Site Investigation / Remedial Alternatives Selection Work Plan

Former Brainerd Manufacturing Site
East Rochester, New York

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SITE INVESTIGATION/REMEDIAL ALTERNATIVES SELECTION WORK PLAN

Former Brainerd Manufacturing Facility

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1.0 INTRODUCTION

1.1 Site Description

The former Brainerd Manufacturing Facility is situated at the intersection of North Washington and Monroe Streets in the City of East Rochester, New York (see Figures 1 and 2). The property is comprised of two parcels: an approximately 3.0-acre parcel located at 115 North Washington Street (Tax Map 139.69-1-17) improved with a 73,400 square foot industrial/manufacturing building and offices; and an approximately 0.3-acre parcel (Tax Map 139.69-1-19), comprised of an asphalt parking area. An open gravel lot comprises the western side of the larger parcel, with the former manufacturing building situated on the eastern side of the parcel adjacent to North Washington Street. Surrounding property is mixed use, primarily characterized by light industrial and railroad properties. Figure 3 illustrates surrounding uses based on Monroe County Tax Assessor's Records (Monroe County 2005). A Rochester Gas and Electric (RG&E) substation and a pre-cast concrete product manufacturing building owned by E.J. Delmonte border the property to the north. Monroe Street, Rochester Lumber Company and A.J. Interiors are located south of the property, adjacent to the asphalt parking lot parcel.

1.2 Site History

The property was operated as an industrial facility for nearly 100 years prior to relocation of Brainerd's operations in 1998 (Sear-Brown, February 2000). Historic operations conducted at the facility included the manufacture of hardware and decorative metal products. Production of these products involved stamping, cutting, drilling, burnishing, deburring, degreasing, lacquering and electroplating. A site schematic showing the current building configuration and former manufacturing operations within the facility is presented as Figure 2. The equipment formerly used in the production process has been removed from the premises. The property has been operated under lease since January 2004 by DeskSet, Ltd, an office furniture reconditioning and sales company.

1.3 Previous Investigations

Previous investigations conducted at the site include Phase I and Phase II investigations of soil and groundwater, an interim remedial measure (IRM) investigation, and a sub-slab vapor investigation as summarized in this section. Copies of the referenced reports discussed in this section have been previously submitted to the NYSDEC, and are therefore not repeated in their entirety. Rather, the summaries and findings presented herein are intended to document the progressive investigative history of the site.

- **February 2000 - Phase I Environmental Site Assessment (ESA) & Limited Phase II:** (Ref. 1)

  Investigation Summary:
  - o Three interior soil cores, identified as GP-101, GP-102, and GP-103, and three outdoor temporary wells, identified as MW-201, MW-202, and MW-203, were advanced/installed on the south side of plant to depths of 20-25 feet below ground surface (fbgs).
  - o Soil samples were collected from each of the three coring locations and analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) and select metals (chromium, nickel, copper, and zinc) and cyanide.
  - o Composite surface soil samples (0 to 0.5 fbgs) were collected from 4 grab locations in the open lot located on the west side of the property. Composite soil samples were analyzed for TCL semi-VOCs (SVOCs), RCRA metals and nickel, copper, zinc, and cyanide.
  - o Groundwater samples were collected from each of 3 temporary wells and analyzed for TCL VOCs and select metals (chromium, nickel, copper, and zinc) and cyanide.

  Investigation Findings:
  - o Soil samples collected from the cores showed the presence of trichloroethene (TCE), tetrachloroethene (PCE), chromium, copper, nickel, and zinc, in the vicinity of GP-103. Other soil core sample results were generally below range of Technical and Administrative Guidance Memorandum (TAGM) #4046 background and VOC cleanup objectives.
  - o Surface soil sample results indicated no exceedance of TAGM #4046 criteria, except zinc, which was slightly elevated.
  - o Groundwater analytical results indicated detections in the parts per billion (ppb) range for TCE and PCE, primarily near well MW-202. Trace concentrations of xylene were also detected at this location.

- **June 2001 - Supplemental Phase II Investigation:** (Ref. 2)

  Investigation Summary:
  - o Five interior soil cores, identified as SC-1 through SC-5, were advanced near Phase I/Limited Phase II soil core location GP-103. Four soil core samples were selected for analysis of TCL VOCs and RCRA metals.
  - o Three flush-mount wells, identified as MW-1, MW-2, and MW-3, were installed on the south side of the plant. Well MW-1 was installed to 71 fbgs, immediately above a described confining layer. Wells MW-2 and MW-3 were installed to 30 and 35 fbgs, respectively. One soil sample was collected and submitted from each well boring for TCL VOC and RCRA metal analysis. Groundwater from each well was also sampled and analyzed for TCL VOCs.

  Investigation Findings:
  - o Interior soil cores located near Phase I/Limited Phase II soil core location GP-103 indicate the presence of TCE and PCE from 2 to 8 parts per million (ppm).
  - o Soil samples collected from well borings were all within TAGM #4046 criteria.
  - o Groundwater results at well MW-1 indicated no Class "GA" exceedances and no evidence of dense non-aqueous phase liquid (DNAPL). Groundwater results from wells MW-2 and MW-3 indicated slightly elevated concentrations of PCE (<10 ppb) and TCE (11 - 48 ppb).

- **August 2001 – Follow-up Phase II Activities:** (Ref. 3)

  Investigation Summary:
  - o Trench drain test was performed to determine floor drain discharge point.
  - o Twelve additional interior soil core samples, identified as SC-6 through SC-17, were collected within building. Eighteen soil samples were collected from these 12 locations at various 2-foot depth intervals ranging from 1 to 4 fbgs. All soil samples were analyzed for TCL VOCs and select metals (chromium, nickel, copper, and zinc) and cyanide.
  - o Two flush-mount wells were installed on the north side of plant, identified as MW-4 and MW-5. Well MW-4 was installed to 28 fbgs and well MW-5 was installed to 30 fbgs. Two soil samples were collected and submitted from each well boring from two intervals: 0.5 to 2 fbgs and 20 to 22 fbgs. Both soil samples were analyzed for TCL VOCs and select metals (chromium, nickel, copper, and zinc). Groundwater samples were collected from all 3 existing (MW-1, MW-2, and MW-3) and 2 newly installed wells (MW-4 and MW-5) and analyzed for TCL VOCs. Hydraulic conductivity testing was also performed on all wells.

Investigation Findings:

- Trench drain test confirmed discharge to sump within former water treatment area of facility and no outlet was discovered.
- Interior soil core samples SC-7, SC-8, SC-10, SC-11, SC-13, SC-14, SC-16, and SC-17 indicated PCE concentrations from 0.5 to 20 ppm and TCE concentrations from 1.4 to 8 ppm. VOCs were not detected above TAGM #4046 criteria in the deeper borings. Soil core samples also indicated copper and zinc concentrations above TAGM #4046 criteria, as well as sporadic nickel concentrations above TAGM #4046 criteria. Chromium concentrations were reported below TAGM #4046 criteria with two exceptions where levels were detected slightly above background. Cyanide was not detected in any of the soil core samples. Soil borings from wells MW-4 and MW-5 were all within TAGM #4046 criteria for inorganic compounds.
- Groundwater results for MW-1 through MW-3 are very similar to the June 2001 findings. PCE was detected in wells MW-4 and MW-5 at concentrations of 28 ppb and 1200 ppb, respectively. TCE was detected in wells MW-4 and MW-5 at concentrations of 190 ppb and 1100 ppb, respectively.
- Groundwater was determined to flow in a north/northwest direction with an average hydraulic conductivity of 7.9×10^{-4} cm/s.

- **March 2003 – Interim Remedial Measures Investigation:** (Ref. 4)

Investigation Summary:

- Installed one pumping well, designated PW-1, and two observation wells, designated OW-1 and OW-2, in the former Plating and Assembly Rooms of the facility.
- Performed aquifer pump test to determine the characteristics of the unconfined aquifer at the site (i.e., hydraulic conductivity) as well as to estimate the radial capture zone from a single pumping well. The aquifer pump test also determined the vertical and horizontal gradients that exist at the site.
- Upon completion of the aquifer pump test, two groundwater samples were collected from pumping well PW-1 and observation well OW-1; both samples were submitted for laboratory analysis of TCL VOCs. Well PW-1 groundwater was also analyzed for inorganic and wet chemistry parameters to facilitate the IRM design.

Investigation Findings:

- Based on the pump and recovery test results, the estimated unconfined aquifer characteristics at the site are as follows:
  - An approximate average hydraulic conductivity of 2.05×10^{-3} cm/sec.

- An approximate average transmissivity of 1.33 x 10^{-1} ft^2/min.
- A coefficient of storage of 4.78 x 10^{-2}.
- An estimated porosity of 0.25 based upon a sandy soil type aquifer (Driscoll, 1986).
- A specific capacity of 0.40 gpm/ft.
- Average yield of 5.9 gpm.
- Maximum drawdown during pumping of 28.42 feet.

o Horizontal hydraulic gradients calculated from water elevations at monitoring wells MW-3 and MW-5, approximately 262 feet apart, range from 0.007 to 0.009 ft/ft depending on the date. The very low hydraulic gradients are reflective of the low topographic relief and the relatively high hydraulic conductivity. Vertical hydraulic gradients calculated from water elevations at monitoring wells OW-1 and MW-5, approximately 10 feet apart, range from 0.004 to 0.025 depending on the date. Calculated gradients indicate a very slight vertically upward gradient. A comparison of the horizontal and vertical hydraulic gradients indicates that groundwater flow at the site is essentially horizontal and generally in a northwest direction.

o Laboratory analytical results for deep overburden groundwater observation well OW-1 detected the presence of three chlorinated organic compounds: PCE (110 µg/L); 1,1,1-TCA (32 µg/L); and TCE (210 µg/L

o Laboratory analytical results for pumping well PW-1 detected the presence of three chlorinated organic compounds: PCE (190 µg/L); 1,1,1-TCA (1.2 µg/L); and trichloroethene (230 µg/L). The laboratory results indicate chlorinated organics in exceedance of the Class "GA" Standard for each elevated compound except 1,1,1-TCA, which was detected below the standard value.

o The findings of the pump test supported construction of an interim remedial measure (IRM) comprised of a groundwater pump-and-treat system with air stripping as the treatment technology. The IRM was constructed in August 2004. Collected groundwater from PW-1 is treated via low profile air stripping and discharged to the Monroe County Pure Waters sanitary sewer via gravity flow.

▪ **January 2004 – Sub-Slab Vapor Investigation:** (Ref. 5)

Investigation Summary:

o Eleven air samples were collected via Summa Canister fitted with a 24-hour regulator: one sub-slab sample and one ambient sample was collected at each of five locations and one ambient outdoor air sample located on the high point of the building roof. All air samples were analyzed for chlorinated aliphatic volatiles in accordance with USEPA Method TO-15.

- The Johnson and Ettinger (1991) (JEM) model, a widely accepted tool for determining potential health risks due to VOC migration to indoor air, was used to analyze the air sample data in accordance with recommendations presented in USEPA's 2002 "OSWER Draft Guidance For Evaluating Vapor Intrusion to Indoor Air Pathway From Groundwater and Soils."

Investigation Findings:

- All reported concentrations were well below the Occupational Safety and Health Administration's (OSHA) Permissive Exposure Limits (PELs). Thus, both the sub-slab vapors and indoor air comply with these regulatory limits for work place exposure. The outdoor air sample contained only a slightly elevated concentration of toluene, also at a concentration well below the OSHA PEL.
- Based on the laboratory analytical results as well as the JEM results, the potential for excess risk due to vapor intrusion was determined to be insignificant at the site; therefore, no further action was recommended toward addressing this pathway.
- NYSDEC comments regarding the sub-slab vapor investigation findings indicated that emerging NYSDOH guidance on sub-slab vapor intrusion suggested a need for further evaluation of this issue. However, it was agreed that IRM construction could proceed with further evaluation of sub-slab vapors deferred to the SI/RAS.

Monitoring well installation logs pertaining to the investigations presented in this section are presented in Appendix A for reference.

1.4 Interim Remedial Measure (IRM)

As discussed in Section 1.3 of this report, site investigation data supported the need for an IRM to address groundwater impacts at the site. Details of the IRM design are presented in the April 2004 IRM Design Report (Ref. 6). A summary of the IRM elements and performance to date is presented in the following Sections

1.4.1 IRM Description

The IRM was constructed during the period of June through August 2004. The IRM groundwater collection and treatment system involves recovery of contaminated groundwater from a pumping well with concurrent on-site treatment of the recovered groundwater via low profile air stripping. Contaminants present in Site groundwater are

predominantly: trichloroethene (also known as trichloroethylene, or TCE); tetrachloroethene (also known as tetrachloroethylene, perchloroethylene, or PCE); and to a lesser extent 1,1,1-tichloroethane (1,1,1-TCA). Concentrations of these constituents are typically present in untreated groundwater at low part per million levels.

