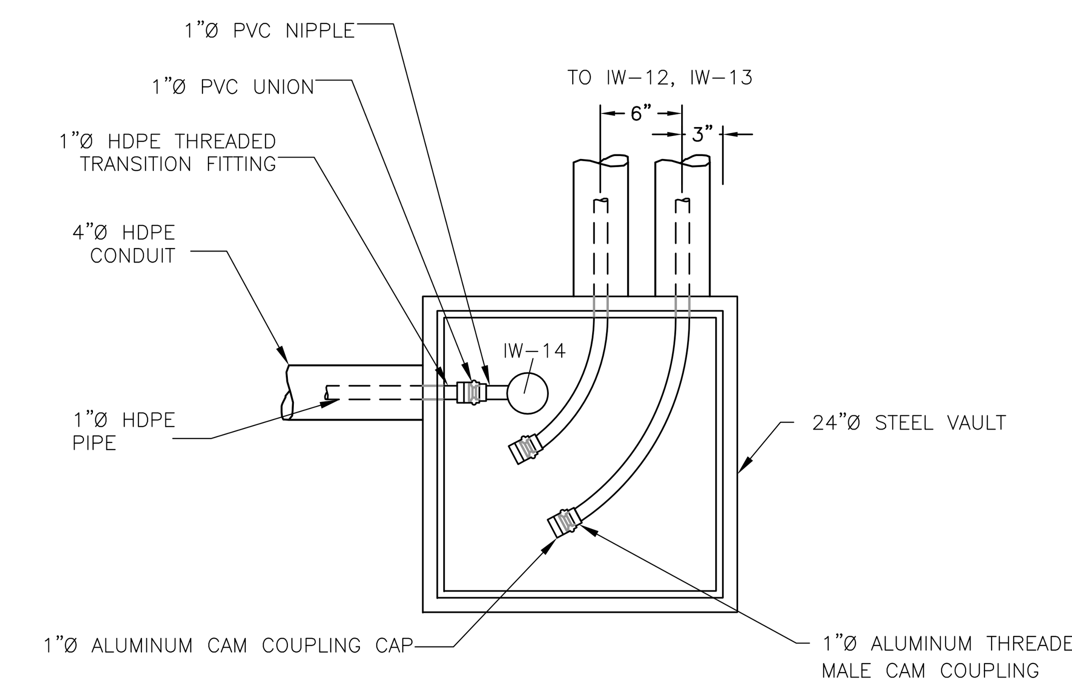
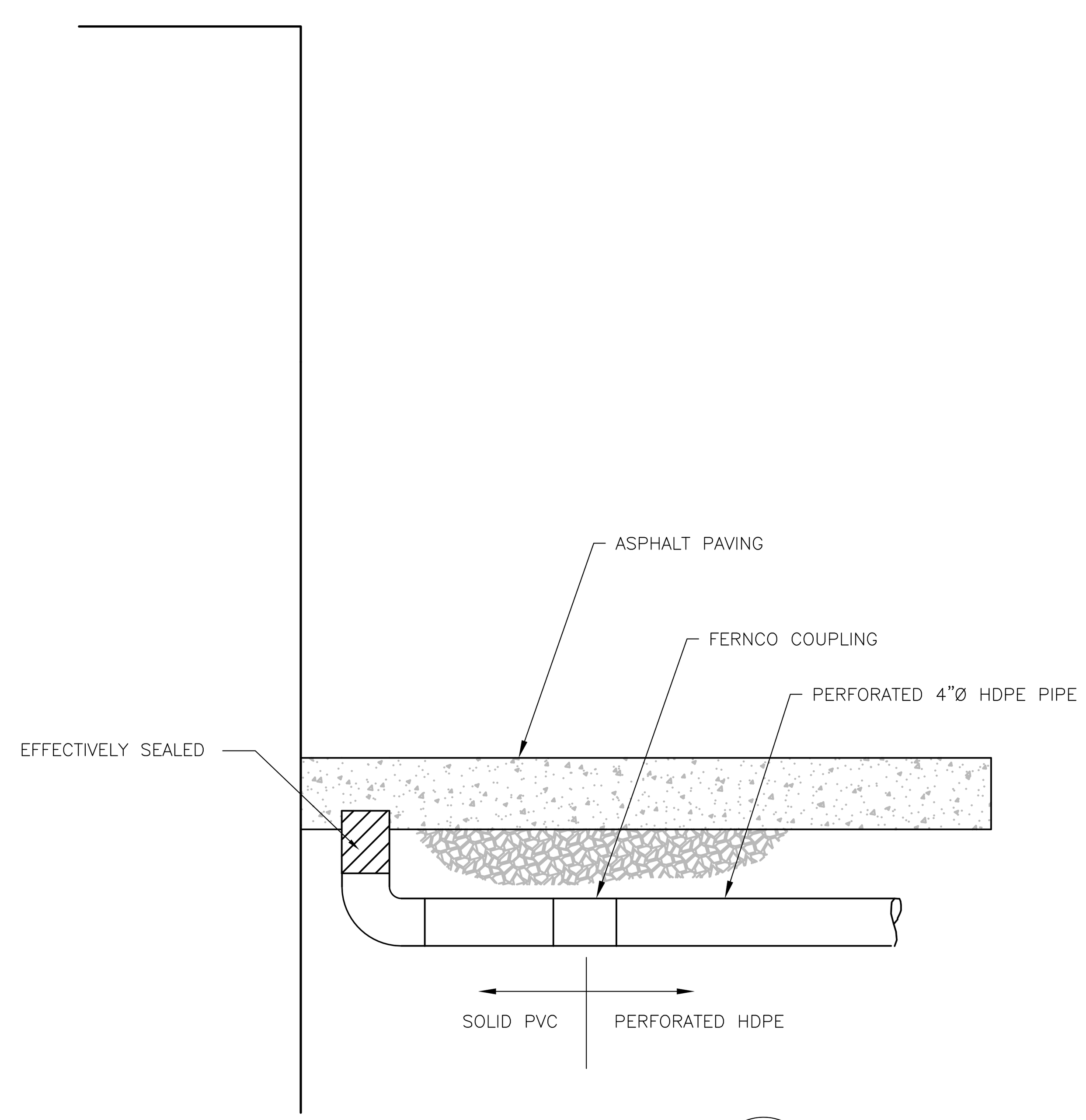


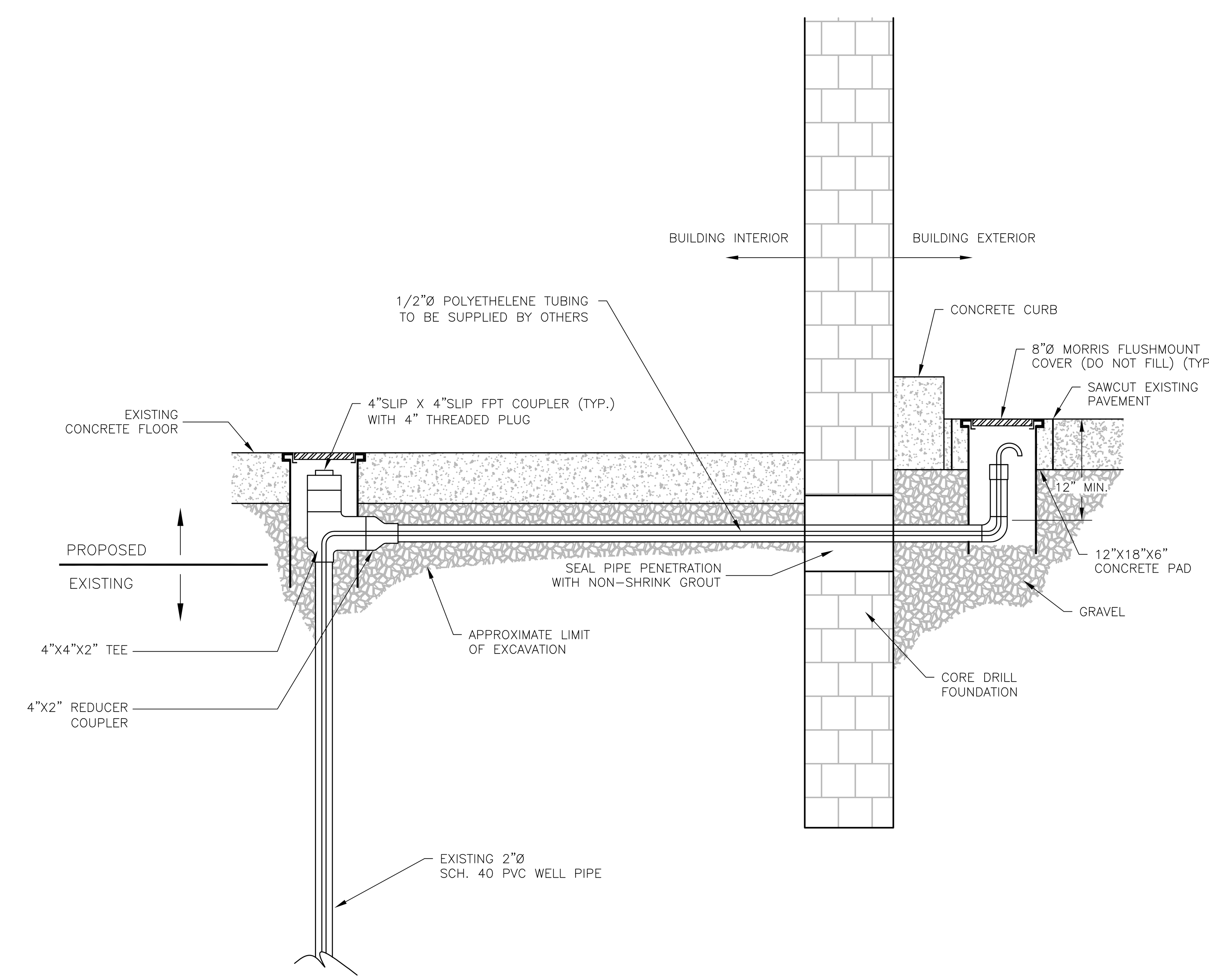
TYPICAL WELL HEAD DETAIL 1 B1|B2
SCALE 1" = 1'-0"



INJECTION LINE PULL BOX 2 B1|B2
SCALE 1" = 1'-0"



TYPICAL VENT DETAIL 3 B1|B2
SCALE 1" = 1'-0"



MONITORING WELL PTW-2 MODIFICATIONS 4 B1|B2
SCALE 1" = 1'-0"

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Professional Engineer's Name		
MOH MOHIUDDIN, PHD, PE, BCEE		
Professional Engineer's No. 074527		
State: NY	Date Signed	Project Mgr.: MM
Designed by: ER	Drawn by: JG	Checked by: MM

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APPENDIX C

AS-BUILT DETAILS

ENVIRONMENTAL

ARCADIS Project No. NJ000423.00005.0003

Date SEPTEMBER 11, 2008

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MAHWAH, NEW JERSEY 07495
TEL. 201.684.1410

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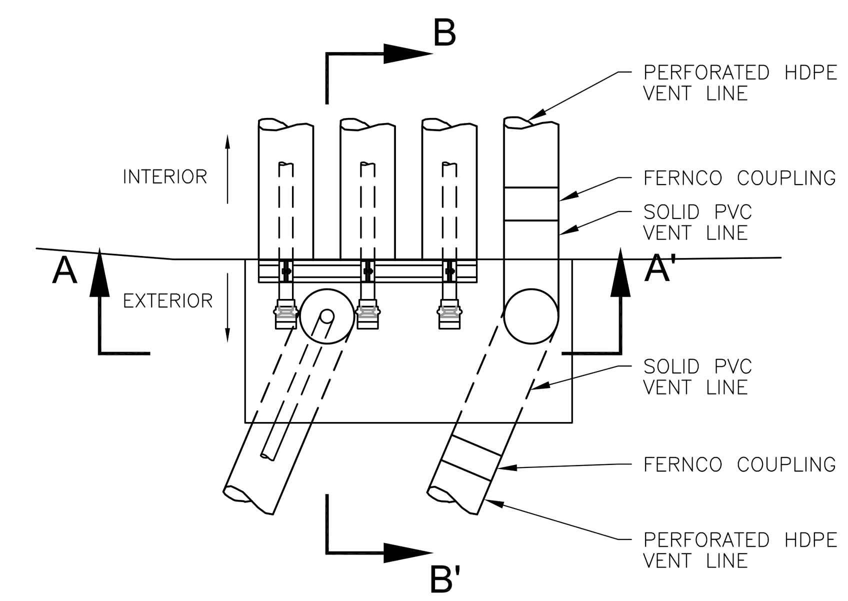
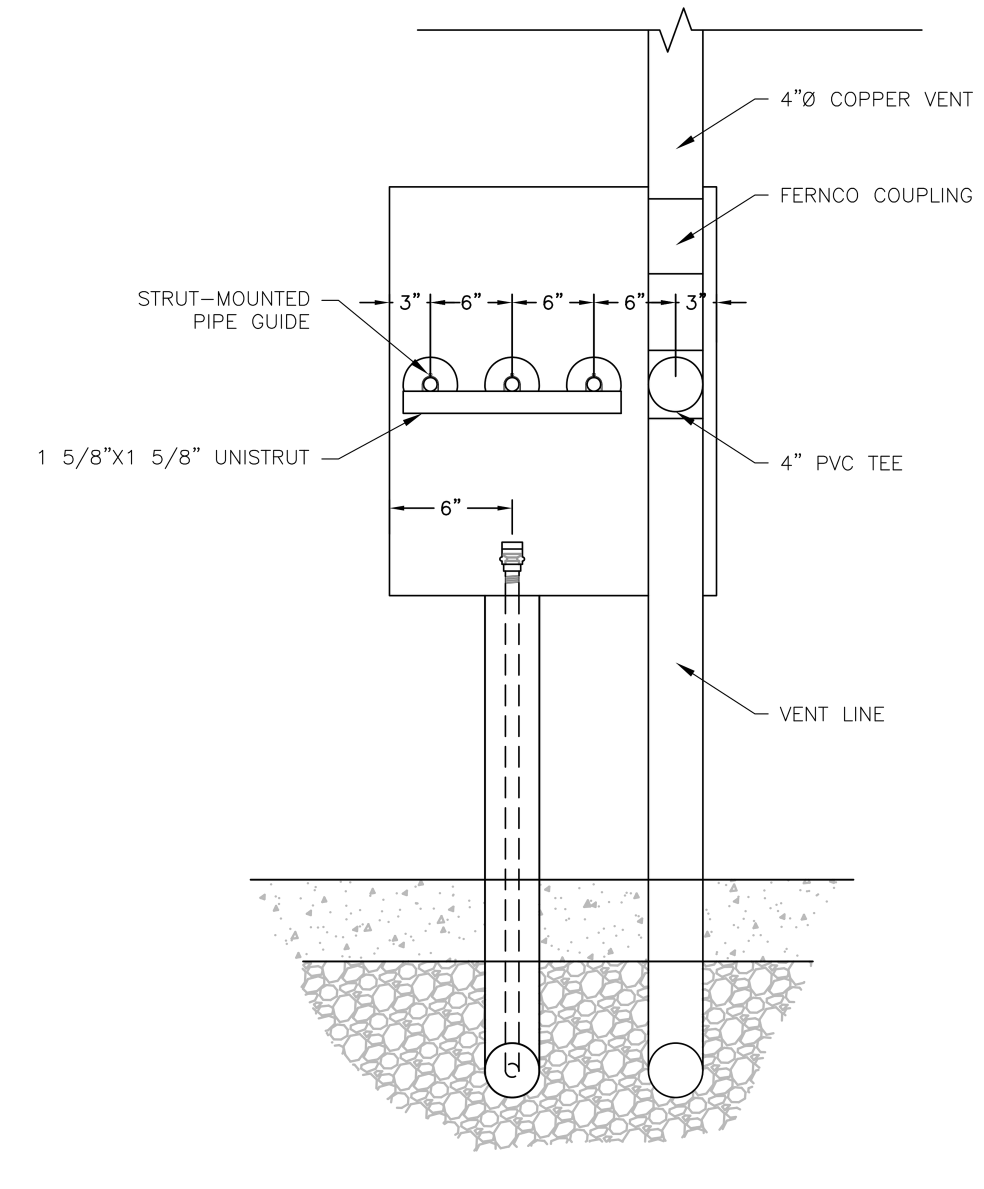
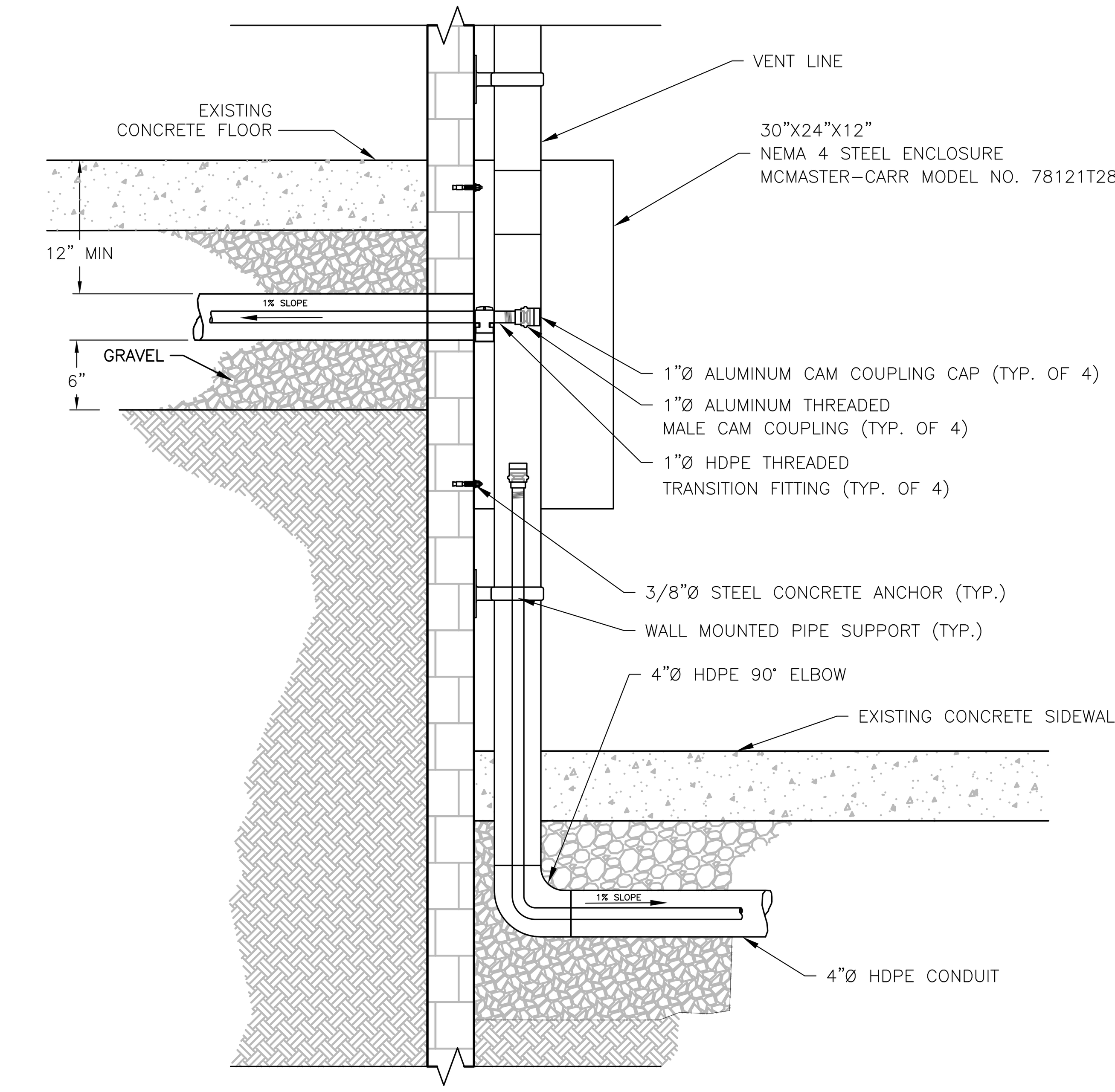


PLAN



SECTION A-A'



SECTION B-B'

WALL MOUNTED INJECTION ENCLOSURE 5 B1 B3

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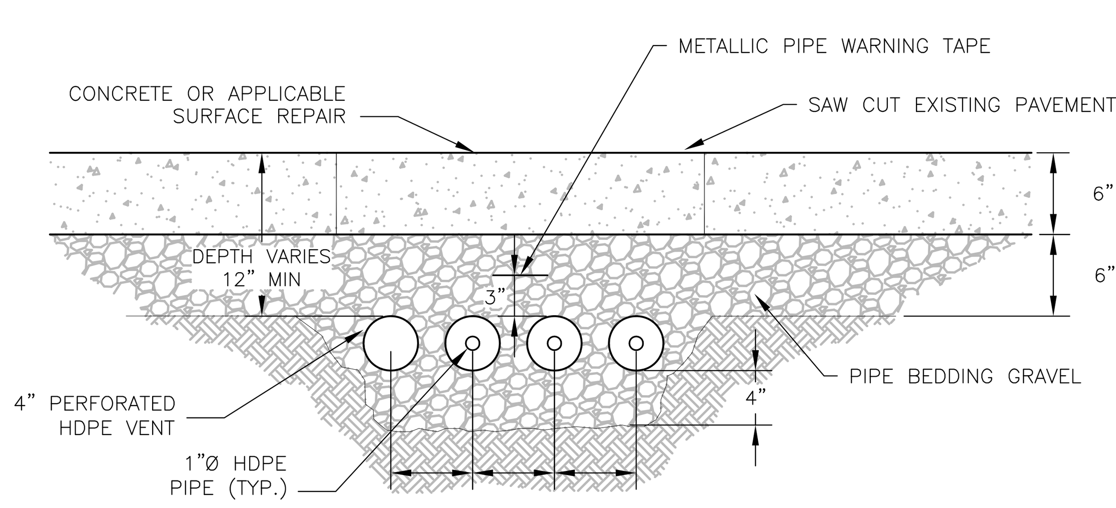
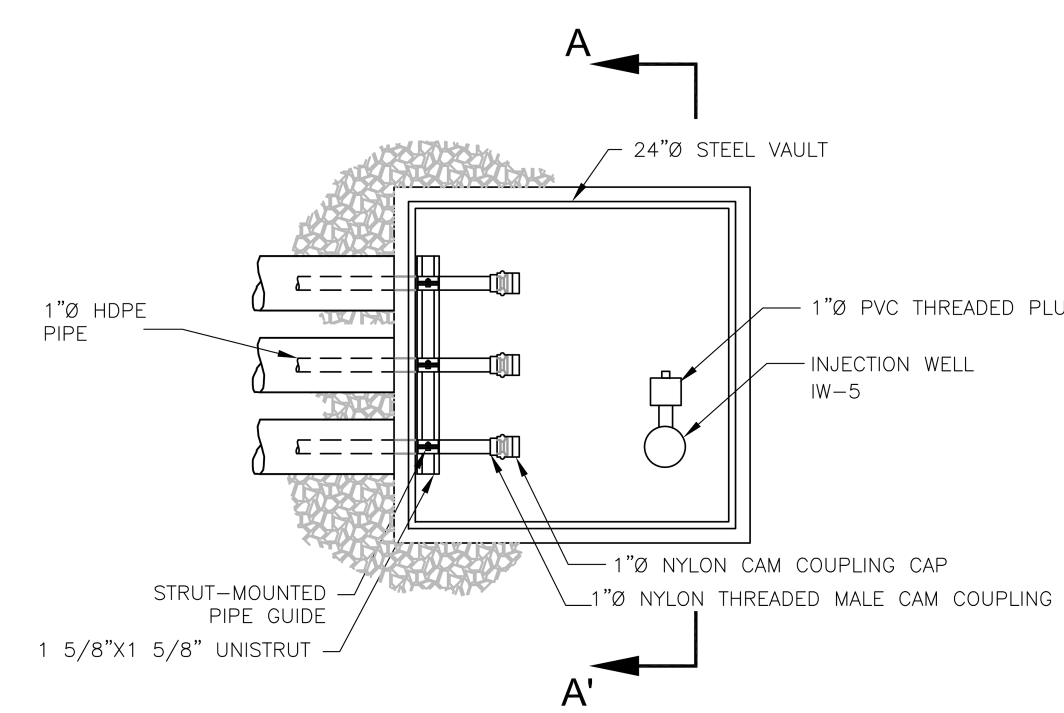


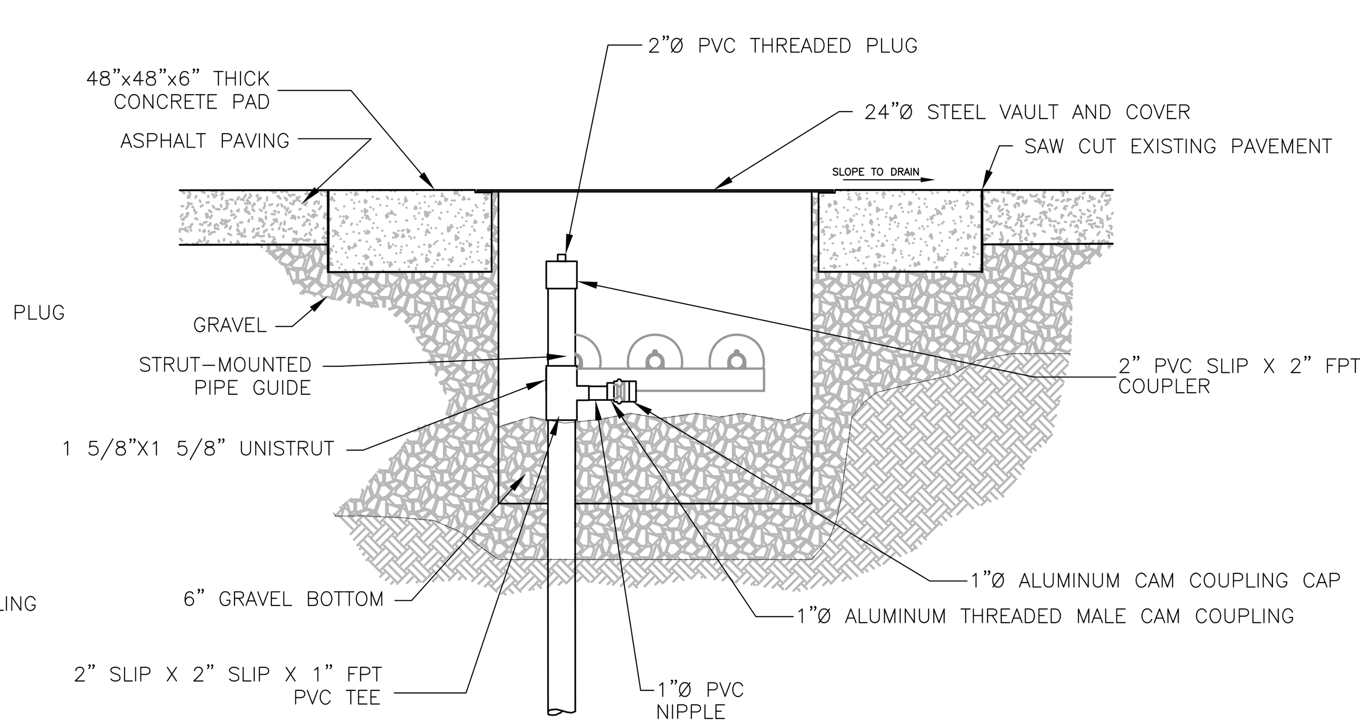
TYPICAL TRENCH DETAIL 6 B1 B3

SCALE 1" = 1'-0"



PLAN

SCALE 1" = 1'-0"



SECTION A-A'

SCALE 1" = 1'-0"

INJECTION MANHOLE 7 B1 B3

SCALE 1" = 1'-0"

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Professional Engineer's Name		
MOH MOHIUDDIN, PHD, PE, BCEE		
Professional Engineer's No. 074527		
State: NY	Date Signed	Project Mgr.: MM
Designed by: ER	Drawn by: JG	Checked by: MM

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FORMER KINGS ELECTRONICS SITE • TUCKAHOE, NEW YORK

APPENDIX C

AS-BUILT DETAILS

ENVIRONMENTAL

ARCADIS Project No. NJ000423.00005.0003

Date SEPTEMBER 11, 2008

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SUITE 406
MAHWAH, NEW JERSEY 07495
TEL. 201.684.1410

C3

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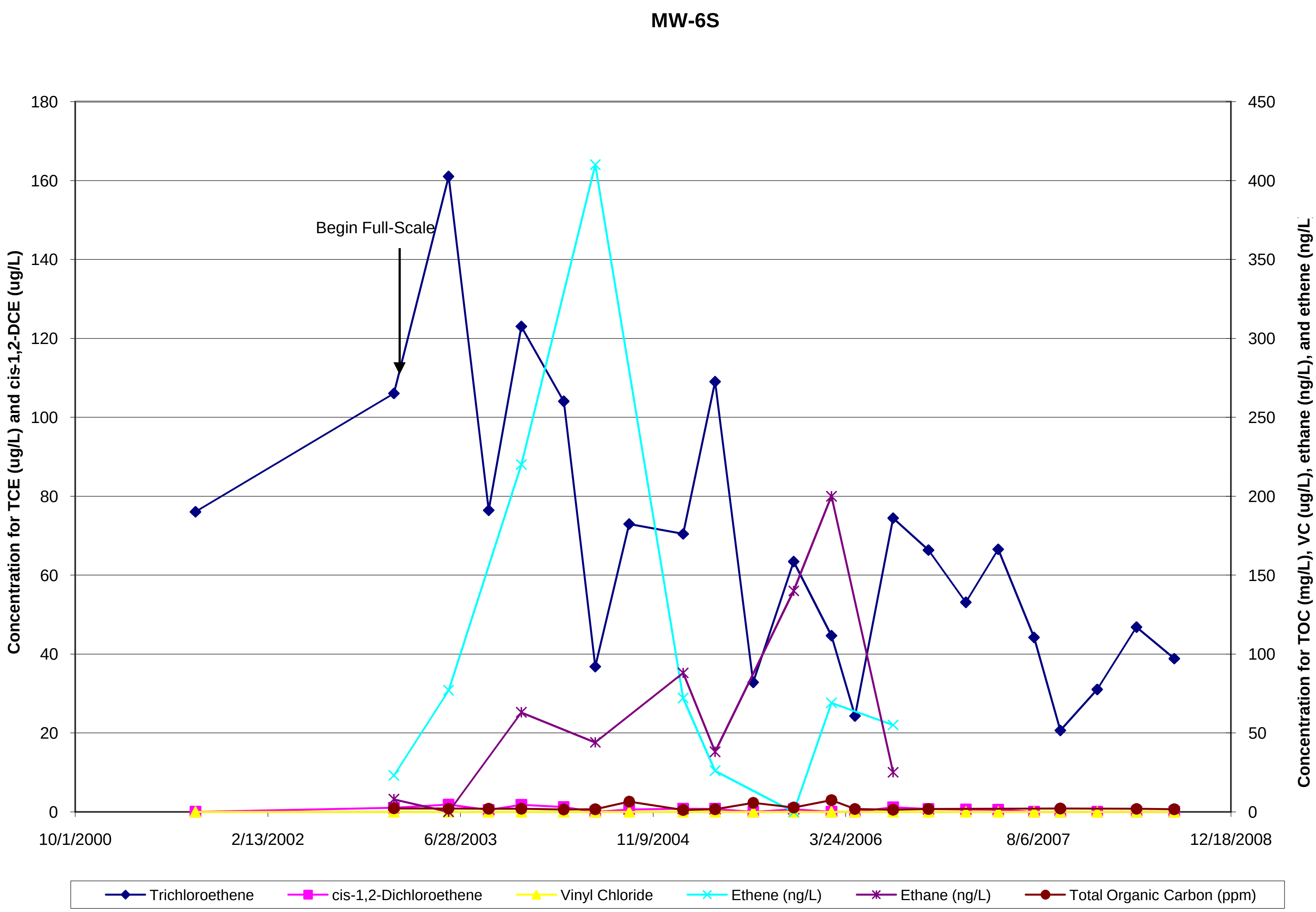
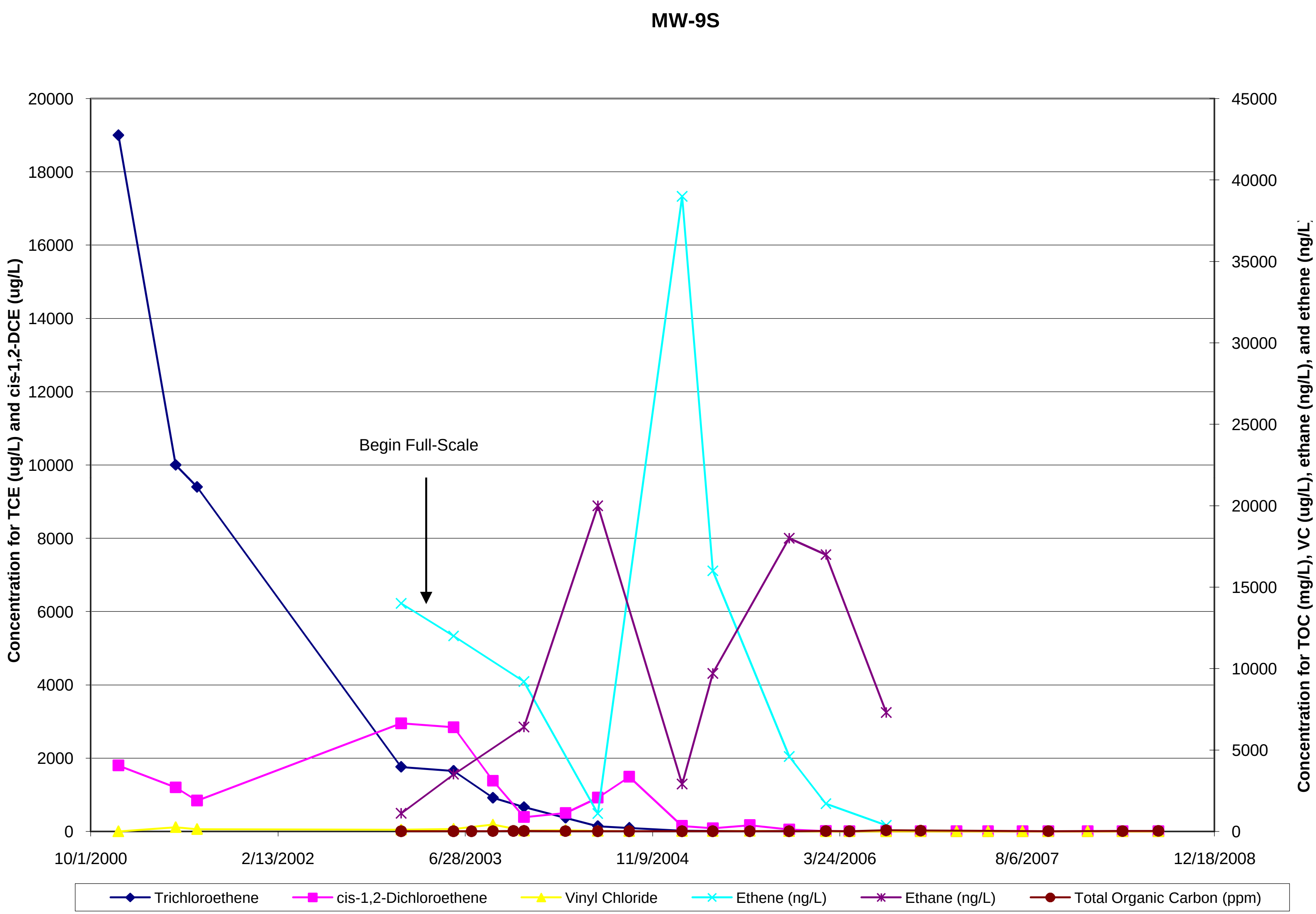
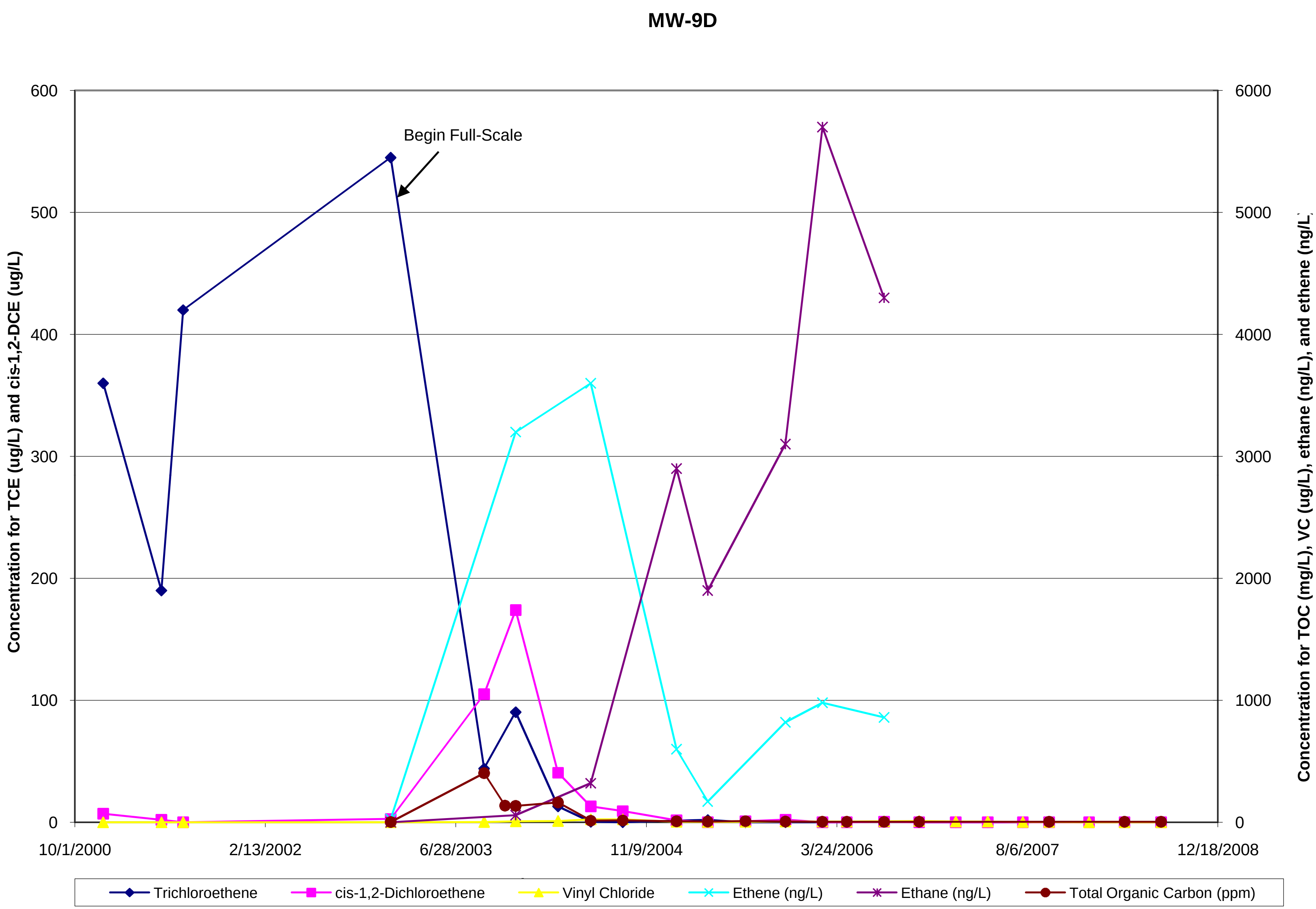
Appendix D