Figure 4 presents a process flow schematic for the IRM pump and treat system. A description of the process components and their operating principles are presented below:

Pumping Well and Well Pump

The 4-inch diameter, 60-foot deep pumping well, designated PW-1, was installed near the northeast corner of the former Brainerd Manufacturing building in January 2003 (see Figure 2 for location). The pumping well was installed to allow for aquifer characteristic testing and serve as a full-scale recovery well. PW-1 was advanced into the Clayey Sand with Gravel (SC) unit using hollow stem augers and installed with a fully penetrating 37 foot sand filter pack extending the entire length of the saturated zone (23 to 60 feet below ground surface). The well was constructed with a 20-foot CircumSlot™ 0.020-inch continuous slot Schedule 40 PVC screen. A 2-foot sump was installed to check for the presence and thickness of free-phase dense non-aqueous phase liquid (none was present), and to facilitate pumping. The PVC riser is completed with an 8-inch diameter steel flush mounted road box. Untreated groundwater is pumped from PW-1 using a submersible well pump. Pumping well operation is controlled locally by level control sensors to maintain drawdown below static levels. The recovery well pump cycles between pump on (high level) at approximately 35 feet below grade and pump off (low level) at approximately 55 feet below grade to maintain an average groundwater elevation several feet below static levels based on pump testing performed during the design phase of work at the Site. The groundwater recovered from pumping well PW-1 is pumped to the treatment room day tank.

Day Tank

Recovered groundwater is temporarily stored in a 1,000-gallon HDPE day tank to facilitate batch treatment system operation. The day tank is fitted with level control switches that control startup and shutdown of the air stripper system. When the tank fills to the point that the start switch is tripped, the air stripper blower and process feed pump are energized. Groundwater in the tank is then processed through the air stripper until the tank level drops to the stop switch, at which point the feed pump automatically shuts down.

Air Stripper

The air stripper is a North East Environmental Products (NEEP) two-tray Model 2321P polyethylene shallow tray aeration system. The air stripping unit is equipped with a 300 cfm blower. Groundwater exits the day tank and enters the top of the stripper, where it is distributed through a series of baffles across the top tray. The groundwater then passes to the second tray in series, where the process is repeated, and flows into a reservoir at the bottom of the air stripper unit. The treated groundwater flows is pumped from this reservoir to a 4-inch sanitary sewer line north of the treatment room. Once groundwater in the day tank has been pumped down to the level of the stop switch, the air stripper is de-energized and the system returns to remote standby mode. Shutdown of the air stripper blower is delayed for approximately 5 minutes to ensure that the remaining water within the unit is treated prior to discharge.

Deposit Control Agent Feed System

A deposit control agent (Redux 300) is mixed with the untreated groundwater to mitigate scale build-up in the stripper due to oxidation of naturally occurring calcium and manganese in the groundwater. The deposit control agent is injected via a chemical feed pump directly into the influent line to the day tank only when the well pump is active.

1.4.2 IRM Performance

The IRM has been operational since August 2004. The draft IRM Operation, Maintenance and Monitoring (OMM) Plan (Ref. 7) identifies performance monitoring for the IRM that incorporates routine groundwater elevation monitoring and influent/effluent sampling. Figure 5 presents an isopotential map for the site based on groundwater elevation measurements collected on July 13, 2005. Table 1 presents groundwater pretreatment system influent sample results for the IRM for the periods of November 2004 and March 2005. PW-1 VOC concentrations as measured during the IRM investigation pump test in January 2003 are also presented. The range of treated air stripper effluent results for the period of September 2004 through March 2005 is presented for comparison. As indicated, effluent concentrations are typically at or near non-detect, indicating excellent VOC treatment efficiency. Influent samples fluctuate in concentration, as would be expected for the first 1-2 years of pump-and-treat system operation and seasonal factors. The isopotential map illustrates an area of influence from the pumping well across the western side of the northernmost section of the building, indicating a substantial downgradient capture zone.

Thus, the data indicate that the IRM is effective in remediating contamination at the property line. .

1.5 Purpose

In general, the results of the site investigations discussed in Section 1.3 identify chlorinated organic compounds, specifically TCE and PCE, in groundwater above NYSDEC Class "GA" Groundwater Quality Standards at certain locations beneath the on-site buildings. Although data for the IRM indicate that it is effectively addressing groundwater impacts and mitigating off-site contaminant migration, the extent of historic off-site impacts, if any, remains unknown. The Site Investigation will therefore focus on determining the extent of off-site impacts, if any, as well as supplemental characterization of the source area to allow for evaluation of alternative remedial measures. In addition, NYSDEC comments have indicated that issues related to sub-slab vapor at the site will require further assessment.

This document presents a Work Plan for Site Investigation and Remedial Alternatives Selection (SI/RAS) at the former Brainerd Manufacturing Site. It has been prepared in accordance with NYSDEC's Draft May 2002 Voluntary Cleanup Program Guide. The Work Plan contains the following sections:

- Section 2.0 presents the Site Investigation scope of work, including field sampling activities and procedures to be implemented in obtaining the data.
- Section 3.0 describes the supporting documents (Site Health and Safety Plan, Community Air Monitoring Plan, and Quality Assurance Project Plan) that are incorporated by reference herein.
- Section 4.0 outlines the content of the Site Investigation report, as well as the preparation of a Data Usability Summary Report by a third party validation expert.
- Section 5.0 describes the Remedial Alternatives Selection (RAS) Report and RAS process.

2.0 SITE INVESTIGATION SCOPE OF WORK

This Work Plan will include the following activities to delineate on and off-site impacts at the site:

- Visual/olfactory/PID characterization of surface and subsurface soil.
- Collection and analysis of on-site surface soil samples.
- Advancement of four off-site, downgradient borings completed as groundwater monitoring wells.
- Advancement of one on-site, source area boring completed as a groundwater monitoring well.
- Collection and analysis of groundwater samples from existing and newly installed monitoring wells at the site.
- Collection and analysis of off-site sub-slab vapor.

The investigation will be geared toward collection of representative analytical data to characterize downgradient and source area groundwater quality; on-site surface soil, and off-site sub-slab soil vapor. A detailed description of the scope of work follows.

2.1 Soil Investigation

Five borings will be advanced utilizing hollow stem auger technology at the locations designated on Figure 2 to facilitate installation of one on-site and four off-site groundwater monitoring wells, designated as MW-6 through MW-10. Prior to initiation of off-site work, access approvals will be secured from the property owners and City of East Rochester.

2.1.1 Boring Advancement

Each boring location will be advanced approximately 35 fbgs into native soils or a minimum of 10 feet below the first encountered groundwater, whichever is greater, utilizing hollow stem auger drilling methods. A 2-inch diameter, 2-foot long split spoon sampler will be advanced ahead of the auger string with a standard 140-pound hammer falling freely over a 30-inch fall until 24 inches have been penetrated or 50 blows applied. Recovered samples will be described in the field by qualified Benchmark personnel using the Unified Soil Classification System (USCS), scanned for total volatile organic vapors with a calibrated Photovac 2020 PID equipped with a 10.6 eV lamp (or equivalent), and characterized for impacts via visual and/or olfactory observations. All non-dedicated drilling tools and

equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (i.e., Alconox).

In the event of cold weather conditions (i.e., temperatures below 50ºF), PID scans will be supplemented with headspace determinations. In general, representative soil samples from each recovered interval will be collected, placed in a sealable plastic bag, and kept at or near room temperature (approximately 65-70°F) within the confines of a heated field vehicle for a minimum of 15 minutes prior to PID measurement.

2.1.2 On-site Surface Soil Sampling

Sampling of exposed surface soil will be conducted to assess potential exposure to site contaminants and establish site background conditions. Five surface soil samples (SS-2 through SS-6) will be collected from the open gravel lot on the western portion of the site, as shown on Figure 2. These samples will be analyzed for VOCs, SVOCs, PCBs, pesticides, TAL metals, and cyanide as indicated on Table 2.

2.2 Groundwater Characterization

One on-site monitoring well (MW-6) and four off-site monitoring wells (MW-7 through MW-10) will be installed as shown on Figure 2. The five newly installed groundwater monitoring wells, in conjunction with on-site existing monitoring wells, identified as MW-1 through 5, OW-1, OW-2, and PW-1, will provide additional groundwater flow information as well as downgradient and source area groundwater quality information. All five borings will be advanced as discussed in Section 2.1.1 above. Based upon split spoon sample moisture descriptions and conditions, the installed monitoring wells will straddle the shallow water table.

2.2.1 Monitoring Well Installation

Subsequent to boring completion, a 2-inch diameter flush-joint Schedule 40 PVC monitoring well will be installed at boring locations MW-6 through MW-10. Each well will be constructed with a 10-foot flush-joint Schedule 40 PVC, 0.010-inch machine slotted well screen. Each well screen and attached riser will be placed at the bottom of each borehole and a silica sand filter pack (size #00) will be installed from the base of the well to a

maximum of 2 feet above the top of the screen. A minimum 2-foot thick bentonite chip seal will then be installed and allowed to hydrate sufficiently to mitigate the potential for downhole grout contamination. Cement/bentonite grout will be installed to fill the remaining annulus to approximately one-foot below ground surface. The newly installed monitoring wells will be completed with keyed alike locks, a lockable J-plug, and either a 4-inch diameter protective casing or an 8-inch diameter steel flush mounted road box, whichever is preferred by the landowner.

2.2.2 Well Survey

All existing and newly installed monitoring wells will be surveyed against fixed reference points to provide location information and allow for accurate site map preparation. The PVC risers will be surveyed against a fixed vertical datum to provide a reference point for groundwater elevation measurements.

2.2.3 Well Development

Upon installation, but not within 24 hours, the newly installed monitoring wells (MW-6 through MW-10) will be developed in accordance with Benchmark and NYSDEC protocol. Development of the newly installed monitoring wells will be accomplished with dedicated disposable polyethylene bailers via surge and purge methodology. Field parameters including pH, temperature, turbidity and specific conductance will be measured periodically (i.e., every well volume or as necessary) during development. Field measurements will continue until they became relatively stable. Stability will be defined as variation between measurements of 10 percent or less with no overall upward or downward trend in the measurements. A minimum of 10 well volumes will be evacuated from each monitoring well. Development water from the newly installed monitoring wells will be contained and processed through the on-site treatment system.

2.2.4 Groundwater Sample Collection

The following monitoring wells will be sampled in accordance with the identified methods:

Purge and Sample Equipment	Purge and Sample Method	Monitoring Locations
Non-dedicated Grundfos® submersible pump and dedicated pump tubing	Low-flow (minimal drawdown)	MW-1, OW-1, and OW-2
Peristaltic pump with dedicated pump tubing[1]	Low-flow (minimal drawdown)	MW-2 through MW-10
Influent sample port	Direct grab	PW-1

Upon arrival at each monitoring well, field personnel will visually inspect the monitoring well for defects and/or vandalism. Following location and inspection of each well, the static water level and total depth will be recorded and one standing well volume will be calculated, except pumping well PW-1, which is continuously purged via the IRM pumping well. The following bulletized list describes each sample collection method presented in the table above.

- **Submersible Pump with Dedicated Pump Tubing**

  Benchmark staff will purge and sample each designated monitoring well in the table above using a non-dedicated Grundfos® submersible pump and dedicated pump tubing following low-flow (minimal drawdown) purge and sample collection procedures. Prior to sample collection, groundwater will be evacuated from each well at a low-flow rate (approximately 0.1 L/min or less) and field measurements for pH, specific conductance, temperature, turbidity, visual and olfactory observations and water level will be periodically recorded and monitored for stabilization. Purging will be considered complete when pH, specific conductivity and temperature stabilized (i.e., a variation between field measurements of 10 percent or less and no overall upward or downward trend in the measurements) and when the turbidity is measured below 50 NTU, or stabilized above 50 NTU. Upon stabilization of field parameters, groundwater

[1] Subject to groundwater elevation. Submersible well pump will be employed in the event that groundwater is too deep for peristaltic pump sampling

samples will be collected and analyzed for the parameters presented in Table 3. The non-dedicated Grundfos® submersible pump will be decontaminated prior to daily use as well as between subsequent monitoring wells in accordance with Benchmark's FOP: Non-Disposable and Non-Dedicated Sampling Equipment Decontamination (see QAPP).

- **Peristaltic Pump with Dedicated Pump Tubing**

  Benchmark staff will purge and sample each designated monitoring well listed in Table 3 using a peristaltic pump and dedicated pump tubing following low-flow (minimal drawdown) purge and sample collection procedures in a manner similar to that described in the previous section. However, the pump will not require decontamination (due to use of dedicated tubing). In addition, groundwater samples collected for VOC analysis will not be sampled directly through the peristaltic pump due to potential degassing (i.e., loss of VOCs) of the groundwater sample. Instead, prior to collection of VOC samples, the pump will be turned off and the pressure on the flexible walled tubing within the pump head will be maintained in order to prevent water within the collection tubing from escaping. The tubing will be removed from the well and coiled to prevent any contact with the ground surface. Upon removal of the tubing and prior to re-activating the pump, the pump flow direction will be reversed. Upon pump re-activation, the pumping rate will be slowly increased; positively displacing groundwater within the tubing allowing it to flow, without disturbance and degassing, into the appropriate VOC sample jars.