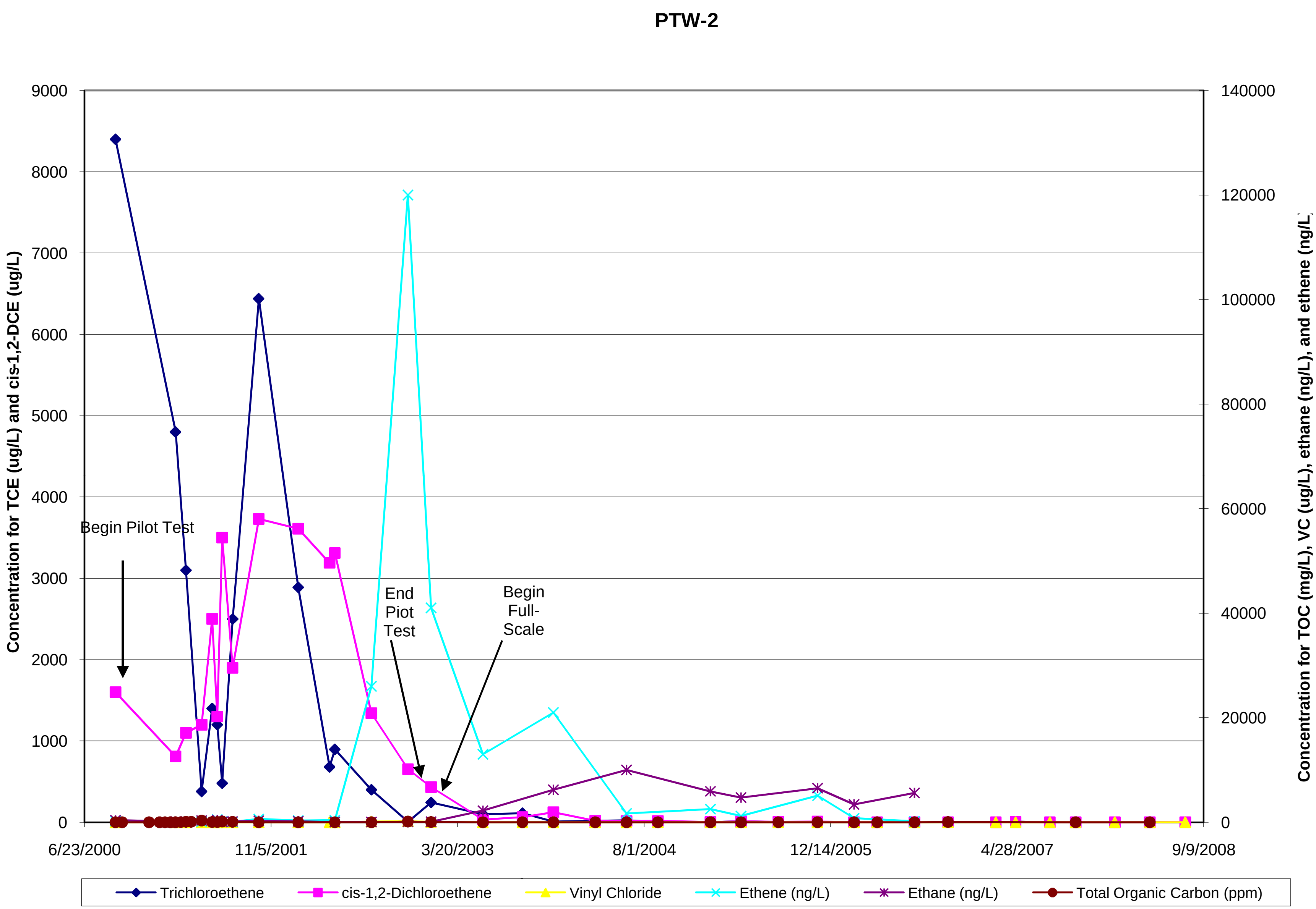
Volatile Organic Compound Concentration Trends


MW-6S
Begin Full-Scale
Concentration for TCE (ug/L) and cis-1,2-DCE (ug/L)
Concentration for TOC (mg/L), VC (ug/L), ethane (ng/L), and ethene (ng/L)
180
160
140
120
100
80
60
40
20
0
450
400
350
300
250
200
150
100
50
0
10/1/2000
2/13/2002
6/28/2003
11/9/2004
3/24/2006
8/6/2007
12/18/2008
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
Ethene (ng/L)
Ethane (ng/L)
Total Organic Carbon (ppm)

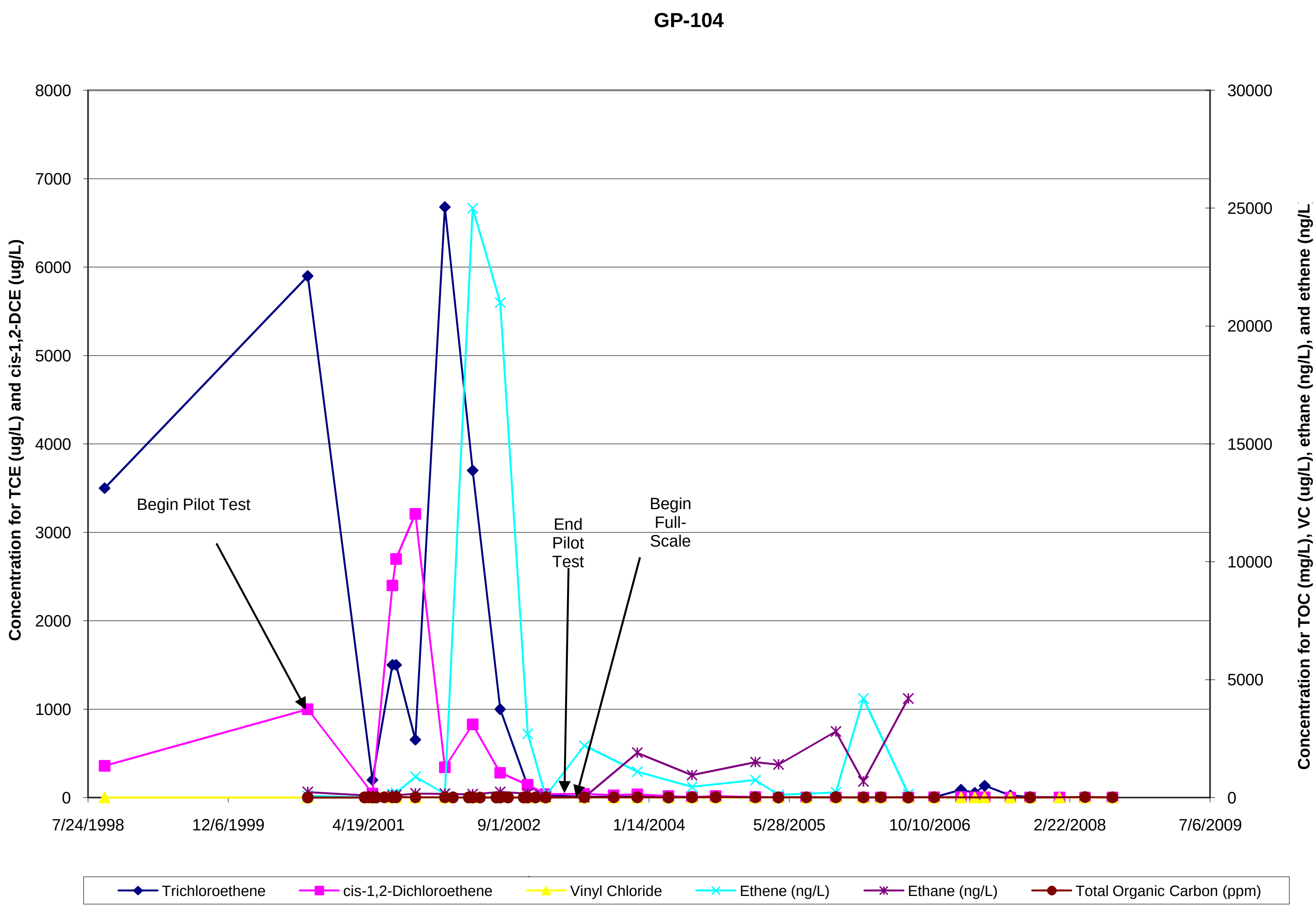


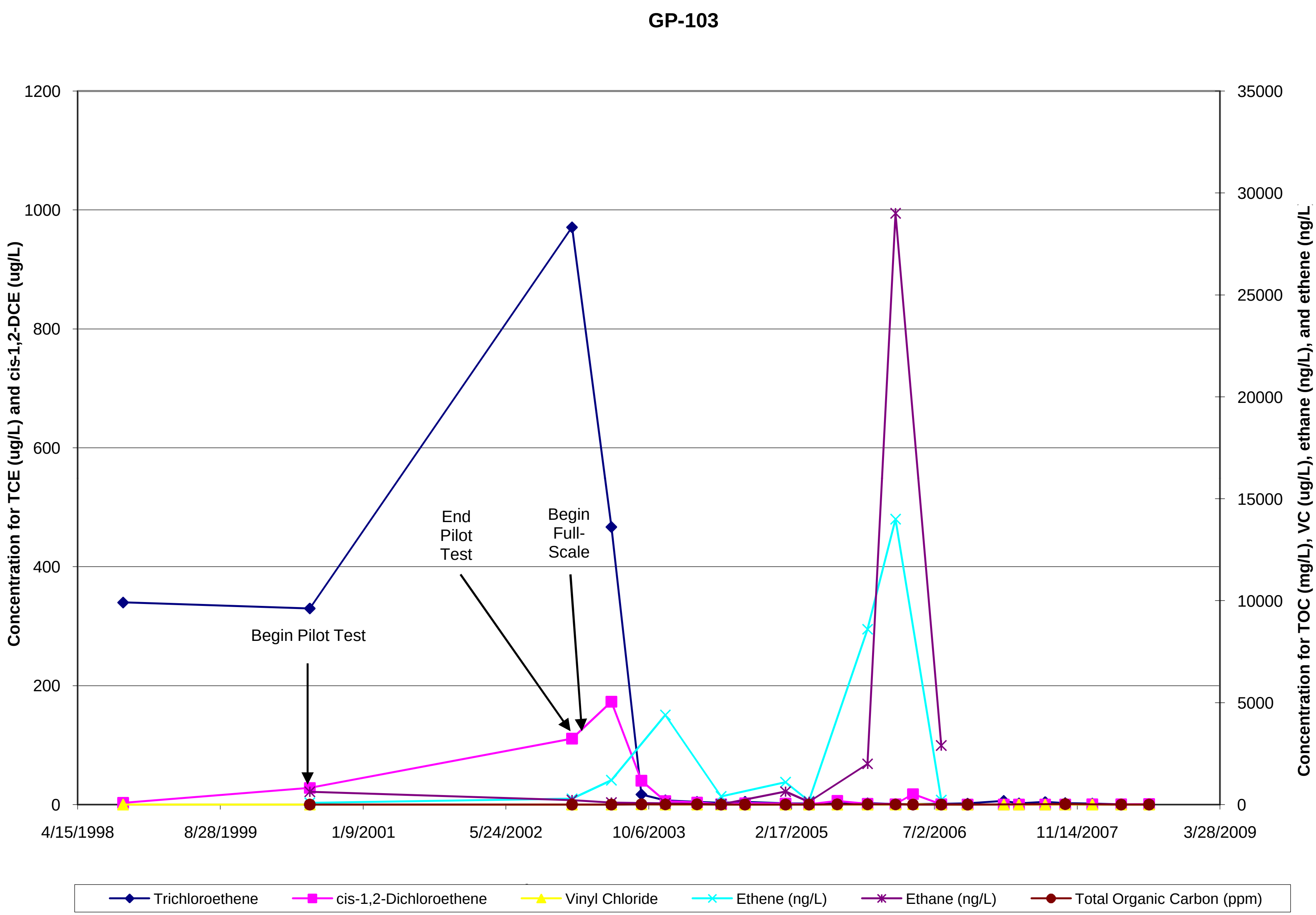
MW-9S
Concentration for TCE (ug/L) and cis-1,2-DCE (ug/L)
Concentration for TOC (mg/L), VC (ug/L), ethane (ng/L), and ethene (ng/L)
Begin Full-Scale
0
2000
4000
6000
8000
10000
12000
14000
16000
18000
20000
0
5000
10000
15000
20000
25000
30000
35000
40000
45000
10/1/2000
2/13/2002
6/28/2003
11/9/2004
3/24/2006
8/6/2007
12/18/2008
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
Ethene (ng/L)
Ethane (ng/L)
Total Organic Carbon (ppm)

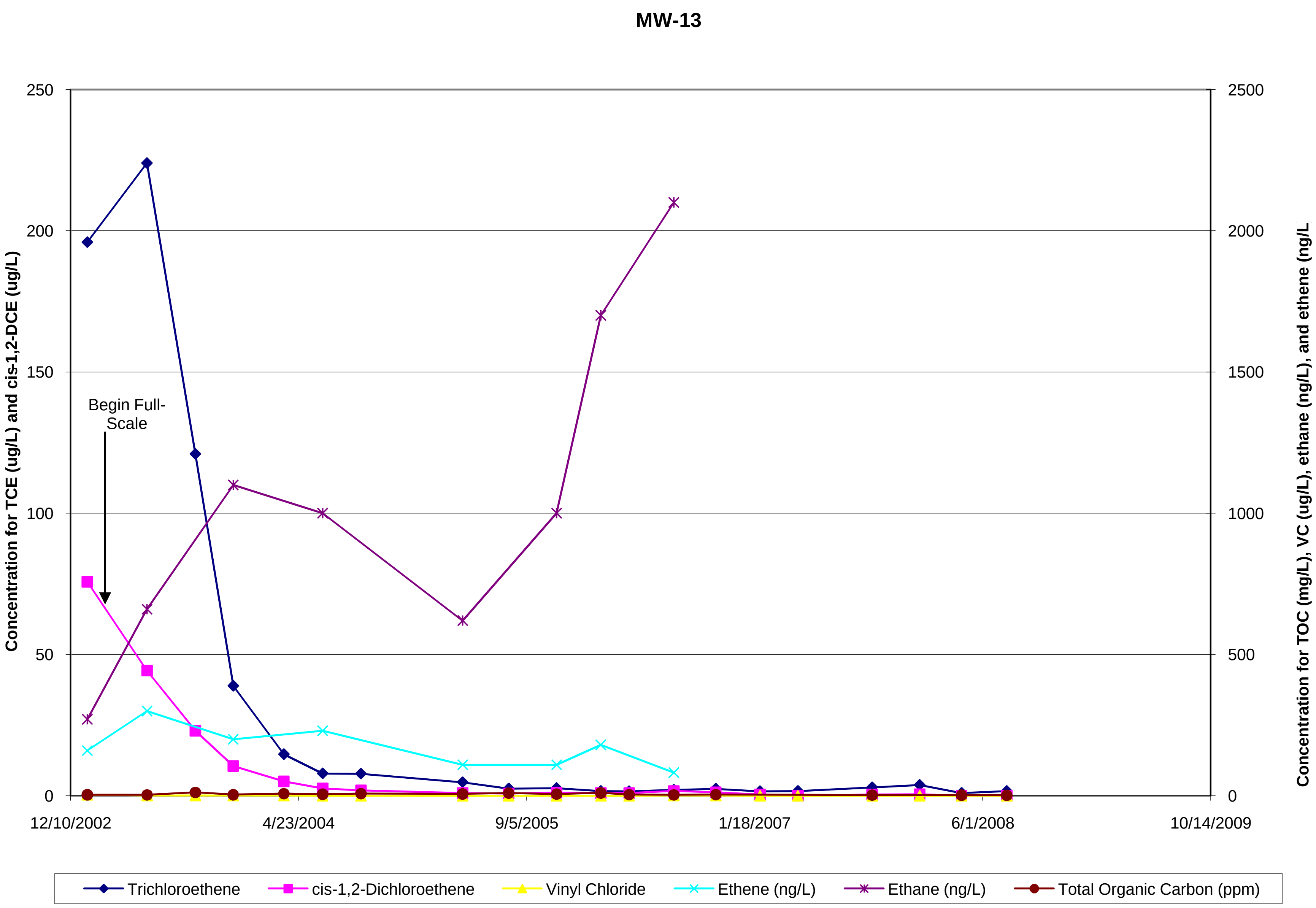

MW-9D
Begin Full-Scale
Concentration for TCE (ug/L) and cis-1,2-DCE (ug/L)
Concentration for TOC (mg/L), VC (ug/L), ethane (ng/L), and ethene (ng/L)
600
500
400
300
200
100
0
6000
5000
4000
3000
2000
1000
0
10/1/2000
2/13/2002
6/28/2003
11/9/2004
3/24/2006
8/6/2007
12/18/2008
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
Ethene (ng/L)
Ethane (ng/L)
Total Organic Carbon (ppm)



PTW-2
Concentration for TCE (ug/L) and cis-1,2-DCE (ug/L)
Concentration for TOC (mg/L), VC (ug/L), ethane (ng/L), and ethene (ng/L)
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
140000
120000
100000
80000
60000
40000
20000
0
6/23/2000
11/5/2001
3/20/2003
8/1/2004
12/14/2005
4/28/2007
9/9/2008
Begin Pilot Test
End Piot Test
Begin Full-Scale
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
Ethene (ng/L)
Ethane (ng/L)
Total Organic Carbon (ppm)


GP-104
Concentration for TCE (ug/L) and cis-1,2-DCE (ug/L)
Concentration for TOC (mg/L), VC (ug/L), ethane (ng/L), and ethene (ng/L
8000
7000
6000
5000
4000
3000
2000
1000
0
30000
25000
20000
15000
10000
5000
0
7/24/1998
12/6/1999
4/19/2001
9/1/2002
1/14/2004
5/28/2005
10/10/2006
2/22/2008
7/6/2009
Begin Pilot Test
End Pilot Test
Begin Full-Scale
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
Ethene (ng/L)
Ethane (ng/L)
Total Organic Carbon (ppm)


GP-103
Concentration for TCE (ug/L) and cis-1,2-DCE (ug/L)
Concentration for TOC (mg/L), VC (ug/L), ethane (ng/L), and ethene (ng/L
1200
1000
800
600
400
200
0
35000
30000
25000
20000
15000
10000
5000
0
4/15/1998
8/28/1999
1/9/2001
5/24/2002
10/6/2003
2/17/2005
7/2/2006
11/14/2007
3/28/2009
Begin Pilot Test
End Pilot Test
Begin Full-Scale
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
Ethene (ng/L)
Ethane (ng/L)
Total Organic Carbon (ppm)


MW-13
Concentration for TCE (ug/L) and cis-1,2-DCE (ug/L)
Concentration for TOC (mg/L), VC (ug/L), ethane (ng/L), and ethene (ng/L
0
50
100
150
200
250
0
500
1000
1500
2000
2500
Begin Full-Scale
12/10/2002
4/23/2004
9/5/2005
1/18/2007
6/1/2008
10/14/2009
Trichloroethene
cis-1,2-Dichloroethene
Vinyl Chloride
Ethene (ng/L)
Ethane (ng/L)
Total Organic Carbon (ppm)

ARCADIS

Appendix E

Post Remedial Operation,
Maintenance and Monitoring Plan

To be submitted separately

ARCADIS

Appendix F

Health and Safety Plan

Imagine the result

Kings Electronics Co., Inc.

Health & Safety Plan

Former Kings Electronics Site

September 18, 2008

ARCADIS

Health and Safety Plan

Former Kings Electronics Site

Janice Teixeira
Designated H&S Plan Reviewer

for

Eric Rodriguez
Project Scientist

Moh Mohiuddin, PhD, PE, BCEE
Project Manager
NY PE License Number 074527

Prepared for:
Kings Electronics Co., Inc.

Prepared by:
ARCADIS of New York, Inc.
105 Fieldcrest Avenue
Suite 305
Edison
New Jersey 08837
Tel 732-225-5061
Fax 732-225-5067

Our Ref.:
NJ000423.0005

Date:
18 September 2008

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Table of Contents

Appendices

Figures

1. Introduction

All work on this project will be carried out in compliance with ARCADIS' Health and Safety Manual and the Occupational Safety and Health Administration's Hazardous Waste Operations and Emergency Response regulation 29 CFR 1910.120. Specific safety information for the project is contained in this Health and Safety Plan (HASP). All personnel working on hazardous operations or in the area of hazardous operations shall read and be familiar with this HASP before doing any work. All project personnel shall sign the certification page acknowledging that they have read and understand this HASP.

Changes in the scope of the project or introduction of new hazards to the project shall require revision of the HASP by the HASP writer and reviewer, and approval by the Project Manager. The HASP Addendum Form is included as Appendix A. Addendums are to be added to every copy of the HASP, and logged in the following table to verify that all copies of the HASP are current:

Addendum Number	Date of Addendum	Reason for Addendum	Person Completing Addendum
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			

2. Project Description

2.1 Project Dates

Projected Start Date: 1/1/08

Projected End Date: Open

2.2 Site Background

The Former Kings Electronics (Kings) Site (Figure 1) is located at 40 Marbledale Road in the Village of Tuckahoe, Town of Eastchester, Westchester County, New York, with Tax Map Identifier Numbers Section 68, Block 4, and Lots 29 and 36 E (Site). The property occupies approximately 1.8 acres and is located in a mixed area consisting of light industrial, commercial, and residential uses. The Site was first developed in the early 1900's as an icehouse. Numerous additional buildings were constructed between 1932 and 1951 during property development by O.D. Chemical Corporation. Kings has utilized the facility for wastewater pretreatment, electroplating, degreasing, and machining operations associated with their manufacturing processes. All manufacturing operations ceased in 1998.

Prior site investigations have detected the presence of chlorinated volatile organic compounds (VOCs) in the soil and groundwater beneath the facility. A soil excavation project was conducted in April 1999 to remove impacted soils from beneath the former degreasing area located in the northern portion of the property. Soil containing residual chlorinated VOCs may still be present beneath the floor of the former degreasing area. Enhanced bioremediation using food grade molasses solution that is injected into the groundwater is taking place at the Site.

2.3 List of Project Tasks and Scope of Work

- Task 1: Groundwater Remediation/Molasses Injection

A 5% molasses solution will be injected directly into 4 injection wells in Injection Line 1 on a bi-monthly basis to prevent potential upgradient and off-site contributions of VOC contaminant mass in groundwater from entering the Site. Based on the future results of the performance monitoring, substrate injections may be further enhanced to optimize site remediation through, but not limited to, the following methods: pH buffering, adjusting molasses concentrations and volume, injection frequency, injection locations, and the addition of supplemental nutrients.

- Task 2: Groundwater sampling

The performance and compliance monitoring will be conducted on a quarterly basis to confirm the effectiveness of the remedial action.

Prior to each sampling event, groundwater elevation measurements will be performed for monitoring and injection wells. Samples will be collected for VOC and TOC analysis and field parameters using low-flow sampling technique. Additional parameters (i.e., dissolved gases) may be added, based on an ongoing review of analytical data, as outlined in the Final Engineering Report.

2.4 Site Description

Site Type: (Check as many as applicable}

x	Active	x	Secure		Industrial		Landfill		Service station
	Inactive		Unsecured	x	Commercial		Well field		Water work
			Uncontrolled		Residential		Railroad		Undeveloped
					Other specify:				

Surrounding Population:

x	Residential		Industrial	x	Commercial		Rural		Other:

Currently, the property was redeveloped by Storage Deluxe to operate as a self-storage facility. Redevelopment activities began in 2006 and are near complete as of August 2008. Minimal vehicular and pedestrian traffic is expected after the completion of redevelopment.

3. Hazard/Risk Analysis and Communication

3.1 Hazard Assessment and Risk Control (HARC)

Each hazard is evaluated and rated for the level of risk based on the task of the project. A thorough analysis of hazards and their risk is completed using the following HARC matrix:

Risk Assessment Matrix

Consequences Ratings*		Likelihood Ratings**				
		A	B	C	D	E
People	Property	Never heard of in the world	Heard of incident in industry	Incident has occurred in ARCADIS Group	Happens several times a year in ARCADIS OpCo	Happens several times a year at ARCADIS Worksite
0 - No health effect	0 - No damage	Low	Low	Low	Low	Low
1 - Slight health effect	1 - Slight damage	Low	Low	Low	Low	Low
2 - Minor health effect	2 - Minor damage	Low	Low	Low	Medium	Medium
3 - Major health effect	3 - Local damage	Low	Low	Medium	Medium	High
4 - PTD or 1 fatality	4 - Major damage	Low	Medium	Medium	High	High
5 - Multiple fatalities	5 - Extensive damage	Medium	Medium	High	High	High

Physical Hazards Present: ☐ None	☒ Heat ☒ Cold ☒ Noise ☒ Walking/working surfaces (includes slip/trip/fall & floor/wall openings) ☒ Visible Dust ☐ LASER ☐ Other:	☐ Holes/Pits ☐ Ionizing radiation ☐ Non-ionizing radiation ☐ Electricity ☒ Severe Weather ☐ Poor lighting ☐ Overhead Hazards ☐ Other:
Environmental/Equipment Hazards Present: ☐ None	☐ Heavy machinery ☐ Trenching/excavation ☐ Docks – marine operations ☐ Docks – loading ☐ Diving operations ☐ Drilling ☐ Forklifts ☐ Water operations work ☐ Elevated heights (includes fall protection) ☐ Overhead/Underground utilities ☐ Confined spaces ☐ Power tools	☐ Cranes/Hoists/Rigging ☐ Ladders ☐ Scaffolding ☐ Man lifts ☐ Welding ☐ Gas cylinders ☒ Roadway work ☐ Railroad work ☐ Energized equipment (LO/TO) ☐ Pressurized equipment (LO/TO) ☒ Drums and containers ☐ Other:

Biological Hazards Present: ☒ None	☐ Animal/human fluids or blood ☐ Animal/human tissue(s) ☐ Poisonous/irritating plants ☐ Other:	☐ Contaminated needles ☐ Live bacterial cultures ☐ Insects/rodents/snakes ☐ Other:
Ergonomic Hazards Present: ☐ None	☐ Repetitive motion ☒ Awkward position ☒ Heavy lifting ☒ Frequent lifting ☐ Other:	☐ Limited movement ☐ Forceful exertions ☐ Vibration ☐ Other: ☐ Other:
Personal Safety/Security: ☐ None	☒ Personal safety ☐ Security issue ☐ Project site in isolated area ☒ Employees working alone ☐ Other:	☒ Employees working early/late ☐ Potentially dangerous wildlife ☐ Guard or stray dogs in area ☐ No/limited cell phone service ☐ Other:
Driving Safety ☐ None	☒ Driving early/late ☒ Driving long trip ☐ Driving off-road	☐ City driving ☐ Pulling trailer ☐ Other:
Training Required: ☐ None	☒ 40-hour HAZWOPER ☐ 24-hour HAZWOPER ☒ HAZWOPER site supervisor ☐ OSHA 30-hour Construction ☐ OSHA 10-hour Construction ☒ PPE ☐ Respiratory protection ☐ Chemical hygiene ☒ Hazard communication ☐ Hazardous waste ☐ First-aid/CPR ☐ DOT/IATA hazmat transportation ☐ Diving ☐ Other:	☐ Bloodborne pathogens ☐ Confined space ☐ Lockout/tagout ☐ Electricity ☐ Fire extinguishers ☐ Fall protection ☐ Noise exposure ☐ Forklifts ☐ Asbestos ☐ Lead ☐ Cadmium ☐ SPCC ☐ Radiation safety ☐ Client specific
Medical Screening	☒ Medical Surveillance Exam (HAZWOPER) ☐ Client required drug and/or alcohol testing	☐ Blood and/or urine screening for other hazardous substances
Chemical Hazards: ☐ None	☒ Flammable/Combustible ☐ Compressed gas ☐ Explosive ☐ Organic peroxide ☐ Oxidizer ☐ Water reactive ☐ Unstable reactivity ☐ Dust/Fumes/ Particulates	☒ Corrosive ☒ Toxic ☐ Highly toxic ☒ Irritant ☐ Sensitizer ☐ Carcinogen ☐ Mutagen ☐ Other:

3.2 Job Safety Analysis

A Job Safety Analysis (JSA) must be completed for the task(s) being completed. Hazards identified above will be addressed in the JSA as well as control methods to be used to protect employees and property from hazards. JSAs for this project are included as **Appendix F.**

3.3 Chemical Hazards

Chemical	Hazards	TLV/PEL* 8-hr TWA	Ionization Potential	Symptoms of Overexposure	Special Precautions
Trichloroethene	Irritant, toxic	TWA 100 ppm C 200 ppm	9.45 eV	Irritation to eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	N/A
Tetrachloroethylene (perchloroethylene)	Noncombustible Liquid	100 ppm	9.32 eV	Irritation to the eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin erythema (skin redness); liver damage	Potential Occupational Carcinogen
1,1,1-Trichloroethane	Irritant, toxic	350 ppm	11.00 eV	Irritation to eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Reacts slowly with water to form hydrochloric acid.
1,1-Dichloroethene	Irritant, toxic, [potential occupational carcinogen]	None	10.00 eV	Irritation eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver,	Polymerization may occur if exposed to oxidizers, chlorosulfonic

				kidney disturbance; pneumonitis;	acid, nitric acid, or oleum. Inhibitors such as the monomethyl ether of hydroquinone are added to prevent polymerization.
cis-1,2-Dichloroethene	Colorless liquid with a mild, chloroform-like odor	200 ppm	11.00 eV	Irritation eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Strong caustics; strong oxidizers; chemically-active metals such as zinc, aluminum, magnesium powders, sodium & potassium; water [Note: Reacts slowly with water to form hydrochloric acid.]
trans-1,2-Dichloroethene	Colorless liquid (usually a mixture of the cis & trans isomers) with a slightly acrid, chloroform-like odor.	TWA: 200 ppm; 790 mg/m^3	9.65 eV	Irritation eyes, respiratory system; central nervous system depression	Strong oxidizers, strong alkalis, potassium hydroxide, copper [Note: Usually contains inhibitors to prevent polymerization.]
Vinyl Chloride	Colorless gas or liquid (below 7°F) with a pleasant odor at high concentrations.	1 ppm	9.99 eV	Lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Polymerizes in air, sunlight, or heat unless stabilized by inhibitors such as phenol. Attacks iron & steel in presence of moisture
Molasses/Molasses Blend	Mild irritant to eyes	None	none	Irritation eyes	Material can ferment if excessive moisture contamination is allowed. Fermentation can yield carbon dioxide with possible traces of ethanol or volatile

					fatty acids.
Hydrochloric Acid (preservative for sample containers)	Colorless to slightly yellow gas with a pungent, irritating odor. Irritation nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite.	5 ppm	12.74 eV	Irritation nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite; in animals: laryngeal spasm; pulmonary edema.	MW: 36.5 Fl.P: NA Hydrochloric acid is highly corrosive to most metals.

*The TLV (Threshold Limit Value) from the American Conference of Governmental Industrial Hygienists is listed unless the PEL (Permissible Exposure Limit), designated by OSHA, is lower.

3.4 Hazard Communication (HazCom)

All project required chemicals will be handled in accordance with OSHA 29 CFR 1910.1200 and ARCADIS-required procedures. The SSO will act as the HazCom Program Coordinator for the Site and will maintain the Master Inventory List (MIL) of hazardous chemicals kept on the job Site. The SSO will maintain an MSDS on Site for all chemicals. MSDSs are located in Appendix G. The SSO will communicate the location of the MSDS and the hazards associated with these chemicals to all project Site ARCADIS employees and subcontractors during the safety orientation. This information will be reviewed during tailgate briefings, especially if new chemicals or materials are introduced on Site.

The SSO will ensure that all containers of chemicals (including drums, bags, pails, tanks, vessels, etc.) are labeled appropriately: The contents of the container, the proper name of the chemical, associated hazards and appropriate hazard warnings, and the name and address of the manufacturer/importer. Chemicals will not be accepted or allowed on Site that are not properly labeled. If transferred to a secondary container, the new container will be labeled as described.

The SSO will ensure that the PPE necessary for work around the particular chemical is available and that project employees have been trained in its use.

The Project Manager will ensure that all project personnel have received Hazard Communication training as required in OSHA 29 CFR 1910.1200 (h).

3.5 Air Monitoring

Air monitoring will be performed for each task per the table below.

Monitoring Equipment	Monitoring	Action Level
TASK 1 -- Groundwater Remediation/Molasses Injection. Is air monitoring required for this task? ☒ YES ☐ NO		
Monitoring Equipment	**Monitoring**	**Action Level**
PID -- VOCs	Background and when opening wells	1 ppm sustained for 10 minutes; work will stop until the hazard can be assessed. Personnel will contact the PM and continue monitoring levels. Work will resume when the hazard has been assessed, levels have returned to zero for a period of 15 minutes and personnel receive clearance from the PM.
Multigas Meter	Background and when opening wells	
Hydrogen Sulfide (H_2S)		≥10 ppm; If above action level is sustained for more than 10 minutes, stop work, move to an area where the concentration is <10, and notify PM.
Methane/Flammable Gases		10% LEL; stop work and call PM for further instructions and/or clearance before resuming work.
Oxygen		<19.5%, >23.5%; stop work until the hazard can be assessed and contact PM.
TASK 2 -- Groundwater Sampling **Is air monitoring required for this task?** ☒ **YES** ☐ **NO**		
Monitoring Equipment	**Monitoring**	**Action Level**
PID -- VOCs	Background and when opening wells	1 ppm sustained for 10 minutes; work will stop until the hazard can be assessed. Personnel will contact the PM and continue monitoring levels. Work will resume when the hazard has been assessed, levels have returned to zero for a period of 15 minutes and personnel receive clearance from the PM.

Multigas Meter	Background and when opening wells	
Hydrogen Sulfide (H_2S)		≥10 ppm; If above action level is sustained for more than 10 minutes, stop work, move to an area where the concentration is <10, and notify PM.
Methane/Flammable Gases		10% LEL; stop work and call PM for further instructions and/or clearance before resuming work.
Oxygen		<19.5%, >23.5%; stop work until the hazard can be assessed and contact PM.

3.6 Client-Specific Health and Safety Requirements

Project workers will comply with the client's safety requirements at all times. The Project Manager is to be notified immediately if subcontractors or visitors are not following client-specific safety guidelines.

4. Decontamination Procedures

Level D decontamination protocol will be used with the following decontamination stations:

Level D Decontamination Steps	
1	Equipment Drop
2	Disposable Garment, Outer Boot, and Glove Removal
3	Field Wash

Place an X by all decontamination equipment that is required at the Site.

Decontamination Equipment Checklist			
x	Scrub Brushes	x	Garbage Bags
x	Waste Containers	x	Paper Towels
x	Soap		Isopropyl Alcohol
	Plastic Tubs	x	Pump Spray Bottles
	Plastic Drop Cloths	x	Pump Spray Bottles (water)

5. Emergency Procedures

In the event that an injury, over-exposure or spill has occurred, emergency response procedures will be implemented. The Site Safety Officer (SSO) will coordinate the entry and exit of response personnel during an emergency and make emergency contacts as necessary from the following list. After immediate notifications are made, the SSO will contact the Project Manager.

5.1 Emergency Contact Information

Emergency Contact	Phone Numbers
Local Police	911 or 914.961.4800
Local Ambulance	911 or 914.723.2003
Local Fire Department	911 or 914.793.6402
Local Hospital – Lawrence Hospital	914.787.1000
National Response Center (all spills in reportable quantities)	800.424.8802
U.S. Coast Guard (spills to water)	804.441.3516
Project Manager – Moh Mohiuddin	732.225.5061
Client Contact – Bruce Munson (EML)	845-429-1141
WORK CARE	800.455.6155

The Project Manager will make the following notifications:

Name	Phone Numbers
Environmental Division H&S Director – Mike Thomas	720.344.3835 (O) 720.308.2147 (C)
Health & Safety Manager – Pat Vollertsen	720.344.3779 (O) 303.518.0622 (C)
Regional Health & Safety Specialist – Kurt Merkle	267.685.1800 (O) 215.534.0435 (C)
Office Health & Safety Representative – Janice Teixeira	732.225.5061 (O) 732.754.6324 (C)

If emergency attention is not needed but professional medical attention is necessary, the employee will be taken to:

Medical Facility:	Lawrence Hospital
Address:	55 Palmer Avenue Bronxville, New York
Phone Number:	914-787-1000

A map to the medical facility is included in **Appendix E**.

5.2 Emergency Equipment

	Emergency shower	x	First-aid kit
x	Emergency eyewash	x	Cell phone/radio
x	Fire extinguisher		Chemical spill kit
	Other:		Other:

All employees working on this project will be shown the location and proper use of all emergency equipment prior to beginning work on the project. Emergency equipment listed above will be kept in company vehicle.

6. Department of Transportation (DOT) Dangerous Good Shipping Requirements

Hazardous materials and dangerous goods (re: Canadian regulatory term) are those materials that have one or more of the following characteristics: explosives, compressed and liquefied gases, flammable liquids and solids, oxidizing materials, and other substances that are poisonous, infectious, radioactive or corrosive. It is the handling, loading, packing or placing of hazardous materials (dangerous goods) in or from a container or vehicle at any facility for the purpose of transportation (including storing) in the course of transportation. This also includes the packing and transporting for air and ground shipment of laboratory analysis samples.

Regulations governing hazardous materials and dangerous goods exist to protect people, the environment, or property when these goods are being transported by road, rail, sea, or air. Given the increased emphasis of federal (i.e., Federal Aviation Administration and US Department of Transportation, and the Transportation of Dangerous Goods Act) attention to the transport of hazard material-containing goods, it is imperative that all shipments are packaged and transported such that they adhere to all federal requirements. ARCADIS has strict policies in place, whether shipping via ground or air, designed to meet the associated federal requirements. As such, only ARCADIS staff that have been trained in the proper methods to prepare and ship hazardous materials are authorized to do so. If you have not received training on the appropriate preparation and shipping protocols, you are to contact your supervisor or health and safety representative prior to packaging and/or shipping any material that is, or suspected to be, hazardous.

7. Project Team and Training

7.1 Personnel List

The project manager is responsible for safety at the project site and for ensuring that all site workers have reviewed the HASP and understand the hazards. The project manager must also ensure that the necessary PPE is procured and provided to site workers. The task manager assists the project manager in implementing safety measures at the site, and conveys any safety concerns to the project manager.

The SSO officer is responsible for implementing the HASP at the project site. If any site personnel or visitors do not comply with the HASP, the SSO will cease all work until personnel/visitors comply. The SSO will contact the PM/TM to inform them of any personnel not complying with the HASP.