- **IRM Influent Sample Port**

  Benchmark staff will collect the influent groundwater sample at the influent sample port within the groundwater treatment system at the site. Purging prior to sample collection is not necessary as the well is continually pumping groundwater through the pre-treatment system as part of the active IRM.

Prior to and immediately following collection of groundwater samples, field measurements for pH, specific conductance, temperature, turbidity, Eh, and water level as well as visual and olfactory field observations will be recorded. All collected groundwater samples will be placed in pre-cleaned, pre-preserved laboratory provided sample bottles, cooled to 4°C in the field, and transported under chain-of-custody command to STL for analysis

2.3 Sample Analyses

As indicated on Table 3, all groundwater samples will be analyzed for Target Compound List (TCL) volatile organic compounds (VOCs) in accordance with USEPA Method 8260 and chromium in accordance with USEPA Method 6010B. In addition, MW-2, MW-9, and PW-1 will be analyzed for TCL semi-volatile organic compounds (SVOCs) in accordance with USEPA Method 8270, cyanide (USEPA Method 9013), and TAL metals(USEPA Method 6010D). Samples from MW-6 will also be analyzed for total and dissolved iron and manganese, as well as COD, nitrate and sulfate. These additional inorganic and water quality analyses will allow for evaluation of enhanced in-situ biodegradation using Hydrogen Release Compound (HRC), a proprietary technology developed by Regenesis Corp. for the degradation of chlorinated hydrocarbons. All samples will be reported with an equivalent ASP Category B deliverables package to allow for third party data usability assessment.

2.4 Field Specific QA/QC

Field specific Quality Assurance and Quality Control (QA/QC) measures will be taken to ensure the reliability of the generated data as described in the Quality Assurance Project Plan (QAPP), provided under separate cover:

- **Trip Blanks** - A sufficient number of trip blanks for volatile organic compound analyses will be prepared by the laboratory and delivered to the sampling team prior to a sampling event. One sealed blank will be carried into the field per day along with the sample containers for each day that volatile organic samples are collected. Trip blanks will be transported and handled in the same manner as the actual samples. The results of the trip blank analysis will be reviewed to evaluate if the potential for sample contamination during transportation and handling exists. The trip blanks will be analyzed for TCL VOCs by EPA Method 8260B.

- **Equipment Blanks** – Equipment Blanks will be prepared daily by pouring ASTM Type I water through any non-dedicated sampling and filtration (if appropriate) devices and filling a complete set of sample bottles for the parameters presented in Table 3. If the equipment is dedicated, no equipment blank will be prepared. The results of the equipment blank(s) will be reviewed to monitor the effectiveness of the equipment decontamination procedures.

- **Blind Duplicate** – One blind duplicate will be collected and analyzed per 20 samples collected for the parameters presented in Table 3 per matrix (i.e., groundwater, soil/fill, air etc.). The location of the sample collection point will not be disclosed to the analytical laboratory, therefore the field sample containers will be returned to the laboratory identified only as the "blind duplicate". The well or sample location will be recorded in the Project Field Book and on the respective Water Sample Collection Log and the results will be compared to review analytical precision.

- **Matrix spike/matrix spike duplicate (MS/MSD)** – A sufficient volume of sample will be collected at one sampling location per sampling event for MS/MSD analysis for the parameters presented in Table 3 per matrix (i.e., groundwater, soil/fill, air etc.). The laboratory will report the results of the MS/MSD analysis, which will be reviewed for sampling and analysis precision and accuracy.

Laboratory and field QC data will be evaluated by a third-party data validation expert. A Data Usability Summary Report (DUSR) will be prepared following the evaluation, with qualifiers added to the data as appropriate.

2.5 Soil Vapor Sampling

Following receipt and compilation of groundwater and hydrogeological data, sub-slab vapor and indoor air samples will be collected. The sub-slab and indoor air samples from the basements and first floors of off-site residences will be collected to investigate the potential for soil vapor intrusion. The properties that will undergo vapor testing will be selected based on the direction and concentration of the off-site VOC plume. In addition, utility corridors will be reviewed relative to potential to transport VOC-impacted groundwater, and will be factored into the soil vapor sampling program. The properties slated to undergo testing will be subject to approval by the NYSDEC and NYSDOH. Off-site vapor intrusion sampling will be performed during the heating season, as stipulated by NYSDOH. Appendix B presents a Sub-slab Soil Vapor Sampling Plan.

3.0 INVESTIGATION SUPPORT DOCUMENTS

3.1 Health and Safety Plan

The site-specific Health and Safety Plan, included as Appendix C, will be used for this investigation. The HASP applies to Benchmark personnel health and safety while conducting field activities, and is consistent with the requirements for hazardous waste site health and safety plans specified in 29 CFR 1910.120. All employees and subcontractors performing field investigation activities will be properly trained for hazardous waste site worker protection in accordance with OSHA 29 CFR 1910.120(e).

3.2 Community Air Monitoring Plan

The site-specific Health and Safety Plan also presents a Community Air Monitoring Plan (CAMP) to be followed during implementation of field activities at the Site. The Community Air Monitoring Plan incorporates procedures for monitoring of respirable particulates and organic vapors downwind of the work area to assure that neighboring receptors and site personnel not involved in investigation activities are not adversely impacted by airborne contaminants potentially emanating from the work zone. The NYSDOH Generic Community Air Monitoring Plan for investigative and remedial work activities (Ref. 8) is included as Appendix C of the HASP.

3.3 Quality Assurance Project Plan (QAPP)

A Quality Assurance Project Plan (QAPP) has been prepared as a stand-alone document for the SI/RAS activities and will be utilized to implement the investigation tasks delineated in this Work Plan. A Sampling and Analysis Plan (SAP) for this investigation is provided as Section 4.0 to the QAPP. The SI/RAS project management methods, organizational structure, and schedule is also included in the QAPP.

4.0 SITE INVESTIGATION REPORT

A Site Investigation Report will be completed upon receipt of the analytical results. The report will describe the field investigation program, and present the analytical results with comparisons to applicable standards, guidance and criteria (SGCs). In addition, the report will include:

- A site map with boring, surface soil sampling, monitoring well, and sub-slab vapor sampling locations.
- Investigative methodologies that deviated from the site work plan, if any.
- Geologic interpretation/description of subsurface soil materials.
- Hydrogeologic interpretation/description of groundwater quality and groundwater flow.
- Conclusions and recommendations, including a discussion on the estimated extent of off-site downgradient groundwater impacts.
- Copies of all pertinent records, including PID readings, maps, field logs, and laboratory reports will be appended to the report.

The draft SI Report will be transmitted to the NYSDEC for review and approval. Final copies will be transmitted upon addressing any comments.

4.1 Data Usability Summary Report

As previously discussed, Benchmark will require third party data review by a qualified, independent data validation expert. Specifically, a Data Usability Summary Report (DUSR) will be prepared, with appropriate data qualifiers added to the results. The format of the DUSR will follow NYSDEC's September 1997 DUSR guidelines. Benchmark will compare the validated analytical results to published standards and guidance values, and present the DUSR within the Site Investigation Report.

4.2 Qualitative Human Health Exposure Assessment

Following receipt of validated data Benchmark will perform a qualitative exposure assessment to evaluate whether the site poses an existing or potential hazard to the exposed or potentially exposed population. This will involve a review of sampling data, both on-site and off-site, and an evaluation of the physical conditions of the contaminant sources or physical hazards near the site that may pose an additional health risk to the community. Site contaminants will be evaluated based upon consideration of:

- Concentrations of contaminants in environmental media both on-site and off-site.
- Field data quality, laboratory data quality and sampling design.
- Comparison of on-site and off-site contaminant concentrations with typical background levels, as appropriate, as well as published health-risk based guidance (e.g., Class GA groundwater standards and guidance values per 6NYCRR Part 703).

5.0 REMEDIAL ALTERNATIVES SELECTION REPORT

A Remedial Alternatives Selection (RAS) Report will be prepared following completion of the Site Investigation Report. The RAS Report will summarize the investigation findings and identify remedial action objectives based on these findings. Proposed site-specific action levels (SSALs) for the property will also be presented.

Based on the remedial action objectives and SSALs, an appropriate remedial approach will be developed, considering the extent to which IRM activities have addressed the constituents and media of concern. The RAS will include a discussion of how the selected remedy is protective of human health and the environment. Justification for the selected remedial approach will be made based on the following criteria as described in 6NYCRR 375-1.10:

- Protection of Human Health and the Environment.
- Compliance with Standards, Criteria, & Guidance (SCGs).
- Short-term Effectiveness & Impacts.
- Long-term Effectiveness & Permanence.
- Reduction of Toxicity, Mobility, or Volume.
- Implementability.

6.0 SCHEDULE

A tentative schedule for completion of SI/RAS activities is presented as Figure 6. As indicated, start of field activities is dependent on NYSDEC approval of the SI/RAS Work Plan and access approvals from surrounding property owners.

7.0 REFERENCES

1. Sear-Brown Group, February 2000, *Phase I Environmental Site Assessment and Limited Phase II Environmental Investigation - Former Brainerd Manufacturing Facility.*

2. Sear-Brown Group, April and May 2001, *Supplemental Subsurface Site Investigation - Former Brainerd Manufacturing Facility.*

3. Sear-Brown Group, August 2001, *Supplemental Subsurface Site Investigation - Former Brainerd Manufacturing Facility.*

4. Benchmark Environmental Engineering and Science, PLLC, March 2003, *Voluntary Cleanup IRM Investigation Report – Former Brainerd Manufacturing Facility.*

5. Benchmark Environmental Engineering and Science, PLLC, January 8, 2004, letter report regarding *Voluntary Cleanup Assessment: Sub-Slab Soil Vapor Sampling Results - Former Brainerd Manufacturing Facility.*

6. Benchmark Environmental Engineering and Science, PLLC, April 2004, *IRM Design Report for IRM Groundwater Collection and Pretreatment System – Former Brainerd Manufacturing Facility.*

7. Benchmark Environmental Engineering and Science, PLLC, February 2004, *Draft IRM Operation, Maintenance, and Monitoring (OM&M) Plan – Former Brainerd Manufacturing Facility.*

8. New York State Department of Health, December 2002, *Draft DER-10 Technical Guidance for Site Investigation and Remediation – Appendix 1A, Generic Community Air Monitoring Plan.*

TABLES

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 1

SUMMARY OF IRM ANALYTICAL RESULTS

Site Investigation / Remedial Alternatives Selection Work Plan
Former Brainerd Manufacturing Facility
East Rochester, New York

Parameter	Untreated Samples			Treated Samples[1]
	01/17/03	11/09/04	03/09/05	09/04 - 03/05
Volatile Organic Compounds (VOCs) - µg/L				
Tetrachloroethene (PCE)	190	230	340	ND - 7.2
1,1,1-Trichloroethane (1,1,1-TCA)	1.2 J	*< 20*	*< 20*	ND
Trichloroethene (TCE)	230	*< 20*	370	ND - 9.8
Total VOCs[3]	**421**	**270**	**730**	**ND - 17**

Notes:

1. Represents minimum and maximum concentrations detected based on weekly samples collected over 4 events following Il startup in August 2004, followed by monthly samples collected October 2004 to March 2005.
2. J = Estimated Concentration; ND = parameter was analyzed, but was not detected above method detection limit.
3. Permitted Discharge Limit for Total VOCs is <2,130 µg/L.

TABLE 2

SOIL SAMPLING LOCATIONS AND ANALYTICAL PARAMETERS

SI/RAS WORK PLAN
Former Brainerd Manufacturing Facility
East Rochester, New York

Sample Location	Sample Type	Field Measurements	Laboratory Parameters					
		Cuttings Scan (PID)	TCL VOCs Method 8260B	TCL SVOCs Method 8270C	Cyanide Method 9014	TAL Metals Method 6010D	PCBs Method 8082	Pesticides Method 8081A
Sample Locations								
SS-2	Surface	x	x	x	x	x	x	x
SS-3	Surface	x	x	x	x	x	x	x
SS-4	Surface	x	x	x	x	x	x	x
SS-5	Surface	x	x	x	x	x	x	x
SS-6	Surface	x	x	x	x	x	x	x
All Monitoring Well Soil Borings	Cont. 2' Split Spoon	x						
Equipment Blank [1]	NA	x	x	x	x	x	x	x
Blind Duplicate [2]	NA	x	x	x	x	x	x	x
MS/MSD [2]	NA	x	x	x	x	x	x	x

Notes:

1. Equipment blanks will be collected at a frequency of 1 per 20 samples on each day of sampling only if samples are collected with non-dedicated equipment.
2. Blind duplicate and MS/MSD samples will be collected at a frequency of 1 per 20 samples collected.