Project Manager:	Moh Mohiuddin
Task Manager:	Eric Rodriguez
Site Safety Officer:	Power Liang
Site Workers:	TBA

7.2 Training Requirements

All personnel working at the site must have the necessary training based on the hazards present. The following training is required for all site workers:

Training Required: ☐ None	☒ 40-hour HAZWOPER ☐ 24-hour HAZWOPER ☒ HAZWOPER site supervisor ☐ OSHA 30-hour Construction ☐ OSHA 10-hour Construction ☒ PPE ☐ Respiratory protection ☐ Chemical hygiene ☒ Hazard communication ☐ Hazardous waste ☒ First-aid/CPR/Bloodborne pathogens ☒ DOT/IATA hazmat transportation ☐ Diving ☐ Boating safety	☐ Confined space ☐ Lockout/tagout ☐ Electricity ☒ Fire extinguishers ☐ Fall protection ☐ Noise exposure ☐ Forklifts ☐ Asbestos ☐ Lead ☐ Cadmium ☐ Radiation safety ☐ Client specific ☐ Other:
Medical Screening	☒ Medical Surveillance Exam (HAZWOPER) ☐ Client required drug and/or alcohol testing	☐ Blood and/or urine screening for other hazardous substances

All 40-hour HAZWOPER trained personnel who are working at HAZWOPER project sites are required to participate in the ARCADIS medical surveillance program as outlined in the Corporate Health and Safety Manual.

7.3 Subcontractors

A copy of this HASP is to be provided to all subcontractors prior to the start of work so that the subcontractor is informed of the hazards at the site. While the ARCADIS HASP will be the minimum H&S requirements for the work completed by ARCADIS and its subcontractors, each subcontractor, in coordination with ARCADIS H&S personnel, is expected to perform its operations in accordance with its own HASP, policies and procedures unique to the subcontractor's work to ensure that hazards associated with the performance of the work activities are properly controlled. Copies of any required safety documentation for a subcontractor's work activities will be provided to ARCADIS for review prior to the start of on-site activities.

In the event that the subcontractor's procedures/requirements conflict with requirements specified in this HASP, the more stringent guidance will be adopted after discussion and agreement between the subcontractor and ARCADIS project H&S personnel. Hazards not listed in this HASP, but known to the subcontractor or known to be associated with the subcontractor's services, must be identified and addressed to the ARCADIS Project or Task Manager and SSO prior to beginning work operations.

If the subcontractor prefers to adopt this HASP, the **"Subcontractor Acknowledgement Memo" (provided on the ARCADIS Intranet) must be signed and dated by the subcontractor's management and placed in the project file.** Once the signed memo is received by the project manager, an electronic version of our HASP can be submitted to the subcontractor to use as their own. Subcontractors working at the site will need to have this plan with them, and will also need to sign the Subcontractors HASP receipt signature page of the ARCADIS HASP (Section 7.2). Subcontractors are responsible for the H&S of their employees at all times, and have the authority to halt work if unsafe conditions arise.

The Project/Task Manager and SSO (or authorized representative) has the authority to halt the subcontractor's operations and to remove the subcontractor or subcontractor's employee(s) from the Site for failure to comply with established health and safety procedures or for operating in an unsafe manner.

8. Project Personnel HASP Certification

8.1 ARCADIS Personnel Signature Page

I certify that I have read, understand, and will abide by the safety requirements outlined in this HASP.

Printed Name	Signature	Date

8.2 Subcontractor Acknowledgement: Receipt of HASP

ARCADIS claims no responsibility for the use of this HASP by others although subcontractors working at the Site may use this HASP as a guidance document. In any event, ARCADIS does not guarantee the health and/or safety of any person entering this Site. Strict adherence to the health and safety guidelines provided herein will reduce, but not eliminate, the potential for injury at this Site. To this end, health and safety becomes the inherent responsibility of personnel working at the Site.

Printed Name	Company	Signature	Date

8.3 Visitor Acknowledgement and Acceptance of HASP

By signing below, I waive, release and discharge the Owner of the Site and ARCADIS and their employees from any future claims for bodily and personal injuries which may result from my presence at, entering, or leaving the Site and in any way arising from or related to any and all known and unknown conditions on the Site.

Name	Company	Reason for Visit	Date/Time On Site	Date/Time Off Site

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Appendix A

HASP Addendum Pages

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Addendum Page

This form should be used to document any changes required to this HASP. These changes may be a result of changes to the scope of services, changes in field conditions, new hazards identified on the Site, higher or lower hazards than anticipated, etc. Please complete this form prior to the next work day once the changes have been identified. Review the modifications with all Site staff, including subcontractors, during the daily tailgate briefing, and complete the tailgate briefing form as required. Attach a copy of the addendum to all copies of the HASP including the Site copy, and log in the Addendum Log in Section 1.0.

Addendum Number: ____________ Project Number: ________________
Date of Changed Conditions: ____________ Date of Addendum: ________________

Description of Change that Results in Modifications to HASP:

Hazard Analysis for Change in Work:

HAZARD		Level of Risk:	
Source of Hazard			
Admin. & Eng. Controls		PPE:	
HAZARD		Level of Risk:	
Source of Hazard			
Admin. & Eng. Controls		PPE:	

Signed: ________________________
Project Manager

Signed: ________________________
Site Safety Officer

Signed: ________________________
H&S Plan Writer

Signed: ________________________
H&S Plan Reviewer

Make additional copies of this form as necessary.

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Appendix B

PPE Checklist

Description (Specify Material or Type in Box)	Level Of Protection R = Required O = Optional	
	D	C
Body		
Coveralls	O	
Chemical Protective Suit		
Splash Apron		
Rain Suit	O	
Traffic Safety Vest (reflective)	R	
Head		
Hard Hat (if does not create other hazard)	R	
Head Warmer (depends on temperature and weather	O	
Eyes & Face		
Safety Glasses (incorporate sun protection as necessary)	R	
Goggles (based on hazard)	O	
Splash Guard (based on hazard)	O	
Ears		
Ear Plugs	O	
Ear Muffs	O	
Hands and Arms		
Outer Chemical Resistant Gloves	O	
Inner Chemical Resistant Gloves (i.e. Nitrile)	R	
Insulated Gloves	O	
Work Gloves	O	
Foot		
Safety Boots (steel toe and shank)	R	
Rubber, Chemical Resistant Boots		
Rubber Boots	R (near water)	
Disposable Boot Covers		
Respiratory Protection (indicate cartridge type where applicable)		
Dust Protection		
1/2 Mask APR		
Full Face APR		
Full Face Canister APR		
Powered APR		
Other Supplies		
First Aid Kit	R	
Fire Extinguisher	R	
Mobile Phone	R	
Traffic Cones	O	
Walkie Talkies	O	
Water or Other Fluid Replenishment	R	
Eye Wash Station	O	
Eye Wash Bottle	R	
Wash and Dry Towelettes	R	
Sunscreen (SPF 15 or higher)	R	
Insect Repellant	R	

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Appendix C

Tailgate Briefing Sign-in Log

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Site Activities Tailgate Safety Briefing Sign-in Log			
Project Number:		**Project Name:**	
Date:		**Time:**	

Briefing Conducted by:	**Signature:**	**Company:**

This sign-in log documents the tailgate briefing conducted in accordance with the HASP. Personnel who perform work operations on Site are required to attend each briefing and to acknowledge receipt of each briefing, daily.

TOPICS COVERED (check all those covered):

☐ General PPE Usage	☐ Confined Space	☐ Excavation Safety
☐ Hearing Conservation	☐ Slips, Trips, Falls	☐ Confined Space
☐ Respiratory Protection	☐ Heat Stress	☐ Traffic Safety
☐ Personal Hygiene	☐ Thermal Stresses	☐ Changes to the HASP
☐ Exposure Guidelines	☐ Site Control	☐ Initial Review of Hazard Evaluation
☐ Decon Procedures	☐ Work Zones	☐ Other (specify):
☐ Emergency Procedures (include route to hospital)	☐ Lockout/Tagout	☐ Other (specify):

Personnel Sign-in List

Printed Name	Signature	Company Name

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Appendix D

Real Time Air Monitoring Log

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Real Time Air Monitoring Data Collection Form

Document all air monitoring conducted on the Site below based on Section E of the HASP. Keep this form with the project files.

Site Name: ______________________________ Date: ______________

Instrument: ______________ Model: ______________ Serial #: ______________

Calibration Method: (material used, settings, etc.)	
Calibration Results:	
Calibrated By:	

Activity Being Monitored	Compounds Monitored	Time	Reading	Action Required? Y/N

Describe Any Actions Taken as a Result of this Air Monitoring and Why:

____

____

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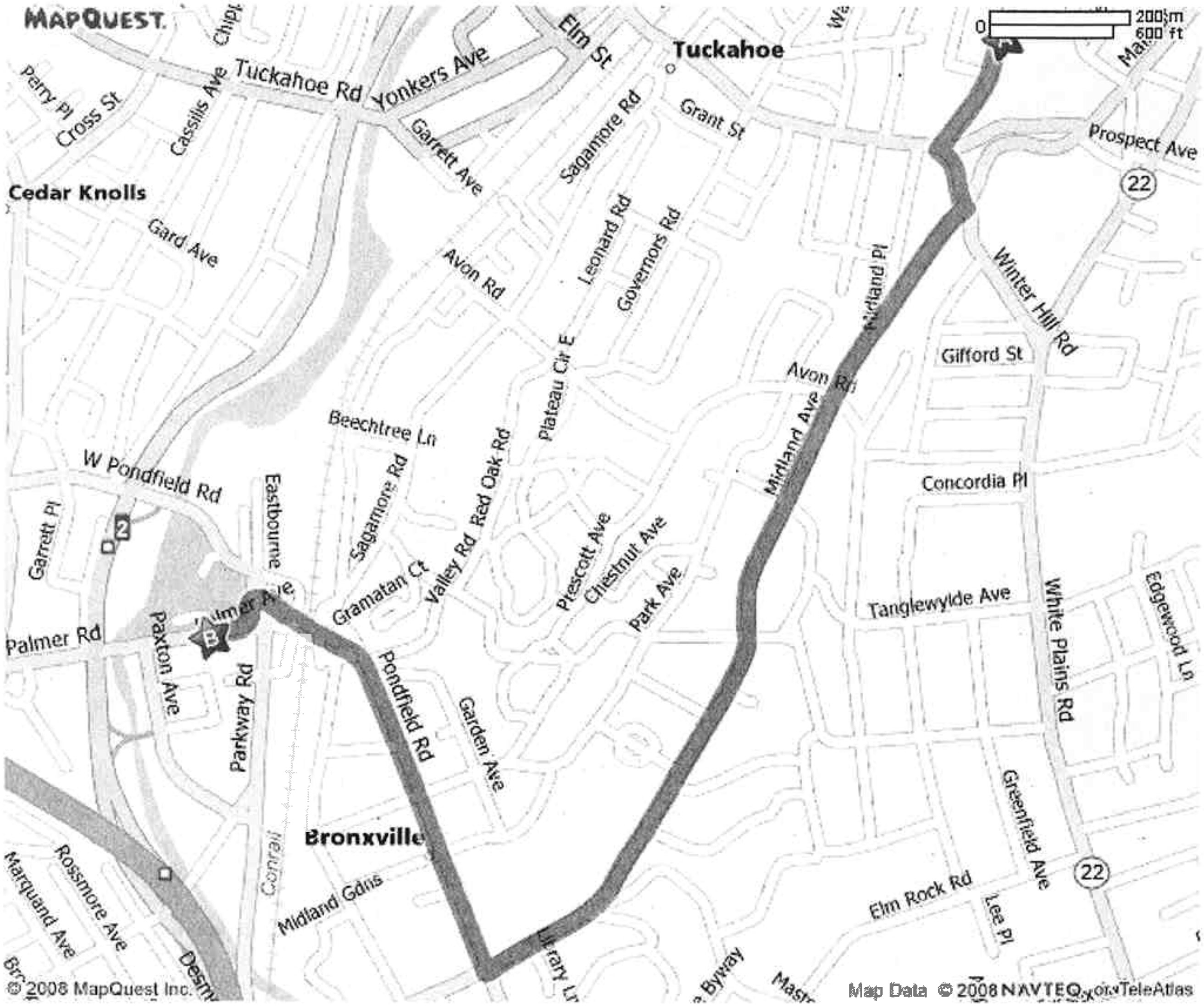
Appendix E

Map to the Hospital

Appendix E: Map to the Hospital



1:	Start out going SOUTHWEST on MARBLEDALE RD toward MARBLE PL.	0.1 mi
2:	Turn LEFT onto WINTER HILL RD.	0.1 mi
3:	Turn RIGHT onto MIDLAND AVE.	1.0 mi
4:	Turn RIGHT onto PONDFIELD RD.	0.5 mi
5:	Enter next roundabout and take 2nd exit onto PALMER AVE.	0.1 mi
6:	End at 55 Palmer Ave Broxville, NY 10708-3403	

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Appendix F

Job Safety Analysis

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JOB SAFETY ANALYSIS

SECTION 1	
JSA Type:	Environmental Operations
JSA No:	JSA001175
Date:	1/4/2008
Work Type:	Environmental - Miscellaneous
Work Activity:	Carbon Source Introduction
Project No.:	000000100000 - GENERAL OVERHEAD (GENERAL OVERHEAD)

SECTION 2

Development Team	Position/Title	PC	Reviewed By	Position/Title	Date
Coppola, Mija A.	H&S	☑	Coppola, Mija A.	H&S	3/14/2008

SECTION 3

Job Steps	Potential Hazard(s)	Critical Action(s)	SOP Reference
Follow procedures for operation and connection of the truck and injection trailer.	If the trailer is not connected and secured properly, it could detach while driving causing an accident. Additionally, pinch points and connection features could cause hand injuries.	Follow JSA for the operation of the truck and injection trailer.	Use separate JSA template for trailer hook-up and use.
Site reconnaissance and walk-around	Slips/trips/falls can occur from uneven ground surface, slipperly walkways or from tripping over equipment. Site vehicular traffic	Survey the site upon arrival. Note any site conditions that may pose a potential hazard, and make note of any changes since the last injection event. Plan the location where the injection trailer will be set up making sure to not block any ingress/egress to the site.	
Setting up the injection trailer.	Pinch points on the trailer can cause hand injury. Heavy equipment can fall and strike personnel,	Make sure that all five (5) jack stands are secured on the injection trailer. Make sure that the wheels of the trailer have been chocked prior to trailer operation. Level trailer utilizing jack stands.	
Load, unload and set up of required PPE, equipment including waterline hoses, injection hoses, flow meters and supplies in/out of vehicle or storage area.	Lifting equipment can cause back/shoulder/arm strains	Use proper lifting techniques. Request assistance when lifting heavy equipment. If injection pumps need to be fueled, then complete fueling before placing pumps on trailer.	
		Check all equipment and valves before making any connections to the Injection Trailer. Be sure all supply lines and hoses are in working condition before	

Connecting the water supply and molasses supply to the injection trailer.	Lifting hazards can cause muscle strains, possible pressure build up can result in equipment failure or flying objects that can cause personal injury.	connecting to Injection Trailer. Be sure to check that the water and molasses supply valves are in the off position. Make the Hose connections and secure the cam locks with counter pins. Open all supply valves slowly to avoid damage to the hoses or personnel. Check all supply lines and valves for leaking after the water/molasses supply has been turned on.	
Connect the injection trailer to a power supply.	Electrocution or power surge resulting in equipment damage, injury or loss of life.	Inspect all power cords for evidence of damage to the wire or the connector before using. If any damage is present, do not use the power cord. Inspect the connection of the power supply for any evidence of damage. Use GFI 'pigtail' with all extension cords. If the generator on the injection trailer is to be utilized, inspect the components for any damage. Check the oil and fuel levels and fill if necessary before starting generator. Inspect the injection trailer control panel for any evidence of damage to the switches, circuits or breakers before connecting power. If everything is satisfactory, connect the power cord then the power supply.	
Connecting the injection flow meters to the injection wells.	Pressure build up in wells can cause well caps to fly off causing head or body injury.	When opening injection wells, be sure that your body is not over the well when opening. All wells should have been constructed with a pressure relief valve (or retrofitted with a pressure relief valve). Turn the pressure relief valve to release build-up of pressure within the well, and listen for pressure escaping from the well. Be sure that safety glasses are worn and your head is facing away from the well when opening.	
Filling the tanks on the injection trailer.	Pressure can build up in the hoses and tanks, and tanks can overflow with the mixture causing slippery walking surfaces	Open all valves slowly when filling the tanks on the injection trailer. Maintain a visual on the tank levels so they do not overflow.	
Pump solution into wells and read pressure and flow gauges.	Pressure can build up resulting in hose or flow meter failure leading to possible injury. Slips/trips/falls can occur due to hoses laying on the ground resulting in injury.	Start the injections at a low flow rate and adjust as needed. Always secure all cam locks to hoses or flow meters with counter pins. Never place any body part directly over well head. Monitor the pressures and stress points of the system during injection (connections, valves, threaded fittings, etc.). When injection is complete, ensure there is no pressure prior to disassembly. If injecting into bedrock, utilize fittings at the well head that will allow you to seal off residual pressure in	

		the well before disconnecting hoses.	
Clean all equipment including: tanks on trailer, all hoses and fittings and flow meters after injections have been performed.	Slips/trips/falls can occur from water and soap causing slippery surfaces. Tripping can occur from equipment being laid out for cleaning. Heavy lifting of equipment can cause muscle strain.	Be aware of surroundings when cleaning equipment. Use a team lift when lifting heavy objects. Maintain good footing and walk slowly on wet/slippery surfaces.	
Site restoration/loading of equipment.	Tripping can occur on equipment laying on the ground, heavy lifting can cause muscle strain.	Secure all equipment after use. Leave the site clean and free from any trash or debris. Secure all wells, gates and entrances to the site. Use proper lifting techniques when loading equipment.	
Inspection of injection trailer and demob from site.	Improperly loading the trailer can cause flying debris on the roadway. Improper trailer connections can cause the trailer to detach during the demob.	Follow the injection trailer check list when loading the trailer. Be sure all line items on the check list are satisfactory before departing from the site.	

SECTION 4
Personal Protective Equipment (PPE):
Level D
Orange Traffic Safety Vest
Protective Gloves - Nitrile and work gloves
Safety Glasses
Safety Shoes
Required and/or Recommended Equipment and Supplies:

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JOB SAFETY ANALYSIS

SECTION 1	
JSA Type:	Environmental Operations
JSA No:	JSA000704
Date:	3/14/2008
Work Type:	Environmental - Ground Water Sampling
Work Activity:	Ground Water Sampling
Project No.:	OH0002940011 - GM/MORAINE OMM ACTIVITIES 2007 (GM/MORAINE OMM ACTIVITIES 2007)

SECTION 2

Development Team	Position/Title	PC	Reviewed By	Position/Title	Date
Coppola, Mija A.	H&S	☑	Coppola, Mija A.	H&S	3/14/2008

SECTION 3

Job Steps	Potential Hazard(s)	Critical Action(s)	SOP Reference
Open wells to equilibrate and gauge wells.	When squatting down, personnel can be difficult to see by vehicular traffic. Pinchpoints on well vault can pinch fingers. Exposure to COCs in groundwater. Pressure can build up inside wells causing well caps to project into the air.	Wear Class II traffic vest if wells are located proximal to vehicular traffic. Use tall cones and the buddy system if practicable. Use correct tools to open well vault/cap. Wear proper PPE including safety boots, knee pads and safety glasses. Wear leather gloves when removing well vault lids, and chemical protective gloves while guaging. Keep head away from well cap when opening.	
Stage at pre-determined sampling location and set up work zone and sampling equipment	Slips, trips and falls can occur from equipment lying on the ground and uneven ground surfaces.	Set-up cones and establish work area. Position vehicle so that field crew is protected from site traffic. Unload as close to work area as safely possible; use proper lifting and reaching techniques and body positioning; don't carry more than you can handle, and get help moving heavy or awkward objects.	
Well purging	Electrical shock can occur when connecting/disconnecting pump from the battery. Lacerations to hand/fingers can occur when cutting tubing, Muscle strain can occur when lifting equipment, pinch point	Wear protective gloves and lower pump/bailer slowly. Cut tubing with tube cutting device (do not use pocket knife). Take stretch breaks as needed. Pour water slowly into buckets to minimize	

	between tubing and well casing while lowering pump or bailers. Exposure to COCs from splashing of water when pouring into 5 gallon bucket.	splashing. Use proper lifting techniques when moving equipment. Use two people if necessary; wear safety glasses and gloves.	
Moving purge buckets, and emptying water into drums.	Splashing can cause exposure to COCs in groundwater. Back/muscle strain from lifting and carrying 5 gallon buckets of water.	To minimize splashing and to keep the load at a reasonable weight, do not overfill buckets. Use proper lifting techniques. If buckets need to be transported to the purge storage containers, cover the buckets with lids to minimize spillage and move using a cart, dolly, or by putting in the back of truck.	
Collect groundwater sample	Cuts to hand and potential contact with COCs. Back strain from lifting full coolers. Exposure to sample preservatives.	Make sure glass sample containers are not cracked or broken. Ensure proper PPE is used to prevent dermal exposure. When lifting, use proper lifting techniques. Get help when moving heavy or awkward loads.	
Load equipment and samples back into vehicle.	Lifting hazards and back strain.	Use proper lifting techniques. Request assistance when lifting heavy equipment.	