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

TABLE 3

GROUNDWATER MONITORING LOCATIONS AND ANALYTICAL PARAMETERS

SI/RAS WORK PLAN
Former Brainerd Manufacturing Facility
East Rochester, New York

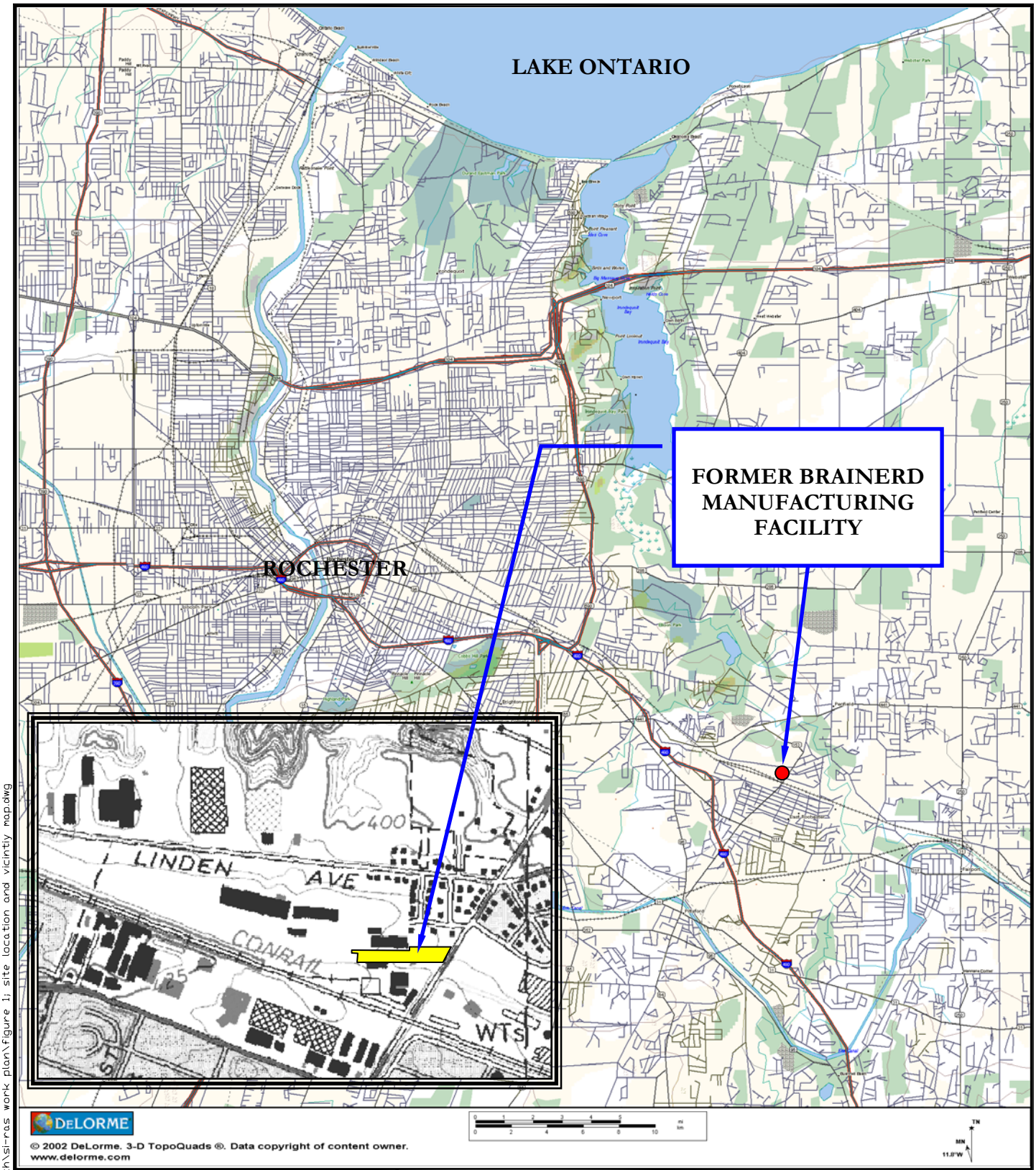
Sample Location	Well Type	Water Level	Field Measurements				Laboratory Parameters							
			pH	Temperature	Specific Conductance	,	TCL VOCs Method 8260B	TCL SVOCs Method 8270C	Cyanide Method 9014	TAL Metals Method 6010D	Total and Dissolved Iron and Manganese Method 6010B	COD	Nitrate	Sulfate
Monitoring Well Locations														
MW-1	existing	x	x	x	x	x	x							
MW-2	existing	x	x	x	x	x	x	x	x	x				
MW-3	existing	x	x	x	x	x	x							
MW-4	existing	x	x	x	x	x	x							
MW-5	existing	x	x	x	x	x	x							
MW-6	new	x	x	x	x	x	x				x	x	x	x
MW-7	new	x	x	x	x	x	x							
MW-8	new	x	x	x	x	x	x							
MW-9	new	x	x	x	x	x	x	x	x	x				
MW-10	new	x	x	x	x	x	x							
PW-1	existing	x	x	x	x	x	x	x	x	x				
OW-1	existing	x	x	x	x	x	x							
OW-2	existing	x	x	x	x	x	x							
Trip Blank [2]	NA	NA					x							
Equipment Blank [3]	NA	NA					x	x	x	x				
Blind Duplicate [4]	NA	NA	x	x	x	x	x	x	x	x				
MS/MSD [4]	NA	NA	x	x	x	x	x	x	x	x				

Notes:

2. Trip blanks will be submitted to the laboratory each day volatile organic samples are collected.
3. Equipment blanks will be collected each day samples are collected with the non-dedicated submersible pump.
4. Blind duplicate and MS/MSD samples will be collected at a frequency of 1 per 20 samples collected.

FIGURES

FIGURE 1



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BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

50 FOUNTAIN PLAZA
SUITE 1350
BUFFALO, NEW YORK 14202
(716) 856-0599

PROJECT NO.: 0040-002-300

DATE: APRIL 2005

DRAFTED BY: BCH

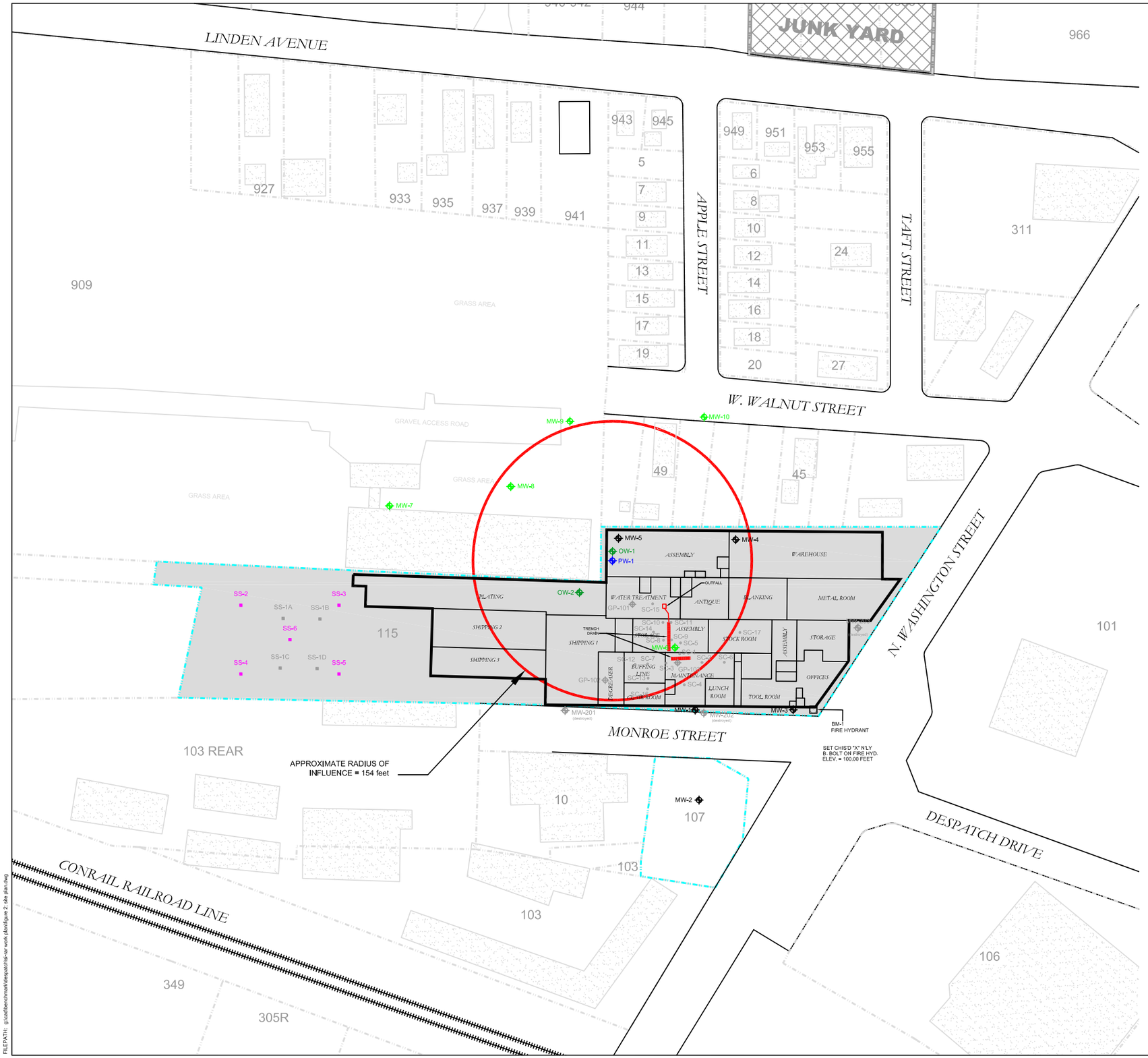
SITE LOCATION AND VICINITY MAP

SI/RAS WORK PLAN

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

PREPARED FOR

DESPATCH INDUSTRIES, INC.



EXPLANATION

PW-1	PUMPING WELL LOCATION
OW-1	OBSERVATION WELL LOCATION
MW-4	EXISTING MONITORING WELL LOCATION
MW-201	DESTROYED MONITORING WELL LOCATION
GP-101	GEOPROBE SOIL CORE LOCATION
SS-1A	SURFACE SOIL SAMPLE LOCATION
SC-1	SOIL CORING LOCATION
	PROPERTY BOUNDARY
MW-6	PROPOSED MONITORING WELL LOCATION
SS-2	PROPOSED SURFACE SOIL SAMPLE LOCATION
	DESPATCH PROPERTY BOUNDARY
	OFF-SITE BUILDING STRUCTURE

NOTES:

1. ORIGINAL BUILDING LAYOUT FROM SITE PLAN PROVIDED TO SEAR-BROWN DURING SEAR BROWN PHASE I PROPERTY VISIT IN JANUARY 2000.
2. PROPERTY BOUNDARIES OBTAINED FROM "A MAP OF SURVEY & INSTRUMENT LOCATION OF LANDS OF BRAINERD MANUFACTURING CORP," SCALE 1" = 30', DATED MAY 16, 1990, BY DOMINIC J. PARRONE & ASSOCIATES OF PENFIELD, NEW YORK.
3. SURFACE SOIL SAMPLES (0 TO 0.5 FBGS) SS-1A THROUGH SS-1D WERE COLLECTED BY SEAR-BROWN IN JANUARY 2000, AND SUBMITTED AS COMPOSITE SAMPLE SS-1.
4. MONITORING WELLS MW-201, MW-202, AND MW-203 AND SOIL CORINGS GP-101, GP-102, AND GP-103 WERE COMPLETED BY SEAR-BROWN IN JANUARY 2000; MONITORING WELLS MW-201, MW-202, AND MW-203 WERE DESTROYED DUE TO SITE RE-PAVING ACTIVITIES.
5. MONITORING WELLS MW-1, MW-2, AND MW-3 AND SOIL CORINGS SC-1 THROUGH SC-5 WERE COMPLETED BY SEAR-BROWN IN APRIL 2001 AND MAY 2001, RESPECTIVELY.
6. MONITORING WELLS MW-4 AND MW-5 AND SOIL CORINGS SC-6 THROUGH SC-17 WERE COMPLETED BY SEAR-BROWN IN AUGUST 2001.
7. PUMPING WELL PW-1 AND OBSERVATION WELLS OW-1 AND OW-2 WERE COMPLETED BY BENCHMARK IN DECEMBER 2002 AS PART OF THE IRM.

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JOB NO.: 0040-002-900

REVISIONS

NO.	BY	DATE	REMARKS

DRAWN BY: BCH
DATE: APRIL 2005
CHECKED BY: THF
APPROVED BY:

SEAL

SITE PLAN

SITE INVESTIGATION/REMEDIAL ALTERNATIVES SELECTION WORK PLAN
FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

PREPARED FOR
DESPATCH INDUSTRIES, INC.

FIGURE 2

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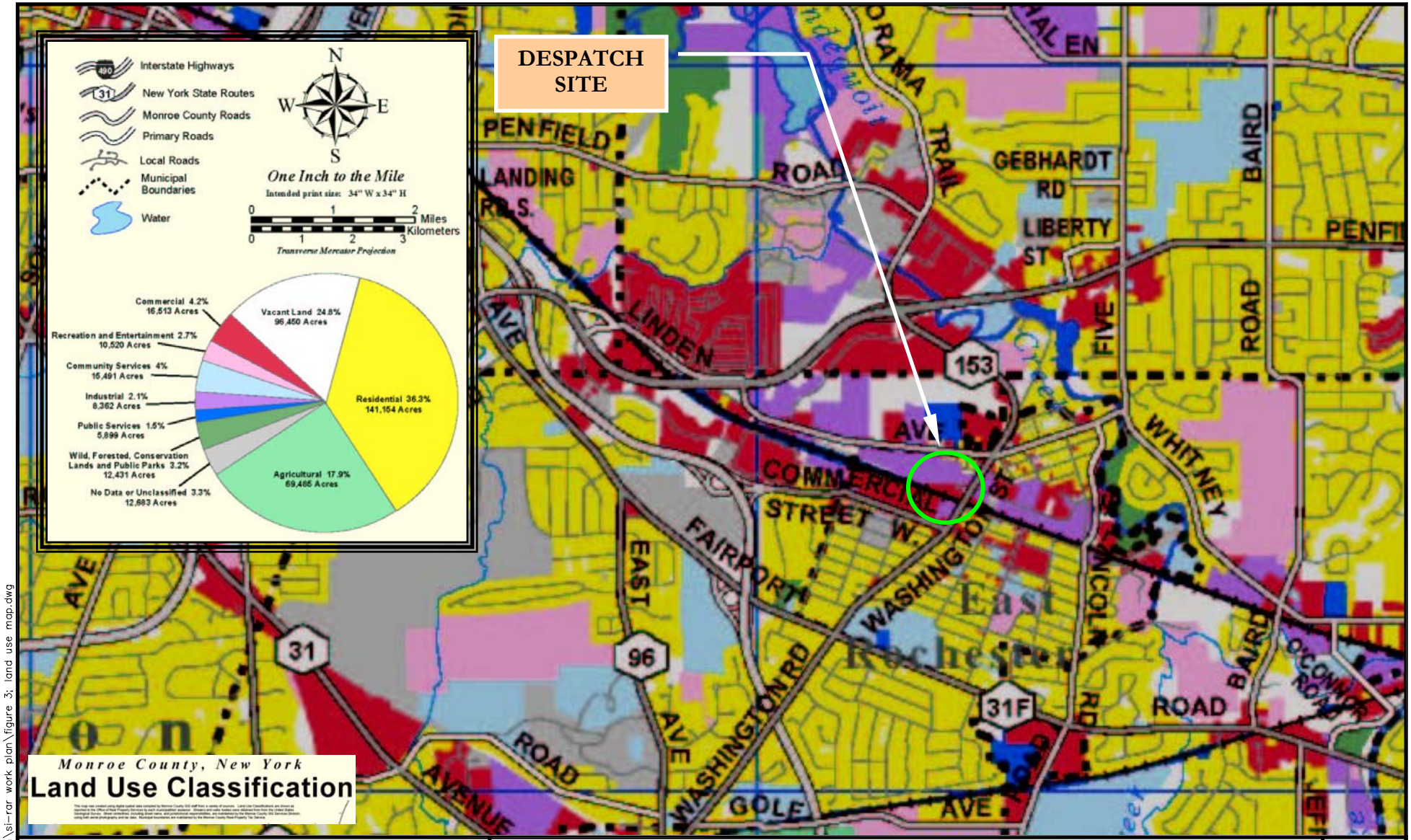

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PROJECT NO.: 0040-002-300

DATE: APRIL 2005

DRAFTED BY: BCH

LAND USE MAP

SI/RAR WORK PLAN

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

PREPARED FOR
DESPATCH INDUSTRIES, INC.

FIGURE 3

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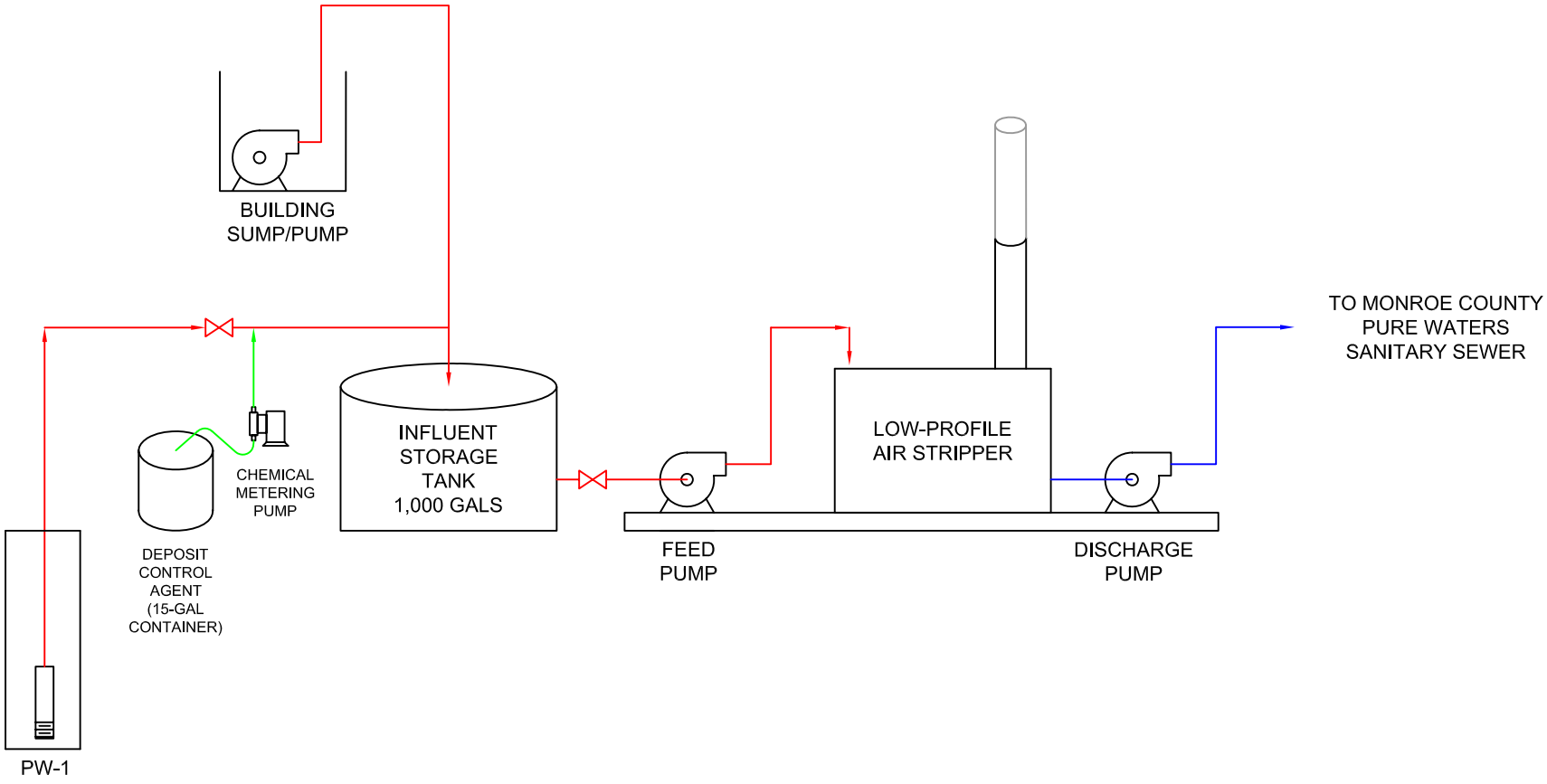

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DATE: Rev. 1, APRIL 2005

DRAFTED BY: BCH

PROCESS FLOW SCHEMATIC

SI/RAS WORK PLAN

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

PREPARED FOR
DESPATCH INDUSTRIES, INC.

FIGURE 4

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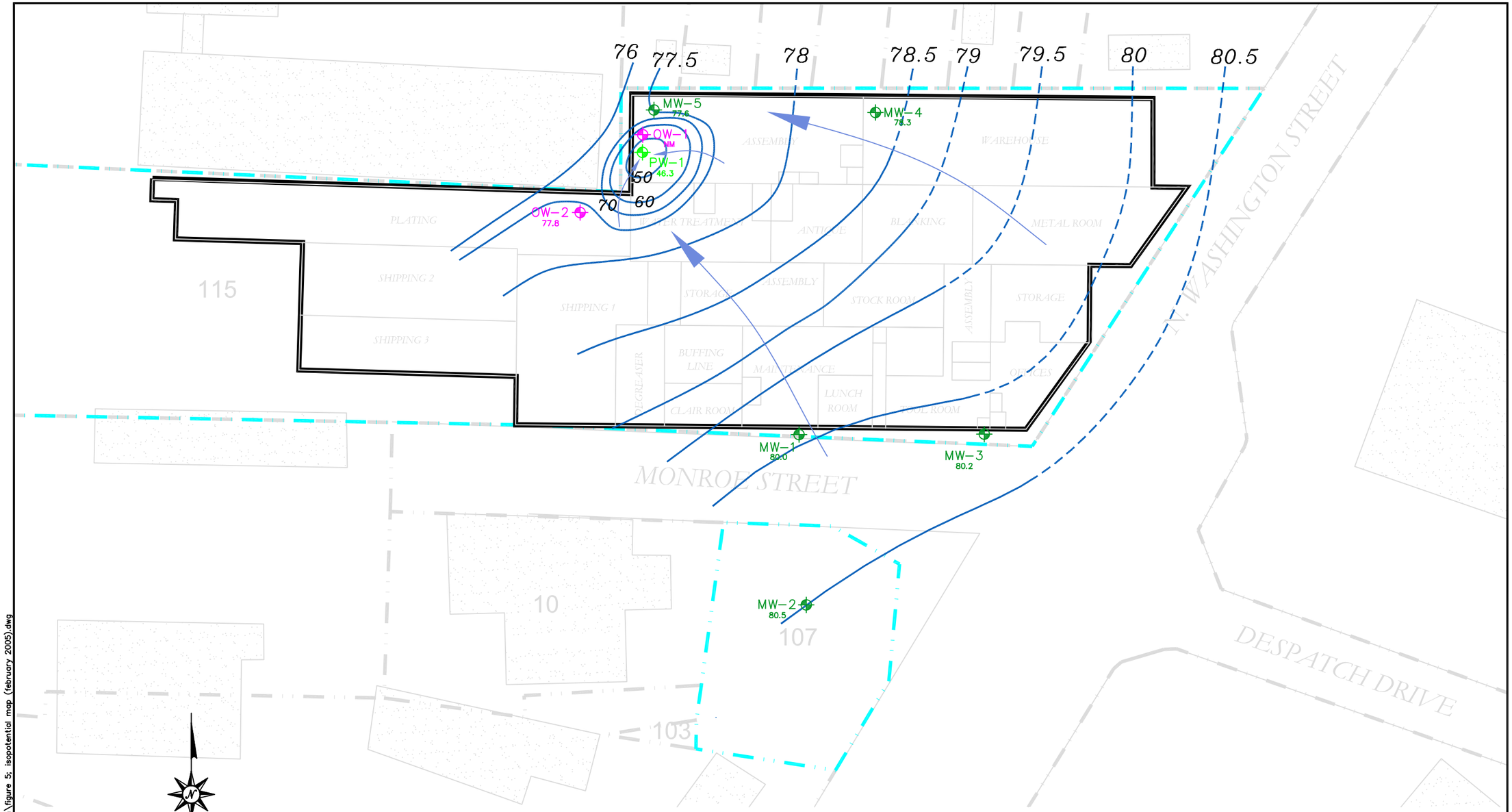

DATE: APRIL 2005
DRAFTED BY: BCH
FILEPATH: g:\cad\benchmark\despatch\si-ras work plan\figure 5; isopotential map (february 2005).dwg

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(716) 856-0599

JOB NO.: 0040-002-300

ISOPOTENTIAL MAP - FEBRUARY 2005

SI/RAR WORK PLAN

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NEW YORK

PREPARED FOR
DESPATCH INDUSTRIES, INC.