SECTION 4
Personal Protective Equipment (PPE):
Level D
Orange Traffic Safety Vest
Protective Gloves - Nitrile or Latex
Safety Glasses
<u>Required and/or Recommended Equipment and Supplies:</u> cones for traffic control

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Appendix G

Material Safety Data Sheets

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: VINYLIDENE CHLORIDE

TRADE NAMES/SYNONYMS:
MTG MSDS 239; 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: Jan 01 2007

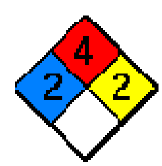
2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: VINYLIDENE CHLORIDE
CAS NUMBER: 75-35-4
PERCENTAGE: >99.9

COMPONENT: 4-METHOXYPHENOL
CAS NUMBER: 150-76-5
PERCENTAGE: 0.02000

3. HAZARDS IDENTIFICATION

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



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: symptoms of drunkenness, liver damage
LONG TERM EXPOSURE: same as effects reported in short term exposure

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If a large amount is swallowed, get medical attention.

5. FIRE FIGHTING MEASURES

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

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. 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

STORAGE: 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

EXPOSURE LIMITS:
VINYLIDENE CHLORIDE:
1 ppm (4 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993)
5 ppm ACGIH TWA
NIOSH TWA (lowest feasible concentration)

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 a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted 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

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

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

VINYLIDENE CHLORIDE:
TOXICITY DATA: 10000 mg/m3 inhalation-rat LC50; 200 mg/kg oral-rat LD50
CARCINOGEN STATUS: IARC: Human Inadequate Evidence, Animal Limited Evidence, Group 3; ACGIH: A4 -Not Classifiable as a Human Carcinogen
LOCAL EFFECTS:
Irritant: inhalation, skin, eye

ACUTE TOXICITY LEVEL:
Toxic: inhalation, ingestion
TARGET ORGANS: central nervous system, liver
TUMORIGENIC DATA: Available.
MUTAGENIC DATA: Available.
REPRODUCTIVE EFFECTS DATA: Available.

12. ECOLOGICAL INFORMATION

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)

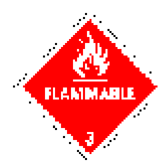
ALGAL TOXICITY: >712000 ug/L 96 hour(s) EC50 (Photosynthesis) Diatom (Skeletonema costatum)

ENVIRONMENTAL SUMMARY: Moderately toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

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



U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: Vinylidene chloride, stabilized
ID NUMBER: UN1303
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: I
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: Vinylidene chloride, stabilized
UN NUMBER: UN1303
CLASS: 3
PACKING GROUP/RISK GROUP: I

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):
VINYLIDINE CHLORIDE: 100 LBS RQ

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: Yes
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: Yes

SARA TITLE III SECTION 313 (40 CFR 372.65):
VINYLIDINE CHLORIDE

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: BD2

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION:
VINYLIDENE CHLORIDE
CAS NUMBER: 75-35-4
SECTION 4
4-METHOXYPHENOL
CAS NUMBER: 150-76-5
SECTION 4

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

MATHESON TRI-GAS, INC.
150 Allen Road Suite 302
Basking Ridge, New Jersey 07920
Information: 1-800-416-2505

Emergency Contact:
CHEMTREC 1-800-424-9300
Calls Originating Outside the US:
703-527-3887 (Collect Calls Accepted)

SUBSTANCE: CIS-1,2-DICHLOROETHYLENE

TRADE NAMES/SYNONYMS:
CIS-ACETYLENE DICHLORIDE; 1,2-DICHLOROETHYLENE; C2H2CL2; MAT05125; RTECS KV9420000

CHEMICAL FAMILY: halogenated, aliphatic

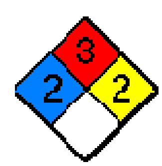
CREATION DATE: Jan 24 1989
REVISION DATE: Jan 01 2007

2. COMPOSITION, INFORMATION ON INGREDIENTS

COMPONENT: CIS-1,2-DICHLOROETHYLENE
CAS NUMBER: 156-59-2
PERCENTAGE: 100.0

3. HAZARDS IDENTIFICATION

NFPA RATINGS (SCALE 0-4): HEALTH=2 FIRE=3 REACTIVITY=2



EMERGENCY OVERVIEW:
COLOR: colorless
PHYSICAL FORM: liquid
ODOR: pleasant odor
MAJOR HEALTH HAZARDS: respiratory tract irritation, skin irritation, eye irritation, central nervous system depression
PHYSICAL HAZARDS: Flammable liquid and vapor. Vapor may cause flash fire. May react on contact with air, heat, light or water.

POTENTIAL HEALTH EFFECTS:
INHALATION:

SHORT TERM EXPOSURE: irritation, nausea, vomiting, drowsiness, symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects
SKIN CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
EYE CONTACT:
SHORT TERM EXPOSURE: irritation
LONG TERM EXPOSURE: same as effects reported in short term exposure
INGESTION:
SHORT TERM EXPOSURE: symptoms of drunkenness
LONG TERM EXPOSURE: no information on significant adverse effects

4. FIRST AID MEASURES

INHALATION: If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.

SKIN CONTACT: Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

EYE CONTACT: Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

INGESTION: If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

NOTE TO PHYSICIAN: For ingestion, consider gastric lavage. Consider oxygen.

5. FIRE FIGHTING MEASURES

FIRE AND EXPLOSION HAZARDS: Severe fire hazard. Moderate explosion hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back.

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

Large fires: Use regular 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: 39 F (4 C) (CC)
LOWER FLAMMABLE LIMIT: 9.7%
UPPER FLAMMABLE LIMIT: 12.8%
FLAMMABILITY CLASS (OSHA): IB

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:
Avoid heat, flames, sparks and other 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. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry.

7. HANDLING AND STORAGE

STORAGE: 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. Keep separated from incompatible substances.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

EXPOSURE LIMITS:
CIS-1,2-DICHLOROETHYLENE:
1,2-DICHLOROETHYLENE (ALL ISOMERS):
200 ppm (790 mg/m3) OSHA TWA
200 ppm ACGIH TWA
200 ppm (790 mg/m3) NIOSH recommended TWA 10 hour(s)

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 with a faceshield. 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.
2000 ppm
Any supplied-air respirator operated in a continuous-flow mode.
Any powered, air-purifying respirator with organic vapor cartridge(s).
Any air-purifying respirator with a full facepiece and an organic vapor canister.
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any self-contained breathing apparatus with a full facepiece.
Any supplied-air respirator with a full facepiece.
Emergency or planned entry into unknown concentrations or IDLH conditions -
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 a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted 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

PHYSICAL STATE: liquid
COLOR: colorless
ODOR: pleasant odor
MOLECULAR WEIGHT: 96.94
MOLECULAR FORMULA: C2-H2-CL2
BOILING POINT: 140 F (60 C)
FREEZING POINT: -114 F (-81 C)
VAPOR PRESSURE: 400 mmHg @ 41 C
VAPOR DENSITY (air=1): 3.34
SPECIFIC GRAVITY (water=1): 1.2837
WATER SOLUBILITY: insoluble
PH: Not available
VOLATILITY: Not available
ODOR THRESHOLD: Not available
EVAPORATION RATE: Not available
COEFFICIENT OF WATER/OIL DISTRIBUTION: Not available

SOLVENT SOLUBILITY:
Soluble: acetone, benzene, ether, alcohol

10. STABILITY AND REACTIVITY

REACTIVITY: May decompose on contact with air, light, moisture, heat or storage and use above room temperature. Releases toxic, corrosive, flammable or explosive gases.

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

INCOMPATIBILITIES: bases, metals, combustible materials, oxidizing materials, acids

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

POLYMERIZATION: May polymerize. Avoid contact with incompatible materials.

11. TOXICOLOGICAL INFORMATION

CIS-1,2-DICHLOROETHYLENE:
TOXICITY DATA: 13700 ppm inhalation-rat LC50
LOCAL EFFECTS:
Irritant: inhalation, skin, eye
ACUTE TOXICITY LEVEL:
Slightly Toxic: inhalation
TARGET ORGANS: central nervous system
MEDICAL CONDITIONS AGGRAVATED BY EXPOSURE: respiratory disorders
MUTAGENIC DATA: Available.

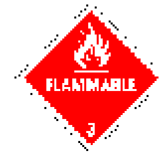
12. ECOLOGICAL INFORMATION

Not available

13. DISPOSAL CONSIDERATIONS

Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001. Dispose in accordance with all applicable regulations.

14. TRANSPORT INFORMATION



U.S. DOT 49 CFR 172.101:
PROPER SHIPPING NAME: 1,2-Dichloroethylene
ID NUMBER: UN1150
HAZARD CLASS OR DIVISION: 3
PACKING GROUP: II
LABELING REQUIREMENTS: 3

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:
SHIPPING NAME: 1,2-Dichloroethylene
UN NUMBER: UN1150
CLASS: 3
PACKING GROUP/RISK GROUP: II

15. REGULATORY INFORMATION

U.S. REGULATIONS:
CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): Not regulated.

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): Not regulated.

SARA TITLE III SECTION 304 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.40): Not regulated.

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):
ACUTE: Yes
CHRONIC: No
FIRE: Yes
REACTIVE: Yes
SUDDEN RELEASE: No

SARA TITLE III SECTION 313 (40 CFR 372.65):
1,2-DICHLOROETHYLENE (ALL ISOMERS)

OSHA PROCESS SAFETY (29CFR1910.119): Not regulated.

STATE REGULATIONS:
California Proposition 65: Not regulated.

CANADIAN REGULATIONS:
WHMIS CLASSIFICATION: BD2

NATIONAL INVENTORY STATUS:
U.S. INVENTORY (TSCA): Listed on inventory.

TSCA 12(b) EXPORT NOTIFICATION: Not listed.

CANADA INVENTORY (DSL/NDSL): Not determined.

16. OTHER INFORMATION

MSDS SUMMARY OF CHANGES
8. EXPOSURE CONTROLS, PERSONAL PROTECTION

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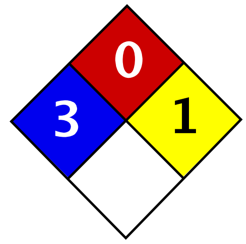

Health	3
Fire	0
Reactivity	1
Personal Protection	

Material Safety Data Sheet
Hydrochloric acid MSDS

Section 1: Chemical Product and Company Identification

Product Name: Hydrochloric acid

Catalog Codes: SLH1462, SLH3154

CAS#: Mixture.

RTECS: MW4025000

TSCA: TSCA 8(b) inventory: Hydrochloric acid

CI#: Not applicable.

Synonym: Hydrochloric Acid; Muriatic Acid

Chemical Name: Not applicable.

Chemical Formula: Not applicable.

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
Hydrogen chloride	7647-01-0	20-38
Water	7732-18-5	62-80

Toxicological Data on Ingredients: Hydrogen chloride: GAS (LC50): Acute: 4701 ppm 0.5 hours [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of eye contact (irritant, corrosive), of ingestion, . Slightly hazardous in case of inhalation (lung sensitizer). Non-corrosive for lungs. Liquid or spray mist may produce tissue damage particularly on mucous membranes of eyes, mouth and respiratory tract. Skin contact may produce burns. Inhalation of the spray mist may produce severe irritation of respiratory tract, characterized by coughing, choking, or shortness of breath. Severe over-exposure can result in death. Inflammation of the eye is characterized by redness, watering, and itching. Skin inflammation is characterized by itching, scaling, reddening, or, occasionally, blistering.

Potential Chronic Health Effects:
Slightly hazardous in case of skin contact (sensitizer).
CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid].
MUTAGENIC EFFECTS: Not available.

TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to kidneys, liver, mucous membranes, upper respiratory tract, skin, eyes, Circulatory System, teeth.
Repeated or prolonged exposure to the substance can produce target organs damage. Repeated or prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation. Repeated or prolonged exposure to spray mist may produce respiratory tract irritation leading to frequent attacks of bronchial infection. Repeated exposure to a highly toxic material may produce general deterioration of health by an accumulation in one or many human organs.

Section 4: First Aid Measures

Eye Contact:
Check for and remove any contact lenses. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Cold water may be used. 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. Cover the irritated skin with an emollient. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention immediately.

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

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately.

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. WARNING: It may be hazardous to the person providing aid to give mouth-to-mouth resuscitation when the inhaled material is toxic, infectious or corrosive. Seek immediate medical attention.

Ingestion:
If swallowed, do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: of metals

Explosion Hazards in Presence of Various Substances: Non-explosive in presence of open flames and sparks, of shocks.

Fire Fighting Media and Instructions: Not applicable.

Special Remarks on Fire Hazards:
Non combustible.
Calcium carbide reacts with hydrogen chloride gas with incandescence.
Uranium phosphide reacts with hydrochloric acid to release spontaneously flammable phosphine.
Rubidium acetylene carbides burns with slightly warm hydrochloric acid.
Lithium silicide in contact with hydrogen chloride becomes incandescent. When dilute hydrochloric acid is used, gas spontaneously flammable in air is evolved.
Magnesium boride treated with concentrated hydrochloric acid produces spontaneously flammble gas.
Cesium acetylene carbide burns hydrogen chloride gas.
Cesium carbide ignites in contact with hydrochloric acid unless acid is dilute.
Reacts with most metals to produce flammable Hydrodgen gas.

Special Remarks on Explosion Hazards:
Hydrogen chloride in contact with the following can cause an explosion, ignition on contact, or other violent/vigorous reaction: Acetic anhydride AgClO + CCl4 Alcohols + hydrogen cyanide, Aluminum Aluminum-titanium alloys (with HCl vapor), 2-Amino ethanol, Ammonium hydroxide, Calcium carbide Ca3P2 Chlorine + dinitroanilines (evolves gas), Chlorosulfonic acid Cesium carbide Cesium acetylene carbide, 1,1-Difluoroethylene Ethylene diamine Ethylene imine, Fluorine, HClO4 Hexalithium disilicide H2SO4 Metal acetylides or carbides, Magnesium boride, Mercuric sulfate, Oleum, Potassium permanganate, beta-Propiolactone Propylene oxide Rubidium carbide, Rubidium, acetylene carbide Sodium (with aqueous HCl), Sodium hydroxide Sodium tetraselenium, Sulfonic acid, Tetraselenium tetranitride, U3P4 , Vinyl acetate.
Silver perchlorate with carbon tetrachloride in the presence of hydrochloric acid produces trichloromethyl perchlorate which detonates at 40 deg. C.

Section 6: Accidental Release Measures

Small Spill:
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container. If necessary: Neutralize the residue with a dilute solution of sodium carbonate.

Large Spill:
Corrosive liquid. Poisonous liquid.
Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not get water inside container. Do not touch spilled material. Use water spray curtain to divert vapor drift. Use water spray to reduce vapors. Prevent entry into sewers, basements or confined areas; dike if needed. Call for assistance on disposal. Neutralize the residue with a dilute solution of sodium carbonate. 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 container dry. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Never add water to this product. 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, organic materials, metals, alkalis, moisture.
May corrode metallic surfaces. Store in a metallic or coated fiberboard drum using a strong polyethylene inner package.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

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:

Face shield. Full suit. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Boots.

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:
CEIL: 5 (ppm) from OSHA (PEL) [United States]
CEIL: 7 (mg/m3) from OSHA (PEL) [United States]
CEIL: 5 from NIOSH
CEIL: 7 (mg/m3) from NIOSH
TWA: 1 STEL: 5 (ppm) [United Kingdom (UK)]
TWA: 2 STEL: 8 (mg/m3) [United Kingdom (UK)]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Pungent. Irritating (Strong.)

Taste: Not available.

Molecular Weight: Not applicable.

Color: Colorless to light yellow.

pH (1% soln/water): Acidic.

Boiling Point:
108.58 C @ 760 mm Hg (for 20.22% HCl in water)
83 C @ 760 mm Hg (for 31% HCl in water)
50.5 C (for 37% HCl in water)

Melting Point:
-62.25°C (-80°F) (20.69% HCl in water)
-46.2 C (31.24% HCl in water)
-25.4 C (39.17% HCl in water)

Critical Temperature: Not available.

Specific Gravity:
1.1- 1.19 (Water = 1)
1.10 (20%and 22% HCl solutions)
1.12 (24% HCl solution)
1.15 (29.57% HCl solution)
1.16 (32% HCl solution)
1.19 (37% and 38%HCl solutions)

Vapor Pressure: 16 kPa (@ 20°C) average

Vapor Density: 1.267 (Air = 1)

Volatility: Not available.

Odor Threshold: 0.25 to 10 ppm

Water/Oil Dist. Coeff.: Not available.

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, diethyl ether.

Solubility: Soluble in cold water, hot water, diethyl ether.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials, water

Incompatibility with various substances:
Highly reactive with metals.
Reactive with oxidizing agents, organic materials, alkalis, water.

Corrosivity:
Extremely corrosive in presence of aluminum, of copper, of stainless steel(304), of stainless steel(316).
Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Reacts with water especially when water is added to the product.
Absorption of gaseous hydrogen chloride on mercuric sulfate becomes violent @ 125 deg. C.
Sodium reacts very violently with gaseous hydrogen chloride.
Calcium phosphide and hydrochloric acid undergo very energetic reaction.
It reacts with oxidizers releasing chlorine gas.
Incompatible with, alkali metals, carbides, borides, metal oxides, vinyl acetate, acetylides, sulphides, phosphides, cyanides, carbonates.
Reacts with most metals to produce flammable Hydrogen gas.
Reacts violently (moderate reaction with heat of evolution) with water especially when water is added to the product. Isolate hydrogen chloride from heat, direct sunlight, alkalies (reacts vigorously), organic materials, and oxidizers (especially nitric acid and chlorates), amines, metals, copper and alloys (e.g. brass), hydroxides, zinc (galvanized materials), lithium silicide (incandescence), sulfuric acid(increase in temperature and pressure)
Hydrogen chloride gas is emitted when this product is in contact with sulfuric acid.
Adsorption of Hydrochloric Acid onto silicon dioxide results in exothmeric reaction.
Hydrogen chloride causes aldehydes and epoxides to violently polymerize.
Hydrogen chloride or Hydrochloric Acid in contact with the folloiwng can cause explosion or ignition on contact or

Special Remarks on Corrosivity:
Highly corrosive. Incompatible with copper and copper alloys. It attacks nearly all metals (mercury, gold, platinium, tantalum, silver, and certain alloys are exceptions).
It is one of the most corrosive of the nonoxidizing acids in contact with copper alloys.
No corrosivity data on zinc, steel.
Severe Corrosive effect on brass and bronze

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
Acute oral toxicity (LD50): 900 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 1108 ppm, 1 hours [Mouse].
Acute toxicity of the vapor (LC50): 3124 ppm, 1 hours [Rat].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified 3 (Not classifiable for human.) by IARC [Hydrochloric acid].
May cause damage to the following organs: kidneys, liver, mucous membranes, upper respiratory tract, skin,

eyes, Circulatory System, teeth.