FIGURE 5

PROJECT SCHEDULE
FORMER BRAINERD MANUFACTURING SITE
SI/RAS

Task Name	2006									
	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
Secure Offsite Access Approvals										
Monitoring Well Installation/Development/Sampling										
Sample Analysis, Validation										
Data Summary/Interpretation										
Off-Site Vapor Sampling/Analysis										
Prepare Qualitative Exposure Assessment										
Draft SI Report Preparation										
SI/RAR Report Review/Revisions										
Draft RAS Report Preparation										
RAS Report Review/Revisions										

FIGURE 6

APPENDIX A

EXISTING MONITORING WELL INSTALLATION LOGS

APPENDIX B

SUB-SLAB VAPOR SAMPLING PLAN

APPENDIX B

SUB-SLAB SOIL VAPOR SAMPLING PLAN

An active soil gas-sampling program will be performed at off-site properties following receipt and compilation of groundwater concentration and hydrogeological data. The sampling program will consist of collecting and analyzing one sub-slab vapor and one or two indoor air samples (i.e., from the first floor as well as the basement, if present) from each off-site property determined to be potentially impacted by the migration of the VOC groundwater plume. In addition, one common outdoor air sample will also be collected and analyzed for nearby properties. At each location, Benchmark personnel will drill an approximately 3/4-inch diameter hole through the concrete slab (est. 4-6 inches thick) using a hand-held hammer drill. Following advancement through the concrete, approximately 6 inches of soil will be hand-augered from the hole. An appropriately sized silicone stopper fitted with a ¼-inch hollow Teflon tube will then be inserted into the concrete core hole and sealed using beeswax (or similar inert substitute). A 6-liter Summa canister fitted with an 8-hour regulator and a flow rate not exceeding 0.2 liters/minute will be attached to the opposite end of the Teflon tubing. Three volumes will be purged from the sampling line before initiating Summa canister sampling. Purging will be performed with a vacuum pump or syringe.

Concurrent with the sub-slab samples, up to two additional samples will be collected from the airspace within each structure. These additional samples will be collected within the basement (for structures having basements) and first-floor level. One outdoor field-located air sample will be collected from a ground level location upwind of the properties, as determined on the day of sub-slab vapor sampling field activities, when structures are within close proximity to each other

All Summa canister valves will remain closed until the borings are complete, purged, and all of the canisters are in their respective positions. The valves will then be opened for the 8-hour collection period. Concurrent with field activities, the NYSDOH building inventory questionnaire will be completed for each structure sampled, in addition to a sample log sheet per the Quality Assurance Project Plan (QAPP).

Following sample collection, the Summa canisters will be shipped to Severn Trent Laboratories (STL) in Burlington, VT for analysis of USEPA Target Compound List (TCL) Volatile Organic Compounds. All concrete/floor openings will be repaired with a cement patch.

All air samples will be analyzed in accordance with USEPA Method TO-15. Laboratory analytical reporting limits for each potential indoor constituent will be

provided to NYSDEC prior to implementation of sampling plan to confirm that the reporting limits levels are sufficiently low to allow for evaluation of the data against NYSDOH vapor intrusion matrices.

APPENDIX C

HEALTH AND SAFETY PLAN (HASP)

SITE HEALTH AND SAFETY PLAN
for
SITE INVESTIGATION ACTIVITIES

FORMER BRAINERD MANUFACTURING FACILITY
EAST ROCHESTER, NY

October 2005 0040-002-100

Former Brainerd Manufacturing Facility:

Health and Safety Plan for Site Investigation Activities

Plan Reviewed by (initial):

Corporate Health and Safety Director: Thomas H. Forbes

Project Manager: Thomas H. Forbes

Designated Site Safety and Health Officer: Bryan C. Hann

Acknowledgement:

I acknowledge that I have reviewed the information contained in this site-specific Health and Safety Plan, and understand the hazards associated with performance of the field activities described herein. I agree to comply with the requirements of this plan.

NAME (PRINT)	SIGNATURE	DATE

Former Brainerd Manufacturing Facility:
HEALTH AND SAFETY PLAN FOR SITE INVESTIGATION ACTIVITIES

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TABLE OF CONTENTS

Former Brainerd Manufacturing Facility:
HEALTH AND SAFETY PLAN FOR SITE INVESTIGATION ACTIVITIES

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Former Brainerd Manufacturing Facility:
HEALTH AND SAFETY PLAN FOR SITE INVESTIGATION ACTIVITIES

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APPENDICES:

1.0 INTRODUCTION

1.1 General

In accordance with OSHA requirements contained in 29 CFR 1910.120 and USEPA Standard Operating Safety Guidelines, this Health and Safety Plan (HASP) describes the specific health and safety practices and procedures to be employed by Benchmark Environmental Engineering & Science, PLLC and TurnKey Environmental Restoration, LLC employees (referred to jointly hereafter as Benchmark) during investigation activities at the Former Brainerd Manufacturing Facility located in East Rochester, Monroe County, New York. This HASP presents information and procedures for Benchmark employees who will be involved with field activities, including the assignment of responsibilities, personnel protection requirements, work practices and emergency response procedures. It is not intended to cover the activities of other contractors or subcontractors on the Site; these firms will be required to develop and enforce their own HASPs as discussed below. In order to ensure that proper coordination on such key issues as emergency notification and decontamination exists between Benchmark and other contractors or subcontractors, Benchmark will review all HASPs and coordinate procedures where appropriate.

This HASP presents information on known Site health and safety hazards using available historical information for previously-investigated areas of the Site, and identifies the equipment, materials and procedures that will be used to eliminate or control these hazards. Environmental monitoring will be performed during the course of field activities to provide real-time data for on-going assessment of potential hazards. This HASP will be updated as new investigation data becomes available.

All Benchmark personnel involved with the field activities associated with the Site Investigation will be required to comply with this HASP and any field modifications as directed by the Site Safety and Health Officer.

1.2 Site Location and Description

The former Brainerd Manufacturing Facility is situated at the intersection of North Washington and Monroe Streets in the City of East Rochester, New York (Figure 1). The property is comprised of two parcels: an approximately 3.0 acre parcel located at 115 North Washington Street (Tax Map 139.69-1-17) improved with a 73,400 square foot industrial/manufacturing building and offices; and an approximately 0.3 acre parcel (Tax Map 139.69-1-19), comprised of an asphalt parking area. An open gravel lot comprises the western side of the larger parcel, with the former manufacturing building situated on the eastern side of the parcel adjacent to North Washington Street. A Rochester Gas and Electric (RG&E) substation and a pre-cast concrete product manufacturing building owned by E.J. Delmonte border the property to the north. Monroe Street, Rochester Lumber Company and A.J. Interiors are located south of the property, adjacent to the asphalt parking lot parcel.

1.3 Site History

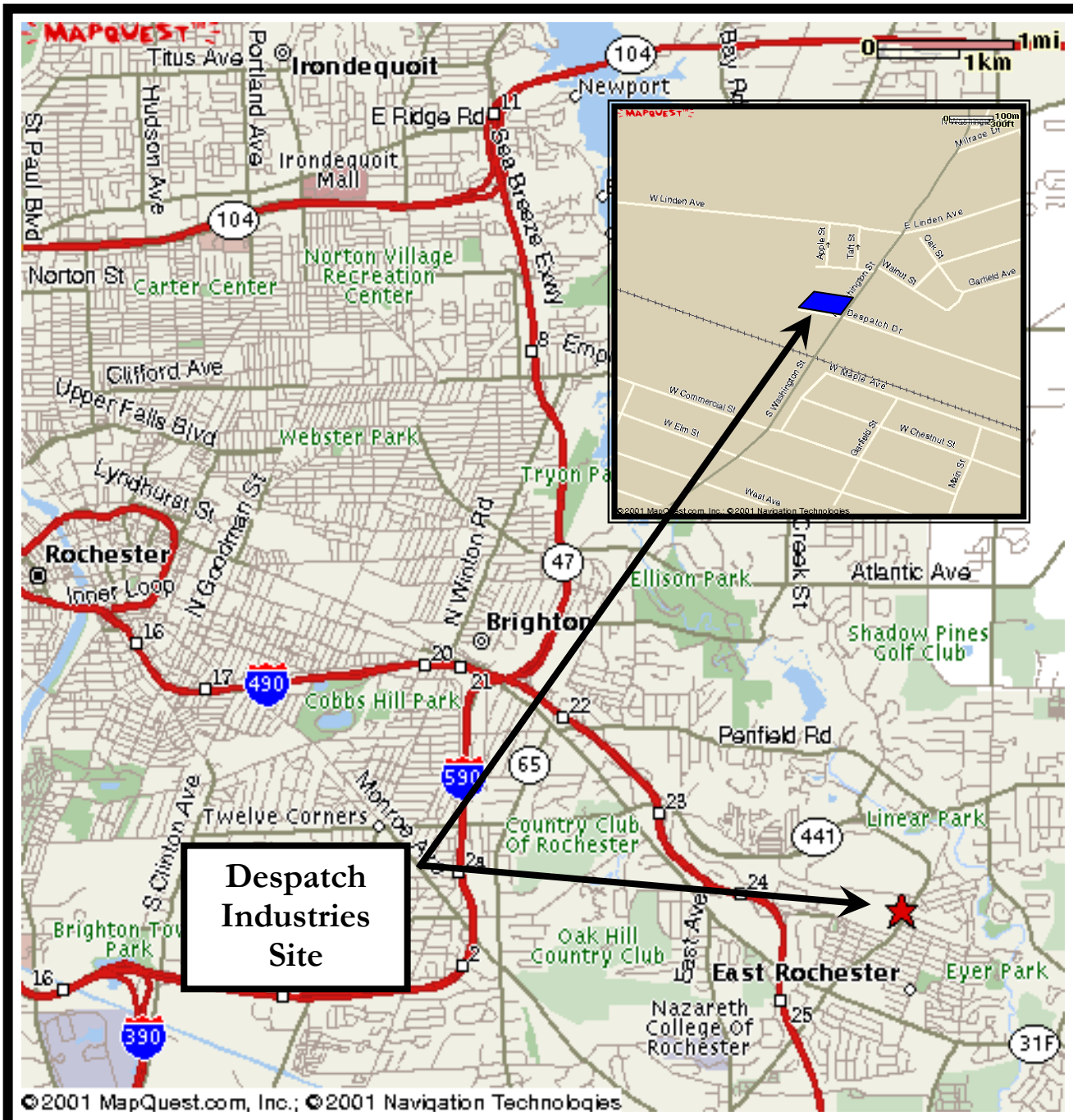
The property was operated as an industrial facility for nearly 100 years prior to relocation of Brainerd's operations in 1998 (Ref. 1). Historic operations conducted at the facility included the manufacture of hardware and decorative metal products. Production of these products involved stamping, cutting, drilling, burnishing, deburring, degreasing, lacquering and electroplating. The majority of the equipment formerly used in the production process has been removed from the premises.

1.4 Investigation Activities

Benchmark personnel will be on-site for Site Investigation activities including the following:

- Subsurface soil boring and field characterization during monitoring well installations.

Figure 1



SITE VICINITY MAP

SITE INVESTIGATION ACTIVITIES
HEALTH AND SAFETY PLAN
FORMER BRAINERD MANUFACURING FACILITY

- Development and sampling of monitoring wells including measurement of field parameters.
- Discharge water management.
- Collection of surface soil samples.
- Collection of sub-slab vapor, indoor air, and outdoor air samples.

2.0 ORGANIZATIONAL STRUCTURE

This chapter of the HASP describes the lines of authority, responsibility and communication as they pertain to health and safety functions at the Site. The purpose of this chapter is to identify the personnel who will impact the development and implementation of the HASP and to describe their roles and responsibilities. This chapter also identifies other contractors and subcontractors involved in work operations and establishes the lines of communication among them for heath and safety matters. The organizational structure described in this chapter is consistent with the requirements of 29 CFR 1910.120(b)(2). This section will be reviewed by the Project Manager and updated as necessary to reflect the current organizational structure at this Site.

2.1 Roles and Responsibilities

All Benchmark personnel on the Site must comply with the minimum requirements of this HASP. The specific responsibilities and authority of management, safety and health, and other personnel on this Site are detailed in the following paragraphs.

2.1.1 Corporate Health and Safety Director

The Benchmark Corporate Health and Safety Director is **Mr. Thomas H. Forbes**. The Corporate Health and Safety Director is responsible for developing and implementing the Health and Safety program and policies for Benchmark Environmental Engineering & Science PLLC and TurnKey Environmental Restoration, LLC, and consulting with corporate management to ensure adequate resources are available to properly implement these programs and policies. The Corporate Health and Safety Director coordinates Benchmark's Health and Safety training and medical monitoring programs, and assists project management and field staff in developing site-specific health and safety plans.

2.1.2 Project Manager

The Project Manager for this Site is **Mr. Thomas H. Forbes**. The Project Manager has the responsibility and authority to direct all Benchmark work operations at the Site. The Project Manager coordinates safety and health functions with the Site Safety and Health Officer, and bears ultimate responsibility for proper implementation of this HASP. He may delegate authority to expedite and facilitate any application of the program, including modifications to the overall project approach as necessary to circumvent unsafe work conditions. Specific duties of the Project Manager include:

- Preparing and coordinating the Site Work Plan.
- Providing Benchmark workers with work assignments and overseeing their performance.
- Coordinating health and safety efforts with the Site Safety and Health Officer (SSHO).
- Reviewing the emergency response coordination plan to assure its effectiveness.
- Serving as the primary liason with Site contractors and the property owner.

2.1.3 Site Safety and Health Officer

The Site Safety and Health Officer (SSHO) for this Site is **Mr. Bryan H. Hann**. The qualified alternate SSHO is **Mr. Richard L. Dubisz**. The SSHO reports to the Project Manager. The SSHO is on-site or readily accessible to the Site during all work operations and has the authority to halt work if unsafe conditions are detected. The specific responsibilities of the SSHO are:

- Managing the safety and health functions for Benchmark personnel on the Site.
- Serving as the point of contact for safety and health matters.

- Ensuring that Benchmark field personnel working on the Site have received proper training (per 29 CFR Part 1910.120(e)), that they have obtained medical clearance to wear respiratory protection (per 29 CFR Part 1910.134), and that they are properly trained in the selection, use and maintenance of personal protective equipment, including qualitative respirator fit testing.

- Performing or overseeing Site monitoring as required by the HASP.

- Assisting in the preparation and review of the HASP.

- Maintaining site-specific safety and health records as described in this HASP.

- Coordinating with the Project Manager, Site Workers and Contractor's SSHO as necessary for safety and health efforts.

2.1.4 Site Workers

Site workers are responsible for: complying with this HASP or a more stringent HASP, if appropriate (i.e. Contractor and Subcontractor's HASP); using proper PPE; reporting unsafe acts and conditions to the SSHO; and following the safety and health instructions of the Project Manager and SSHO.

2.1.5 Other Site Personnel

Other Site personnel who will have health and safety responsibilities in the work zone will include subcontractors and governmental agencies performing Site inspection work (viz. New York State Department of Environmental Conservation and/or its designated oversight contractor) who will be responsible for developing, implementing and enforcing a Health and Safety Plan equally stringent or more stringent than Benchmark's HASP. Benchmark assumes no responsibility for the health and safety of anyone outside its direct employ. During activities involving subcontractors, the subcontractor's HASP shall cover all non-Benchmark Site personnel. The subcontractor(s) shall assign a SSHO who will coordinate with Benchmark's SSHO as necessary to ensure effective lines of communication and consistency between contingency plans.

3.0 HAZARD EVALUATION

The possibility exists that workers will be exposed to hazardous substances during subsurface soil sampling, well development and groundwater monitoring. The principal points of exposure would be through direct contact with impacted media or vapors during sample collection and handling activities. In addition, the use of large equipment will also present conditions for potential physical injury to workers. Adherence to the medical evaluations, worker training relative to chemical hazards, safe work practices, proper personal protection, environmental monitoring, establishment work zones and site control, appropriate decontamination procedures and contingency planning outlined herein will reduce the potential for chemical exposures and physical injuries.

3.1 Chemical Hazards

Manufacturing processes known to have previously taken place at the Manufacturing Facility give an indication as to the types of hazardous substances that may be encountered during Site Investigation activities. Table 3-1 identifies known constituents of potential concern and ranges of concentrations, by media, observed during previous Phase II investigations (Ref 2). Based on this work, the constituents of potential concern include specific chlorinated organics and inorganic compounds. Table 3-2 lists toxicity and exposure data for these constituents of potential concern. As additional data is obtained, Tables 3-1 and 3-2 will be updated accordingly. Brief descriptions of the toxicology of these materials and related health and safety guidance and criteria are provided below.

- **Acetone** is used as an industrial and laboratory solvent; and in the manufacturing of plastics, paints and varnishes. It is toxic by inhalation, ingestion and skin absorption. Symptoms of exposure may include nose, throat, eye and lung irritation as well as headache, dizziness and nausea. Prolonged or repeated skin contact may cause irritation and dermatitis.

- **Chromium** is used in the production of stainless steel, chrome plated metals and batteries. Two forms of chromium, hexavalent (CR+6) and trivalent (CR+3), are

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TABLE 3-1

CONSTITUENTS OF POTENTIAL CONCERN & OBSERVED CONCENTRATIONS BY MEDIA [(1)]

Site Investigation Activities Health and Safety Plan
Former Brainerd Manufacturing Facility
East Rochester, New York

Parameter	Groundwater (mg/L)
Acetone *	2.58
Tetrachloroethene	1.2
Trichloroethene	1.1
1,1,1 Trichloroethane	0.007
Xylene	0.01
Chromium	0.145

Notes:

(1) Concentration ranges based on Supplemental Subsurface Site Investigation Report prepared by Sear Brown Group June 2001.

* Acetone suspected to be an artifact of well supply manufacturer during Phase II Supplemental Site Investigation.

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TABLE 3-2

TOXICITY AND EXPOSURE DATA FOR CONSTITUENTS OF POTENTIAL CONCERN

Health & Safety Plan For Site Investigation Activities
Former Brainerd Manufacturing Facility
East Rochester, New York

Constituents of Potential Concern	Inhalation Hazard		IDLH
	PEL	TLV	
Volatile Organic Compounds (ppm):			
Acetone	250	250	20,000
Tetrachloroethene	25	50	Ca
Trichloroethene	50	50	Ca
1,1,1 Trichloroethane	350 C	350	
Xylene (Total)	100	100	1000
Inorganic Compounds: (mg/m^3)			
Chromium	0.5	0.5	250

Notes:

PEL- Permissible Exposure Limit, established by OSHA, equals the maximium exposure concentration allowable for 8 hours per day @ 40 hours per week.

TLV- Threshold Limit Value, established by ACGIH, equals the maximum exposure concentration allowable for 8 hours per day @ 40 hours per week.

C- Ceiling Level equals the maximum exposure concentration allowable during the work day.

IDLH- Immediately Dangerous to Life or Health

Ca- NIOSH considers constituent to be a potential occupational carcinogen.

ND- IDLH has not yet been established.

toxic. Hexavalent chromium is an irritant and corrosive to the skin and mucus membranes. Chromium is a potential occupational carcinogen. Acute exposures to dust may cause coughing, wheezing, headaches, pain and fever.

- **Tetrachloroethene** is used a solvent for greases, waxes and rubbers. It is harmful by ingestion inhalation and skin absorption. Exposure can cause dermatitis, dizziness, nausea, liver and kidney damage. This compound is a suspected carcinogen.

- **Trichloroethene** (**TCE)** This compound was formally used in dry cleaning operations and metal degreasing. It is toxic by inhalation and skin absorption. It is an irritant to the skin, eyes and mucous membranes. Symptoms of exposure may include headache, dizziness and nausea. Exposure may cause liver and kidney damage. TCE is a suspected human carcinogen.

- **1, 1, 1-Trichloroethane** This compound is used as a metal and plastic cleaning solvent. It is harmful by inhalation, ingestion and skin absorption. Exposure can cause headache and drowsiness. Repeated skin contact may result in dry scaly and fissured dermatitis. Chronic exposure may result in liver and kidney damage.

- **Xylene** is used in variety of applications including cleaning and degreasing solvents and in the manufacturing of plastics and synthetic fibers. It is toxic by inhalation and skin contact. Inhalation exposure can cause nausea, headache and drowsiness. Chronic exposure can cause liver and kidney damage. Prolonged skin contact can cause irritation and dermatitis.

With respect to the anticipated activities defined in Section 1.4, possible routes of exposure to the above-mentioned contaminants are presented in Table 3-3. The use of proper respiratory equipment, as outlined in Section 7.0, will minimize the potential for exposure to airborne contamination. Further, exposure to contaminants through dermal and other routes will also be minimized through the use of protective clothing (Section 7.0), safe work practices (Section 6.0), and proper decontamination procedures (Section 12.0).

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TABLE 3-3

POTENTIAL ROUTES OF EXPOSURE TO CONSTITUENTS OF POTENTIAL CONCERN

Site Investigation Activities Health and Safety Plan
Former Brainerd Manufacturing Facility
East Rochester, New York

Activity	Direct Contact with Surface and Subsurface Soils	Direct Contact with Groundwater	Inhalation of Vapors or Dust
Subsurface Soil Boring	X		X
Surface Soil Sampling	X		X
Development and Sampling of Monitoring Wells		X	X
Discharge Water Management		X	X
Sub-slab Vapor Sampling	X		X

3.2 Physical Hazards

Remedial investigation activities at the Site may present the following physical hazards:

- The potential for physical injury during heavy equipment use, such as drill rigs.
- The potential for slip and fall injuries due to slippery terrain.

These hazards represent only some of the possible means of injury which may be present during investigation and sampling activities at the Site. Since it is impossible to list all potential sources of injury, it shall be the responsibility of each individual to exercise proper care and caution during all phases of the work.

4.0 TRAINING

4.1 Site Workers

All personnel performing site investigation activities (such as, but not limited to, equipment operators and general laborers) and who may be exposed to hazardous substances, health hazards, or safety hazards and their supervisors/managers responsible for the site shall receive training in accordance with 29 CFR 1910.120(e) before they are permitted to engage in operations in the exclusion zone or contaminant reduction zone. This training includes an initial 40-hour Hazardous Waste Site Worker Protection Course, an 8-hour Annual Refresher Course subsequent to the initial 40-hour training, and 3 days of actual field experience under the direct supervision of a trained, experienced supervisor. Additional site-specific training shall also be provided by the SSHO prior to the start of field activities. A description of topics to be covered by this training is provided below.

4.1.1 Initial and Refresher Training

Initial and refresher training is conducted by a qualified instructor as specified under OSHA 29 CFR 1910.120(e)(5), and is specifically designed to meet the requirements of OSHA 29 CFR 1910.120(e)(3) and 1910.120(e)(8). The training covers, as a minimum, the following topics:

- OSHA HAZWOPER regulations.
- Site safety and hazard recognition, including chemical and physical hazards.
- Medical monitoring requirements.
- Air monitoring, permissible exposure limits, and respiratory protection level classifications.
- Appropriate use of personal protective equipment (PPE), including chemical compatibility and respiratory equipment selection and use.
- Work practices to minimize risk.

- Work zones and Site control.
- Safe use of engineering controls and equipment.
- Decontamination procedures.
- Emergency response and escape.
- Confined space entry procedures.
- Heat and cold stress monitoring.
- Elements of a Health and Safety Plan.
- Spill containment.

Initial training also incorporates workshops for PPE and respiratory equipment use (Levels A, B and C), and respirator fit testing. Records and certification received from the course instructor documenting each employee's successful completion of the training identified above are maintained on file at Benchmark Environmental Engineering and Science, PLLC's Buffalo, NY office. Contractors and Subcontractors are required to provide similar documentation of training for all their personnel who will be involved in on-site work activities.

Any employee who has not been certified as having received health and safety training in conformance with 29 CFR 1910.120(e) is prohibited from working in the exclusion and contamination reduction zones, or to engage in any on-site work activities that may involve exposure to hazardous substances or wastes.

4.1.2 Site Training

Site workers are given a copy of the HASP and provided a site-specific briefing prior to the commencement of work to ensure that employees are familiar with the HASP and the information and requirements it contains. The site briefing shall be provided by the SSHO prior to initiating field activities and shall include:

- Names of personnel and alternates responsible for Site safety and health.
- Safety, health and other hazards present on the Site.
- The Site lay-out including work zones and places of refuge.
- The emergency communications system and emergency evacuation procedures.
- Use of PPE.
- Work practices by which the employee can minimize risks from hazards.
- Safe use of engineering controls and equipment on the Site.
- Medical surveillance, including recognition of symptoms and signs of over-exposure (see Section 5).
- Decontamination procedures (see Section 12).
- The Emergency Response Plan (see Appendix B).
- Confined space entry procedures, if required (see Section 13).
- The spill containment program (see Section 9).
- Site control (see Section 11).

Supplemental health and safety briefings will also be conducted by the SSHO on an as-needed basis during the course of the work. Supplemental briefings are provided as necessary to notify employees of any changes to this HASP as a result of information gathered during on-going Site characterization and analysis. Conditions for which the SSHO may schedule additional briefings include, but are not limited to: a change in Site conditions (viz., based on monitoring results); changes in the work schedule/plan; newly discovered hazards; and safety incidents occurring during Site work.

4.2 Supervisor Training

On-site safety and health personnel who are directly responsible for or who supervise the safety and health of workers engaged in hazardous waste operations (viz., SSHO) shall receive, in addition to the appropriate level of worker training described in Section 4.1, above, 8 additional hours of specialized supervisory training, in compliance with 29 CFR 1910.120(e)(4).

4.3 Emergency Response Training

Emergency response training is addressed in Appendix B of this HASP, Emergency Response Plan.

4.4 Site Visitors

Benchmark's SSHO will provide a site-specific briefing to all Site visitors and other non-Benchmark personnel who enter the Site beyond the Site entry point. The site-specific briefing will provide information about Site hazards, the Site lay-out including work zones and places of refuge, the emergency communications system and emergency evacuation procedures, and other pertinent safety and health requirements as appropriate.

Site visitors will not be permitted to enter the exclusion zone or contaminant reduction zones unless they have received the level of training required for Site workers as described in Section 4.1.