Other Toxic Effects on Humans:
Very hazardous in case of skin contact (corrosive, irritant, permeator), of ingestion, .
Hazardous in case of eye contact (corrosive), of inhalation (lung corrosive).

Special Remarks on Toxicity to Animals:
Lowest Published Lethal Doses (LDL/LCL)
LDL [Man] -Route: Oral; 2857 ug/kg
LCL [Human] - Route: Inhalation; Dose: 1300 ppm/30M
LCL [Rabbit] - Route: Inhalation; Dose: 4413 ppm/30M

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects (fetoxicity).
May affect genetic material.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Corrosive. Causes severe skin irritation and burns.
Eyes: Corrosive. Causes severe eye irritation/conjuntivitis, burns, corneal necrosis.
Inhalation: May be fatal if inhaled. Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract. Inhalation of hydrochloric acid fumes produces nose, throat, and larryngeal burning, and irritation, pain and inflammation, coughing, sneezing, choking sensation, hoarseness, laryngeal spasms, upper respiratory tract edema, chest pains, as well has headache, and palpitations. Inhalation of high concentrations can result in corrosive burns, necrosis of bronchial epithelium, constriction of the larynx and bronchi, nasospetal perforation, glottal closure,
occur, particularly if exposure is prolonged. May affect the liver.
Ingestion: May be fatal if swallowed. Causes irritation and burning, ulceration, or perforation of the gastrointestinal tract and resultant peritonitis, gastric hemorrhage and infection. Can also cause nausea, vomitting (with "coffee ground" emesis), diarrhea, thirst, difficulty swallowing, salivation, chills, fever, uneasiness, shock, strictures and stenosis (esophogeal, gastric, pyloric). May affect behavior (excitement), the cardiovascular system (weak rapid pulse, tachycardia), respiration (shallow respiration), and urinary system (kidneys- renal failure, nephritis).
Acute exposure via inhalation or ingestion can also cause erosion of tooth enamel.
Chronic Potential Health Effects:
dyspnea, bronchitis. Chemical pneumonitis and pulmonary edema can also

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 less toxic than the product itself.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: Class 8: Corrosive material

Identification: : Hydrochloric acid, solution UNNA: 1789 PG: II

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Connecticut hazardous material survey.: Hydrochloric acid
Illinois toxic substances disclosure to employee act: Hydrochloric acid
Illinois chemical safety act: Hydrochloric acid
New York release reporting list: Hydrochloric acid
Rhode Island RTK hazardous substances: Hydrochloric acid
Pennsylvania RTK: Hydrochloric acid
Minnesota: Hydrochloric acid
Massachusetts RTK: Hydrochloric acid
Massachusetts spill list: Hydrochloric acid
New Jersey: Hydrochloric acid
New Jersey spill list: Hydrochloric acid
Louisiana RTK reporting list: Hydrochloric acid
Louisiana spill reporting: Hydrochloric acid
California Director's List of Hazardous Substances: Hydrochloric acid
TSCA 8(b) inventory: Hydrochloric acid
TSCA 4(a) proposed test rules: Hydrochloric acid
SARA 302/304/311/312 extremely hazardous substances: Hydrochloric acid
SARA 313 toxic chemical notification and release reporting: Hydrochloric acid
CERCLA: Hazardous substances.: Hydrochloric acid: 5000 lbs. (2268 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 D-2A: Material causing other toxic effects (VERY TOXIC).
CLASS E: Corrosive liquid.

DSCL (EEC):
R34- Causes burns.
R37- Irritating to respiratory system.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

HMIS (U.S.A.):

Health Hazard: 3

Fire Hazard: 0

Reactivity: 1

Personal Protection:

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

Health: 3

Flammability: 0

Reactivity: 1

Specific hazard:

Protective Equipment:
Gloves.
Full suit.
Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate.
Face shield.

Section 16: Other Information

References:

-Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987.
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984.
-The Sigma-Aldrich Library of Chemical Safety Data, Edition II.
-Guide de la loi et du règlement sur le transport des marchandises dangeureuses au canada. Centre de conformité internatinal Ltée. 1986.

Other Special Considerations: Not available.

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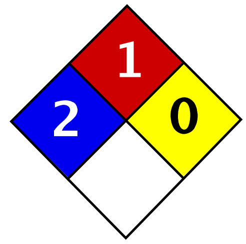

Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
1,1,1-Trichloroethane MSDS

Section 1: Chemical Product and Company Identification

Product Name: 1,1,1-Trichloroethane

Catalog Codes: SLT4180, SLT2167, SLT3460

CAS#: 71-55-6

RTECS: KJ2975000

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

CI#: Not available.

Synonym:

Chemical Formula: CH3CCl3

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
{1,1,1-}Trichloroethane	71-55-6	100

Toxicological Data on Ingredients: 1,1,1-Trichloroethane: ORAL (LD50): Acute: 9600 mg/kg [Rat]. 6000 mg/kg [Mouse]. DERMAL (LD50): Acute: 15800 mg/kg [Rabbit]. VAPOR (LC50): Acute: 18000 ppm 4 hour(s) [Rat].

Section 3: Hazards Identification

Potential Acute Health Effects:
Very hazardous in case of eye contact (irritant), of ingestion. Hazardous in case of skin contact (irritant, permeator), of inhalation. Inflammation of the eye is characterized by redness, watering, and itching.

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Not available.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to lungs, the nervous system, liver, mucous membranes.
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. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. 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 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. 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: May be combustible at high temperature.

Auto-Ignition Temperature: 537°C (998.6°F)

Flash Points: Not available.

Flammable Limits: LOWER: 7.5% UPPER: 12.5%

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

Fire Hazards in Presence of Various Substances: Slightly flammable to flammable in presence of oxidizing materials, of acids, of alkalis.

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.
Slightly explosive to explosive in presence of oxidizing materials, of acids, of alkalis.

Fire Fighting Media and Instructions:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

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:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. 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 away from heat. Keep away from sources of ignition. Empty containers pose a fire risk, evaporate the residue under a fume hood. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapour/spray. 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

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Keep container tightly closed. Keep in a cool, well-ventilated place. Combustible materials should be stored away from extreme heat and away from strong oxidizing agents.

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: 350 STEL: 440 CEIL: 440 (ppm) from ACGIH (TLV) [1995]
TWA: 1900 STEL: 2460 CEIL: 2380 (mg/m3) from ACGIH [1995]Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 133.41 g/mole

Color: Not available.

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

Boiling Point: 74.1°C (165.4°F)

Melting Point: -32.5°C (-26.5°F)

Critical Temperature: Not available.

Specific Gravity: 1.3376 (Water = 1)

Vapor Pressure: 100 mm of Hg (@ 20°C)

Vapor Density: 4.6 (Air = 1)

Volatility: Not available.

Odor Threshold: 400 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility: Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 6000 mg/kg [Mouse].
Acute dermal toxicity (LD50): 15800 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 18000 ppm 4 hour(s) [Rat].

Chronic Effects on Humans: The substance is toxic to lungs, the nervous system, liver, mucous membranes.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Detected in maternal milk in human.

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 more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : 1,1,1-Trichloroethane : UN2831 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
Pennsylvania RTK: 1,1,1-Trichloroethane
Massachusetts RTK: 1,1,1-Trichloroethane
TSCA 8(b) inventory: 1,1,1-Trichloroethane
SARA 313 toxic chemical notification and release reporting: 1,1,1-Trichloroethane
CERCLA: Hazardous substances.: 1,1,1-Trichloroethane

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada): CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).

DSCL (EEC):
R38- Irritating to skin.
R41- Risk of serious damage to eyes.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 1

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.

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Last Updated: 10/10/2005 08:31 PM

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MATERIAL SAFETY DATA SHEET
MOLASSES/MOLASSES BLENDS/BINDERS

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Chemical Name	Chemical Formula	Molecular Weight
N/A	Mixture of liquid Agricultural commodities	No data

Trade Name – Molasses/Molasses Blends

Synonyms: DOT Identification No.

Liquid animal supplement: N/A

Company Identification:
Westway Trading Corporation
365 Canal Street, Suite 2900
New Orleans, Louisiana 70130
(504) 525-9741

2. COMPOSITION, INFORMATION ON INGREDIENTS

Component(s), Chemical Name	CAS Registry No.	%(Approx.)	ACGIH TLV-TWA
Proprietary **See ingredient tag**	NA	No data	No data

3. HAZARDS IDENTIFICATION

Emergency Overview

This material should be stored in a vented tank designed to contain a material with a specific gravity of 1.3 or greater. Material can ferment if excessive moisture contamination is allowed. Fermentation can yield carbon dioxide with possible traces of ethanol or volatile fatty acids (e.g. acetic, propionic, lactic, or butyric) and if exposed to a spark or flame may result in an explosion. These conditions should be avoided. If maintenance of tank requires entry by personnel, OSHA's Confined Space standard (29CFR1910.146) shall be complied with. If welding is to be performed, the tank should be gas freed and only certified welders shall perform welding operations.

Potential Health Effects

Eyes - Mild irritant

Skin - None

Inhalation – Insufficient oxygen may be present in vessels containing the product due to the generation of carbon monoxide during fermentation

4. FIRST AID MEASURES

Eyes: Flush eyes for 15 minutes.

Skin: Wash with soap and water.

Ingestion: No data

5. FIRE FIGHTING MEASURES

Flashpoint (Method used)	Flammable Limits in Air
Non-flammable Non-combustible	Non-flammable Non-combustible

Extinguishing Agents - NA

Unusual Fire and Explosion Hazards – Fermentation occurs when diluted with water and is accelerated by heat. During fermentation, carbon monoxide with possible traces of ethanol or volatile fatty acids (e.g., acetic, propionic, lactic, or butyric) is given off, which produces inhalation hazards and possible explosion hazards.

6. ACCIDENTAL RELEASE MEASURES

Steps to be Taken in Case Material is Released or Spilled

Small spills - Stop the source of the spill. Recover as much product as possible for reuse. Absorb remaining spill and dispose solids in waste container.

Large spills - Stop the source of the spill. Create diversionary structures to minimize the extent of the release. Prevent the release from entering a waterway or sewer. Recover useable product. Absorb remaining spill and dispose of at an approved facility such as a municipal landfill or land application site.

7. HANDLING AND STORAGE

This material should be stored in a vented tank designed to contain a material with a specific gravity of 1.3 or greater. Material can ferment if excessive moisture contamination is allowed.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Respiratory Protection - None

Ventilation – Provide adequate ventilation to prevent accumulation of vapors.

Skin Protection - Rubber gloves

Eye Protection - Safety glasses

Hygiene - Wash any exposed area promptly with soap and water. Launder contaminated clothing.

Other Control Measures - None

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance Dark brown syrupy liquid	Odor Sweet
Physical State Liquid	Specific Gravity 1.45
Boiling Point Very high	Freezing/Melting Point Varies
Vapor Pressure Low	% Volatile, by Volume No data
Evaporation Rate No data	Vapor Density in Air Water vapor only
Solubility in Water Soluble	pH 2.25 to 6.0

10. STABILITY AND REACTIVITY

Chemical Stability - Stable

Conditions to Avoid – Excess moisture or heat. Unventilated containers.

Incompatibility with Other Materials - Reacts with concentrated nitric acid or concentrated Sulphuric acid. Ferments when diluted with water.

Hazard Decomposition Products – Carbon monoxide, alcohol or fatty acid vapors

Hazardous Polymerization - NA

11. ECOLOGICAL INFORMATION

Prevent releases to land or water. Results in high Biological Oxygen Demand (BOD) and potential oxygen depletion of aquatic systems.

12. DISPOSAL CONSIDERATIONS

Dispose of waste material at an approved municipal landfill or land application site.

13. TRANSPORT INFORMATION

Hazardous Materials Description/ Proper Shipping Name - NA

DOT Hazard Class - NA

DOT Identification Number - NA

X This product is not a DOT hazardous material.

14. REGULATORY INFORMATION

Discharges to a water of the U.S. are regulated by the Environmental Protection Agency.

15. OTHER INFORMATION

None.

Date of Preparation: 3/15/96 **REVISED: 10/12/01**

Prepared by: Jane Besch, Director - HSE

Disclaimer:
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Health	2
Fire	1
Reactivity	0
Personal Protection	H

Material Safety Data Sheet
Trichloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Trichloroethylene

Catalog Codes: SLT3310, SLT2590

CAS#: 79-01-6

RTECS: KX4560000

TSCA: TSCA 8(b) inventory: Trichloroethylene

CI#: Not available.

Synonym:

Chemical Formula: C2HCl3

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
Trichloroethylene	79-01-6	100

Toxicological Data on Ingredients: Trichloroethylene: ORAL (LD50): Acute: 5650 mg/kg [Rat]. 2402 mg/kg [Mouse]. DERMAL (LD50): Acute: 20001 mg/kg [Rabbit].

Section 3: Hazards Identification

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

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH.
MUTAGENIC EFFECTS: Not available.
TERATOGENIC EFFECTS: Not available.
DEVELOPMENTAL TOXICITY: Not available.
The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.
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. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. 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 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. 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: May be combustible at high temperature.

Auto-Ignition Temperature: 420°C (788°F)

Flash Points: Not available.

Flammable Limits: LOWER: 8% UPPER: 10.5%

Products of Combustion: These products are carbon oxides (CO, CO_2), 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:
SMALL FIRE: Use DRY chemical powder.
LARGE FIRE: Use water spray, fog or foam. Do not use water jet.

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:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. 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. Empty containers pose a fire risk, evaporate the residue under a fume hood. 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

Storage:
Keep container dry. Keep in a cool place. Ground all equipment containing material. Carcinogenic, teratogenic or mutagenic materials should be stored in a separate locked safety storage cabinet or room.

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: 50 STEL: 200 (ppm) from ACGIH (TLV)
TWA: 269 STEL: 1070 (mg/m3) from ACGIH
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Not available.

Taste: Not available.

Molecular Weight: 131.39 g/mole

Color: Clear Colorless.

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

Boiling Point: 86.7°C (188.1°F)

Melting Point: -87.1°C (-124.8°F)

Critical Temperature: Not available.

Specific Gravity: 1.4649 (Water = 1)

Vapor Pressure: 58 mm of Hg (@ 20°C)

Vapor Density: 4.53 (Air = 1)

Volatility: Not available.

Odor Threshold: 20 ppm

Water/Oil Dist. Coeff.: The product is equally soluble in oil and water; log(oil/water) = 0

Ionicity (in Water): Not available.

Dispersion Properties: See solubility in water, methanol, diethyl ether, acetone.

Solubility:
Easily soluble in methanol, diethyl ether, acetone.
Very slightly soluble in cold water.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Not available.

Incompatibility with various substances: Not available.

Corrosivity:
Extremely corrosive in presence of aluminum.
Non-corrosive in presence of glass.

Special Remarks on Reactivity: Not available.

Special Remarks on Corrosivity: Not available.

Polymerization: No.

Section 11: Toxicological Information

Routes of Entry: Dermal contact. Eye contact. Inhalation. Ingestion.

Toxicity to Animals:
Acute oral toxicity (LD50): 2402 mg/kg [Mouse].
Acute dermal toxicity (LD50): 20001 mg/kg [Rabbit].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified + (PROVEN) by OSHA. Classified A5 (Not suspected for human.) by ACGIH.
The substance is toxic to kidneys, the nervous system, liver, heart, upper respiratory tract.

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

Special Remarks on Toxicity to Animals: Not available.

Special Remarks on Chronic Effects on Humans: Passes through the placental barrier in human. Detected in maternal milk in human.

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 more toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Trichloroethylene : UN1710 PG: III

Special Provisions for Transport: Not available.

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Trichloroethylene
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: Trichloroethylene
Pennsylvania RTK: Trichloroethylene
Florida: Trichloroethylene
Minnesota: Trichloroethylene
Massachusetts RTK: Trichloroethylene
New Jersey: Trichloroethylene
TSCA 8(b) inventory: Trichloroethylene
CERCLA: Hazardous substances.: Trichloroethylene

Other Regulations: OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200).

Other Classifications:

WHMIS (Canada):
CLASS D-1B: Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2B: Material causing other toxic effects (TOXIC).

DSCL (EEC):
R36/38- Irritating to eyes and skin.
R45- May cause cancer.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 1

Reactivity: 0

Personal Protection: h

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

Health: 2

Flammability: 1

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.

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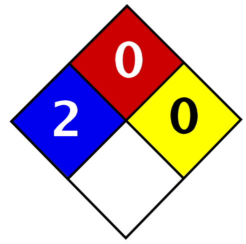

Health	2
Fire	0
Reactivity	0
Personal Protection	G

Material Safety Data Sheet
Tetrachloroethylene MSDS

Section 1: Chemical Product and Company Identification

Product Name: Tetrachloroethylene

Catalog Codes: SLT3220

CAS#: 127-18-4

RTECS: KX3850000

TSCA: TSCA 8(b) inventory: Tetrachloroethylene

CI#: Not available.

Synonym: Perchloroethylene; 1,1,2,2-Tetrachloroethylene; Carbon bichloride; Carbon dichloride; Ankilostin; Didakene; Dilatin PT; Ethene, tetrachloro-; Ethylene tetrachloride; Perawin; Perchlor; Perclene; Perclene D; Percosolvel; Tetrachloroethene; Tetraleno; Tetralex; Tetravec; Tetroguer; Tetropil

Chemical Name: Ethylene, tetrachloro-

Chemical Formula: C2-Cl4

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
Tetrachloroethylene	127-18-4	100

Toxicological Data on Ingredients: Tetrachloroethylene: ORAL (LD50): Acute: 2629 mg/kg [Rat]. DERMAL (LD): Acute: >3228 mg/kg [Rabbit]. MIST(LC50): Acute: 34200 mg/m 8 hours [Rat]. VAPOR (LC50): Acute: 5200 ppm 4 hours [Mouse].

Section 3: Hazards Identification

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

Potential Chronic Health Effects:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (anticipated carcinogen) by NTP.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.
TERATOGENIC EFFECTS: Not available.

DEVELOPMENTAL TOXICITY: Not available.
The substance may be toxic to kidneys, liver, peripheral nervous system, respiratory tract, skin, 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. In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if irritation occurs.

Skin Contact:
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

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

Inhalation:
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

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 unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

Serious Ingestion: Not available.

Section 5: Fire and Explosion Data

Flammability of the Product: Non-flammable.

Auto-Ignition Temperature: Not applicable.

Flash Points: Not applicable.

Flammable Limits: Not applicable.

Products of Combustion: Not available.

Fire Hazards in Presence of Various Substances: Not applicable.

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: Not applicable.

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:
Absorb with an inert material and put the spilled material in an appropriate waste disposal. 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:
Do not ingest. Do not breathe gas/fumes/ vapor/spray. Avoid contact with skin. 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. Keep away from incompatibles such as oxidizing agents, metals, acids, alkalis.

Storage: Keep container tightly closed. Keep container in a cool, well-ventilated area.

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.

Personal Protection:
Safety glasses. 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: 25 (ppm) from OSHA (PEL) [United States]
TWA: 25 STEL: 100 (ppm) from ACGIH (TLV) [United States]
TWA: 170 (mg/m3) from OSHA (PEL) [United States]
Consult local authorities for acceptable exposure limits.

Section 9: Physical and Chemical Properties

Physical state and appearance: Liquid.

Odor: Ethereal.

Taste: Not available.

Molecular Weight: 165.83 g/mole

Color: Clear Colorless.

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

Boiling Point: 121.3°C (250.3°F)

Melting Point: -22.3°C (-8.1°F)

Critical Temperature: 347.1°C (656.8°F)

Specific Gravity: 1.6227 (Water = 1)

Vapor Pressure: 1.7 kPa (@ 20°C)

Vapor Density: 5.7 (Air = 1)

Volatility: Not available.

Odor Threshold: 5 - 50 ppm

Water/Oil Dist. Coeff.: The product is more soluble in oil; log(oil/water) = 3.4

Ionicity (in Water): Not available.

Dispersion Properties: Not available.

Solubility:
Miscible with alcohol, ether, chloroform, benzene, hexane.
It dissolves in most of the fixed and volatile oils.
Solubility in water: 0.015 g/100 ml @ 25 deg. C
It slowly decomposes in water to yield Trichloroacetic and Hydrochloric acids.

Section 10: Stability and Reactivity Data

Stability: The product is stable.

Instability Temperature: Not available.

Conditions of Instability: Incompatible materials

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

Corrosivity: Non-corrosive in presence of glass.

Special Remarks on Reactivity:
Oxidized by strong oxidizing agents.
Incompatible with sodium hydroxide, finely divided or powdered metals such as zinc, aluminum, magnesium, potassium, chemically active metals such as lithium, beryllium , barium.
Protect from light.

Special Remarks on Corrosivity: Slowly corrodes aluminum, iron, and zinc.

Polymerization: Will not occur.

Section 11: Toxicological Information

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

Toxicity to Animals:
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE.
Acute oral toxicity (LD50): 2629 mg/kg [Rat].
Acute dermal toxicity (LD50): >3228 mg/kg [Rabbit].
Acute toxicity of the vapor (LC50): 5200 4 hours [Mouse].

Chronic Effects on Humans:
CARCINOGENIC EFFECTS: Classified A3 (Proven for animal.) by ACGIH. Classified 2A (Probable for human.) by IARC, 2 (Some evidence.) by NTP.
MUTAGENIC EFFECTS: Mutagenic for bacteria and/or yeast.
May cause damage to the following organs: kidneys, liver, peripheral nervous system, upper respiratory tract,

skin, central nervous system (CNS).

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

Special Remarks on Toxicity to Animals:
Lowest Publishe Lethal Dose/Conc:
LDL [Rabbit] - Route: Oral; Dose: 5000 mg/kg
LDL [Dog] - Route: Oral; Dose: 4000 mg/kg
LDL [Cat] - Route: Oral; Dose: 4000 mg/kg

Special Remarks on Chronic Effects on Humans:
May cause adverse reproductive effects and birth defects(teratogenic).
May affect genetic material (mutagenic).
May cause cancer.

Special Remarks on other Toxic Effects on Humans:
Acute Potential Health Effects:
Skin: Causes skin irritation with possible dermal blistering or burns. Symtoms may include redness, itching, pain, and possible dermal blistering or burns. It may be absorbed through the skin with possible systemic effects. A single prolonged skin exposure is not likely to result in the material being absorbed in harmful amounts.
Eyes: Contact causes transient eye irritation, lacrimation. Vapors cause eye/conjunctival irritation. Symptoms may include redness and pain.
Inhalation: The main route to occupational exposure is by inhalation since it is readily absorbed through the lungs. It causes respiratory tract irritation, . It can affect behavior/central nervous system (CNS depressant and anesthesia ranging from slight inebriation to death, vertigo, somnolence, anxiety, headache, excitement, hallucinations, muscle incoordination, dizziness, lightheadness, disorentiation, seizures, enotional instability, stupor, coma). It may cause pulmonary edema
Ingestion: It can cause nausea, vomiting, anorexia, diarrhea, bloody stool. It may affect the liver, urinary system (proteinuria, hematuria, renal failure, renal tubular disorder), heart (arrhythmias). It may affect behavior/central nervous system with symptoms similar to that of inhalation.
Chronic Potential Health Effects:
Skin: Prolonged or repeated skin contact may result in excessive drying of the skin, and irritation.
Ingestion/Inhalation: Chronic exposure can affect the liver(hepatitis,fatty liver degeneration), kidneys, spleen, and heart (irregular heartbeat/arrhythmias, cardiomyopathy, abnormal EEG), brain, behavior/central nervous system/peripheral nervous system (impaired memory, numbness of extremeties, peripheral neuropathy and other

Section 12: Ecological Information

Ecotoxicity:
Ecotoxicity in water (LC50): 18.4 mg/l 96 hours [Fish (Fatthead Minnow)]. 18 mg/l 48 hours [Daphnia (daphnia)]. 5 mg/l 96 hours [Fish (Rainbow Trout)]. 13 mg/l 96 hours [Fish (Bluegill sunfish)].

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 product itself and its products of degradation are not toxic.

Special Remarks on the Products of Biodegradation: Not available.

Section 13: Disposal Considerations

Waste Disposal:
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

Section 14: Transport Information

DOT Classification: CLASS 6.1: Poisonous material.

Identification: : Tetrachloroethylene UNNA: 1897 PG: III

Special Provisions for Transport: Marine Pollutant

Section 15: Other Regulatory Information

Federal and State Regulations:
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Tetrachloroethylene
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: Tetrachloroethylene
Connecticut hazardous material survey.: Tetrachloroethylene
Illinois toxic substances disclosure to employee act: Tetrachloroethylene
Illinois chemical safety act: Tetrachloroethylene
New York release reporting list: Tetrachloroethylene
Rhode Island RTK hazardous substances: Tetrachloroethylene
Pennsylvania RTK: Tetrachloroethylene
Minnesota: Tetrachloroethylene
Michigan critical material: Tetrachloroethylene
Massachusetts RTK: Tetrachloroethylene
Massachusetts spill list: Tetrachloroethylene
New Jersey: Tetrachloroethylene
New Jersey spill list: Tetrachloroethylene
Louisiana spill reporting: Tetrachloroethylene
California Director's List of Hazardous Substances: Tetrachloroethylene
TSCA 8(b) inventory: Tetrachloroethylene
TSCA 8(d) H and S data reporting: Tetrachloroethylene: Effective date: 6/1/87; Sunset date: 6/1/97
SARA 313 toxic chemical notification and release reporting: Tetrachloroethylene
CERCLA: Hazardous substances.: Tetrachloroethylene: 100 lbs. (45.36 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 D-1B: Material causing immediate and serious toxic effects (TOXIC).
CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

DSCL (EEC):
R40- Possible risks of irreversible effects.
R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S23- Do not breathe gas/fumes/vapour/spray
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S37- Wear suitable gloves.
S61- Avoid release to the environment. Refer to special instructions/Safety data sheets.

HMIS (U.S.A.):

Health Hazard: 2

Fire Hazard: 0

Reactivity: 0

Personal Protection: g

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

Health: 2

Flammability: 0

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.
Safety glasses.

Section 16: Other Information

References: Not available.

Other Special Considerations: Not available.

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1 PRODUCT AND COMPANY IDENTIFICATION

Fluorochemicals
Arkema Inc.
2000 Market Street
Philadelphia, PA 19103

EMERGENCY PHONE NUMBERS:
Chemtrec: (800) 424-9300 (24hrs) or (703) 527-3887
Medical: Rocky Mountain Poison Control Center
(866) 767-5089 (24Hrs)

Information Telephone Numbers	Phone Number	Available Hrs
Product Information	800-245-5858	8:00 am - 5:30 pm (Eastern)

Product Name: Transcend (R) Additive
Product Synonym(s): Trans-1,2-Dichloroethylene

Chemical Family
Chemical Formula
Chemical Name: Trans-1, 2-Dichloroethylene
EPA Reg Num
Product Use: Additive

2 COMPOSITION / INFORMATION ON INGREDIENTS

Ingredient Name	CAS RegistryNumber	Typical %	OSHA
Trans-1,2-dichloroethylene	156-60-5	>99%	Y

The substance(s) marked with a "Y" in the OSHA column, are identified as hazardous chemicals according to the criteria of the OSHA Hazard Communication Standard (29 CFR 1910.1200)

This material is classified as hazardous under Federal OSHA regulation.

The components of this product are all on the TSCA Inventory list.

3 HAZARDS IDENTIFICATION

Emergency Overview
Clear liquid with a pleasant odor
WARNING!
FLAMMABLE LIQUID AND VAPOR.
CAUSES EYE AND SKIN IRRITATION.
MAY CAUSE RESPIRATORY TRACT IRRITATION.
MAY CAUSE CENTRAL NERVOUS SYSTEM EFFECTS

Potential Health Effects

Inhalation and skin contact are expected to be the primary routes of occupational exposure to this material. Based on single exposure animal tests, it is considered to be slightly toxic if swallowed, practically non-toxic if absorbed through skin or inhaled, moderately to severely irritating to eyes and slightly irritating to skin. High vapor concentrations may be irritating to the eyes and respiratory tract, and may result in central nervous system (CNS) effects such as headache, dizziness, nausea, drowsiness and, in severe exposures, loss of consciousness. Mild to severe lung injury may occur if this material is drawn into the lungs (aspirated) during swallowing, or during vomiting after swallowing. Symptoms of injury may include increased breathing and heart rate, coughing and related signs of respiratory distress. Inhalation of this material may cause an increase in the sensitivity of the heart to adrenaline, which could result in irregular or rapid heartbeats and reduced heart function. Medical conditions which may be aggravated by exposure to this material include heart disease or compromised heart function.

4 FIRST AID MEASURES

IF IN EYES, immediately flush with plenty of water for at least 15 minutes. Get medical attention immediately.

IF ON SKIN, immediately flush with plenty of water. Remove contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Destroy contaminated shoes.

IF SWALLOWED, do NOT induce vomiting. Give water to drink. Get medical attention immediately. 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. Get medical attention.

5 FIRE FIGHTING MEASURES

Fire and Explosive Properties

Auto-Ignition Temperature	NE	
Flash Point	-12 C	Flash Point Method
Flammable Limits- Upper	18%	
Lower	6.7%	

Extinguishing Media

Use water spray, carbon dioxide, foam or dry chemical.

Fire Fighting Instructions

Fire fighters and others who may be exposed to products of combustion should wear full fire fighting turn out gear (full Bunker Gear) and self-contained breathing apparatus (pressure demand NIOSH approved or equivalent). Fire fighting equipment should be thoroughly decontaminated after use.

Fire and Explosion Hazards

When burned, the following hazardous products of combustion can occur: Irritating or toxic vapors

6 ACCIDENTAL RELEASE MEASURES

In Case of Spill or Leak

Extinguish or turn off all ignition sources. Ventilate the space involved. Wear appropriate personal protection equipment as indicated in Section 8 of this MSDS. Contain spill with inert materials. Construct a dike to prevent spreading. Collect with non-sparking tools to a suitable container. Prevent waterway contamination. Absorb liquid onto inert absorbent and place in DOT approved drums for disposal. Consult a regulatory specialist to determine appropriate state or local reporting requirements, for assistance in waste characterization and/or hazardous waste disposal and other requirements listed in pertinent environmental permits.

7 HANDLING AND STORAGE

Handling

Do not get in eyes, on skin or clothing. Avoid breathing vapor or mist. Keep container closed. Use only with adequate ventilation. Wash thoroughly after handling. Use grounding and bonding connection when transferring material to prevent static discharges, fire or explosion. Keep away from heat, sparks and flames.

Storage

Store in well ventilated area away from heat and sources of ignition such as flame, sparks and static electricity. Ensure that all storage and handling equipment is properly rated, grounded and installed to satisfy

7 HANDLING AND STORAGE

electrical classification requirements. Static electricity may accumulate and create a fire hazard. All storage containers, including containers such as drums, cylinders and IBC's, must be bonded and grounded during filling and emptying operations. Store away from oxidizers and reactive materials. Keep container tightly closed. Observe all federal, state and local regulations and National Fire Protection Association (NFPA) Codes which pertain to the specific local conditions of storage and use, including OSHA 29 CFR 1910.106 and NFPA 30, 70, 77, and 497.

8 EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls

Investigate engineering techniques to reduce exposures below airborne exposure limits. Provide ventilation if necessary to control exposure levels below airborne exposure limits (see below). If practical, use local mechanical exhaust ventilation at sources of air contamination such as open process equipment.

Eye / Face Protection

Where there is potential for eye contact, wear chemical goggles and have eye flushing equipment available.

Skin Protection

Wear appropriate chemical resistant protective clothing and chemical resistant gloves to prevent skin contact. Consult glove manufacturer to determine appropriate type glove material for given application. Wear face shield and chemical resistant clothing such as a rubber apron when splashing may occur. Rinse contaminated skin promptly. Wash contaminated clothing and clean protective equipment before reuse. Wash skin thoroughly after handling.

Respiratory Protection

Avoid breathing vapor or mist. When airborne exposure limits are exceeded (see below), use NIOSH approved respiratory protection equipment appropriate to the material and/or its components. Consult respirator manufacturer to determine appropriate type equipment for given application. Observe respirator use limitations specified by NIOSH or the manufacturer. For emergency and other conditions where exposure limit may be significantly exceeded, use an approved full face positive-pressure, self-contained breathing apparatus or positive-pressure airline with auxiliary self-contained air supply. Respiratory protection programs must comply with 29 CFR § 1910.134.

Airborne Exposure Guidelines for Ingredients

Exposure Limit		Value
Trans-1,2-dichloroethylene		
ACGIH TWA	-	200 ppm
OSHA TWA PEL	-	200 ppm (790 mg/m3)

-Only those components with exposure limits are printed in this section.
-Skin contact limits designated with a "Y" above have skin contact effect. Air sampling alone is insufficient to accurately quantitate exposure. Measures to prevent significant cutaneous absorption may be required.
-ACGIH Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic reactions.
-WEEL-AIHA Sensitizer designator with a value of "Y" above means that exposure to this material may cause allergic skin reactions.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance/Odor	Clear liquid with a pleasant odor
pH	NA
Specific Gravity	1.2565
Vapor Pressure	400 mm Hg @ 87 F
Vapor Density	3.34
Melting Point	NE
Freezing Point	-58 F (-50 C)
Boiling Point	118 F (48 C)
Solubility In Water	Slightly
Molecular Weight	96.94

10 STABILITY AND REACTIVITY

Stability

This material is chemically stable under normal and anticipated storage and handling conditions.

Incompatibility

Sodium hydroxide, steam, potassium hydroxide, oxidizing agents.

Hazardous Decomposition Products

Hydrogen chloride gas. Carbon oxides.

11 TOXICOLOGICAL INFORMATION

Toxicological Information

Data on this material and/or its components are summarized below.

Trans-1,2-dichloroethylene

Single exposure (acute) studies indicate that this material is slightly toxic if swallowed (rat LD50 1,235 mg/kg), practically non-toxic if absorbed through skin (rabbit LD50 >5,000 mg/kg) or inhaled (rat 4-hr LC0 8,000 ppm), moderately to severely irritating to rabbit eyes and slightly irritating to rabbit skin. No adverse effects were observed in rats following repeated oral administration. Repeated inhalation produced effects in the liver, lungs and blood parameters of rats. No malformations in offspring of rats following inhalation during pregnancy; fetal toxicity was noted at doses that also produced adverse effects on the mothers. Cardiac sensitization was noted in dogs after exposure by inhalation after exposure to concentrations of 25 - 50% in air. No genetic changes were observed in tests using bacteria or animal cells or whole animals.

12 ECOLOGICAL INFORMATION

Ecotoxicological Information

Data on this material and/or its components are summarized below.

Trans-1,2-dichloroethylene

Bluegill sunfish 96 hr LC50 = 135 mg/l
Daphnia magna 48 hr LC50 170 - 290 mg/l

12 ECOLOGICAL INFORMATION

Chemical Fate Information

Data on this material and/or its components are summarized below.

Trans-1,2-dichloroethylene

Aerobic biodegradation: 93 - 95 % after 28 day(s); the test material exhibited slow to moderate biodegradative activity

13 DISPOSAL CONSIDERATIONS

Waste Disposal

Recover, reclaim or recycle when practical. Dispose of in accordance with federal, state and local regulations. Note: Chemical additions to, processing of, or otherwise altering this material may make this waste management information incomplete, inaccurate, or otherwise inappropriate. Furthermore, state and local waste disposal requirements may be more restrictive or otherwise different from federal laws and regulations.

14 TRANSPORT INFORMATION

DOT Name	1,2-Dichloroethylene
DOT Technical Name	
DOT Hazard Class	3
UN Number	UN1150
DOT Packing Group	PG II
RQ	1000 lbs/454 kg (1,2-trans-Dichloroethylene)

15 REGULATORY INFORMATION

Hazard Categories Under Criteria of SARA Title III Rules (40 CFR Part 370)

Immediate (Acute) Health	Y	Fire	Y
Delayed (Chronic) Health	N	Reactive	N
		Sudden Release of Pressure	N

The components of this product are all on the TSCA Inventory list.

Ingredient Related Regulatory Information:

SARA Reportable Quantities	CERCLA RQ	SARA TPQ
Trans-1,2-dichloroethylene	1000 LBS	NE

SARA Title III, Section 313

This product does contain chemical(s) which are defined as toxic chemicals under and subject to the reporting requirements of, Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. See Section 2

Trans-1,2-dichloroethylene

Massachusetts Right to Know

This product does contain the following chemicals(s), as indicated below, currently on the Massachusetts Right to Know Substance List.

Trans-1,2-dichloroethylene

New Jersey Right to Know

This product does contain the following chemical(s), as indicated below, currently on the New Jersey Right-to-Know Substances List.

Trans-1,2-dichloroethylene

Pennsylvania Environmental Hazard

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Environmental Hazard List.

Trans-1,2-dichloroethylene

Pennsylvania Right to Know

This product does contain the following chemical(s), as indicated below, currently on the Pennsylvania Hazardous Substance List.

Trans-1,2-dichloroethylene

16 OTHER INFORMATION

Revision Information

Revision Date	03 APR 2006	Revision Number 8
Supercedes Revision Dated	08-NOV-2004	

Revision Summary

Transcend has been registered

Key

NE= Not Established   NA= Not Applicable   (R) = Registered Trademark

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Cleveland, Ohio 44101
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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)
	DOT Hazard Class: Division 2.1
CHEMICAL NAME AND SYNONYMS Vinyl Chloride, Chloroethylene; Chloroethene	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)

Information contained in this material safety data sheet is offered without charge for use by technically qualified personnel at their discretion and risk. All statements, technical information and recommendations contained herein are based on tests and data which we believe to be reliable, but the accuracy or completeness thereof is not guaranteed and no warranty of any kind is made with respect thereto. This information is not intended as a license to operate under or a recommendation to practice or infringe any patent of this Company or others covering any process, composition of matter or use.
Since the Company shall have no control of the use of the product described herein, the Company assumes no liability for loss or damage incurred from the proper or improper use of such product.

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 7.3ºF (-13.7ºC)	LIQUID DENSITY AT BOILING POINT 60.6 lb/ft^3 (971 kg/m^3)
VAPOR PRESSURE @ 70ºF (21.1ºC) = 52 psia (360 kPa)	GAS DENSITY AT 70°F. 1 atm @ 77ºF (25ºC) = .164 lb/ft^3 (2.63 kg/m^3)
SOLUBILITY IN WATER Slightly Soluble	FREEZING POINT -244.8ºF (-153.8ºC)
EVAPORATION RATE N/A (Gas)	SPECIFIC GRAVITY (AIR=1) @ 77ºF (25ºC) = 2.22
APPEARANCE AND ODOR Colorless gas with a pleasant, sweet odor	

FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used) -108ºF (CC)	AUTO IGNITION TEMPERATURE 882ºF (472ºC)	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 Hood with forced ventilation	**LOCAL EXHAUST** To prevent accumulation above the TWA	**SPECIAL** N/A
	MECHANICAL (Gen.) In accordance with electrical codes	**OTHER** 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	I.D. No.:	UN 1086; RQ 1.0(0.454)
DOT Shipping Label: Flammable Gas	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.