5.0 MEDICAL MONITORING

Medical monitoring examinations are provided to Benchmark employees as stipulated under 29 CFR Part 1910.120(f). These exams include initial employment and termination physicals for all Benchmark employees involved in hazardous waste Site field operations. Annual exams are provided for those employees who are engaged in hazardous waste site field operations for more than 30 days per year, or who meet other specific criteria listed in 29 CFR 1910.120(f). Post-exposure examinations are also provided for employees who may have been injured, received a health impairment, or developed signs or symptoms of over-exposure to hazardous substances or were accidentally exposed to substances at concentrations above the permissible exposure limits without necessary personal protective equipment. Such exams are performed as soon as possible following development of symptoms or the known exposure event.

Medical evaluations are performed by ADP Screening & Selection Services, an occupational health care provider under contract with TurnKey-Benchmark. ADP's local facility is Health Works WNY, Seneca Square Plaza, 1900 Ridge Road, West Seneca, New York 14224. The facility can be reached at (716) 823-5050 to schedule routine appointments or post-exposure examinations.

Medical evaluations are conducted according to the Benchmark-TurnKey Medical Monitoring Program and include an evaluation of the workers' ability to use respiratory protective equipment. The examinations include:

- Occupational/medical history review.
- Physical exam, including vital sign measurement.
- Spirometry testing.
- Eyesight testing.
- Audio testing (minimum baseline and exit, annual for employees routinely exposed to greater than 85db).

- EKG (for employees >40 yrs age or as medical conditions dictate).
- Chest X-ray (baseline and exit, and every 5 years).
- Blood biochemistry (including blood count, white cell differential count, serum multiplastic screening).
- Medical certification of physical requirements (viz., sight, musculoskeletal, cardiovascular) for safe job performance and to wear respiratory protection equipment.

The purpose of the medical evaluation is to determine an employee's fitness for duty on hazardous waste sites; and to establish baseline medical data.

In conformance with OSHA regulations, Benchmark will maintain and preserve medical records for a period of 30 years following termination of employment. Employees are provided a copy of the physician's post-exam report, and have access to their medical records and analyses.

6.0 SAFE WORK PRACTICES

All Benchmark employees shall conform to the following safe work practices during all on-site work activities conducted within the exclusion and contamination reduction zones:

- Eating, drinking, chewing gum or tobacco, smoking, or any practice that increases the probability of hand-to-mouth contact is strictly prohibited.

- The hands and face must be thoroughly washed upon leaving the work area and prior to engaging in any activity indicated above.

- Respiratory protective equipment and clothing must be worn by all personnel entering the Site as required by the HASP or as modified by the Site Safety Officer. Excessive facial hair (i.e., beards, long mustaches or sideburns) that interferes with the satisfactory respirator-to-face seal is prohibited.

- Contact with surfaces/materials either suspected or known to be contaminated will be avoided to minimize the potential for transfer to personnel, cross contamination and need for decontamination.

- Due to possible contraindications, use of prescribed drugs should be reviewed with the Benchmark occupational physician.

- Alcoholic beverage and illegal drug intake are strictly forbidden during the work day.

- All personnel shall be familiar with standard operating safety procedures and additional instructions contained in this Health and Safety Plan.

- On-site personnel shall use the "buddy" system. No one may work alone (i.e., out of earshot or visual contact with other workers) in the exclusion zone.

- Personnel and equipment in the contaminated area shall be minimized, consistent with effective Site operations.

- All employees have the obligation to immediately report and if possible, correct unsafe work conditions.

- Use of contact lenses on-site will not be permitted. Spectacle kits for insertion

into full-face respirators will be provided for Benchmark employees, as requested and required.

The recommended specific safety practices for working around the subcontractor's equipment (e.g., drill rig, site truck.) are as follows:

- Although the subcontractors are responsible for their equipment and safe operation of the Site, Benchmark personnel are also responsible for their own safety.
- Subsurface work will not be initiated without first clearing underground utility services.
- Heavy equipment should not be operated within 20 feet of overhead wires. This distance may be increased if windy conditions are anticipated or if lines carry high voltage. The Site should also be sufficiently clear to ensure the project staff can move around the heavy machinery safely.
- Care should be taken to avoid overhead wires when moving heavy-equipment from location to location.
- Hard hats, safety boots and safety glasses should be worn at all times in the vicinity of heavy equipment. Hearing protection is also recommended.
- The work Site should be kept neat. This will prevent personnel from tripping and will allow for fast emergency exit from the Site.
- Proper lighting must be provided when working at night.
- Investigation activities should be discontinued during an electrical storm or severe weather conditions.
- The presence of combustible gases should be checked before igniting any open flame.
- Personnel shall stand upwind of any investigation activity when not immediately involved in sampling/logging/observing activities.
- Personnel will not approach the edge of an unsecured trench/excavation closer than 2 feet.

7.0 PERSONAL PROTECTIVE EQUIPMENT

7.1 Equipment Selection

Personal protective equipment (PPE) will be donned when work activities may result in exposure to physical or chemical hazards beyond acceptable limits, and when such exposure can be mitigated through appropriate PPE. The selection of PPE will be based on an evaluation of the performance characteristics of the PPE relative to the requirements and limitations of the Site, the task-specific conditions and duration, and the hazards and potential hazards identified at the Site.

Equipment designed to protect the body against contact with known or suspect chemical hazards are grouped into four categories according to the degree of protection afforded. These categories, designated A through D consistent with United States Environmental Protection Agency (USEPA) Level of Protection designation, are:

- **Level A:** Should be selected when the highest level of respiratory, skin and eye protection is needed.
- **Level B:** Should be selected when the highest level of respiratory protection is needed, but a lesser level of skin protection is required. Level B (or Level A) is also necessary for oxygen-deficient atmospheres.
- **Level C:** Should be selected when the types of airborne substances are known, the concentrations have been measured and the criteria for using air-purifying respirators are met. In atmospheres where no airborne contaminants are present, Level C provides dermal protection only.
- **Level D:** Should not be worn on any site with elevated respiratory or skin hazards. This is generally a work uniform providing minimal protection.

OSHA requires the use of certain PPE under conditions where an immediate danger to life and health (IDLH) may be present. Specifically, OSHA 29 CFR 1910.120(g)(3)(iii) requires use of a positive pressure self-contained breathing apparatus, or positive pressure air-line respirator equipped with an escape air supply when chemical exposure levels present a substantial possibility of immediate serious injury, illness or death, or impair the ability to

escape. Similarly, OSHA 29 CFR 1910.120(g)(3)(iv) requires donning totally-encapsulating chemical protective suits (with a protection level equivalent to Level A protection) in conditions where skin absorption of a hazardous substance may result in a substantial possibility of immediate serious illness, injury or death, or impair the ability to escape.

In situations where the types of chemicals, concentrations, and possibilities of contact are unknown, the appropriate level of protection must be selected based on professional experience and judgment until the hazards can be further characterized. The individual components of clothing and equipment must be assembled into a full protective ensemble to protect the worker from site-specific hazards, while at the same time minimizing hazards and drawbacks of the personal protective gear itself. Ensemble components are detailed below for levels A/B, C, and D protection.

7.2 Protection Ensembles

7.2.1 Level A/B Protection Ensemble

Level A/B ensembles include similar respiratory protection, however Level A provides a higher degree of dermal protection than Level B. Use of Level A over Level B is determined by: comparing the concentrations of identified substances in the air with skin toxicity data, and assessing the effect of the substance (by its measured air concentrations or splash potential) on the small area of the head and neck unprotected by Level B clothing.

The recommended PPE for level A/B is:

- Pressure-demand, full-face piece self-contained breathing apparatus (MSHA/-NIOSH approved) or pressure-demand supplied-air respirator with escape self-contained breathing apparatus (SCBA).
- Chemical-resistant clothing. For Level A, clothing consists of totally-encapsulating chemical resistant suit. Level B incorporates hooded one-or two-piece chemical splash suit.
- Inner and outer chemical resistant gloves.
- Chemical-resistant safety boots/shoes.

- Hardhat.

7.2.2 Level C Protection Ensemble

Level C protection is distinguished from Level B by the equipment used to protect the respiratory system, assuming the same type of chemical-resistant clothing is used. The main selection criterion for Level C is that conditions permit wearing an air-purifying device. The device (when required) must be an air purifying respirator (MSHA/NIOSH approved) equipped with filter cartridges. Cartridges must be able to remove the substances encountered. Respiratory protection will be used only with proper fitting, training and the approval of a qualified individual. In addition, an air-purifying respirator can be used only if: oxygen content of the atmosphere is at least 19.5% in volume; substances are identified and concentrations measured; substances have adequate warning properties; the individual passes a qualitative fit-test for the mask; and an appropriate cartridge/canister is used, and its service limit concentration is not exceeded.

Recommended PPE for Level C conditions includes:

- Full-face piece, air-purifying respirator equipped with MSHA and NIOSH approved organic vapor/acid gas/dust/mist combination cartridges or as designated by the SSHO.
- Chemical-resistant clothing (hooded, one or two-piece chemical splash suit or disposable chemical-resistant one-piece suit).
- Inner and outer chemical-resistant gloves.
- Chemical-resistant safety boots/shoes.
- Hardhat.

An air monitoring program is part of all response operations when atmospheric contamination is known or suspected. It is particularly important that the air be monitored thoroughly when personnel are wearing air-purifying respirators. Continual surveillance using direct-reading instruments is needed to detect any changes in air quality necessitating a

higher level of respiratory protection.

7.2.3 Level D Protection Ensemble

As indicated above, Level D protection is primarily a work uniform. It can be worn in areas where only boots can be contaminated, where there are no inhalable toxic substances and where the atmospheric contains at least 19.5% oxygen.

Recommended PPE for Level D includes:

- Coveralls.
- Safety boots/shoes.
- Safety glasses or chemical splash goggles.
- Hardhat.
- Optional gloves; escape mask; face shield.

7.2.4 Recommended Level of Protection for Site Tasks

Based upon current information regarding both the contaminants suspected to be present at the Site and the various tasks that are included in the investigation, the minimum required Levels of Protection for these tasks shall be as identified in Table 7-1.

TABLE 7-1

SITE INVESTIGATION ACTIVITIES
FORMER BRAINERD MANUFACTURING FACILITY

REQUIRED PERSONAL PROTECTIVE EQUIPMENT (PPE) LEVELS[1]

Activity	Respiratory Protection[2]	Clothing	Gloves	Boots	Other Required PPE/Modifications[3]
Subsurface Soil Borings	Level D; upgrade to Level C if necessary	Work Uniform or Tyvek	L	L outer, steel-toed safety boot inner	Hardhat, Safety glasses w/ sideshields
Development and Sampling of Monitoring Wells	Level D; upgrade to Level C if necessary	Work Uniform or Tyvek	L	L outer, steel-toed safety boot inner[3]	Safety glasses w/ sideshields
Discharge Water Management	Level D; upgrade to Level C if necessary	Work Uniform or Tyvek	–	L outer, steel-toed safety boot inner[3]	Safety glasses w/ sideshields

Notes:

1. T = Tyvek; L= Latex; N = Nitrile;, S = Saranex
2. Respiratory equipment shall conform to guidelines presented in Section 8. The Level C requirement is an air-purifying respirator equiped with organic compound/acid gas/dust cartridge.
3. Dust masks shall be donned as directed by the site health and safety officer or site safety technician whenever potentially contaminated airborne particulates (i.e., dust) are present in significant amounts in the breathing zone. Goggles may be substituted with safety glasses w/side-shields whenever contact with contaminated liquids is not anticipated.

8.0 EXPOSURE MONITORING

8.1 General

Based on the results of historic sample analysis and the nature of the proposed work activities at the Site, the possibility exists that particulates may be released to the air during intrusive sampling activities. Ambient breathing zone concentrations may at times, exceed the permissible exposure limits (PEL) established by OSHA for the individual compounds (see Table 3-2), in which case respiratory protection will be required. Respiratory and dermal protection may be modified (upgraded or downgraded) by the SSHO based upon real-time field monitoring data.

8.1.1 Work Area Monitoring

Routine, real-time monitoring of the atmosphere within the work area will be conducted by Benchmark during all intrusive investigation phases such as drilling, well development, etc. The work area will be monitored at regular intervals using a photo-ionization detector (PID), combustible gas meter and a particulate meter. Observed values will be recorded and maintained as part of the permanent field record.

Additional air monitoring measurements may be made by Benchmark personnel to verify field conditions during subcontractor oversight activities. Monitoring instruments will be protected from surface contamination during use. Additional monitoring instruments may be added if the situations or conditions change.

8.1.2 Off-Site Community Monitoring

In addition to on-site monitoring within the work zone(s), monitoring at the down-wind portion of the site perimeter will be conducted when any intrusive activities are performed outdoors of the facility. This will provide a real-time method for determination of substantial vapor and/or particulate releases to the surrounding community as a result of ground intrusive investigation work.

Ground intrusive activities are defined by NYSDOH's Generic Community Air Monitoring Plan (see Appendix C) and include soil/waste excavation and handling; test pitting or trenching; and the installation of soil borings and monitoring wells. Non-intrusive activities include the collection of soil and sediment samples or the collection of groundwater samples from existing wells. Continuous monitoring is required for ground instrusive activities and periodic monitoring is required for non-intrusive activities.

The monitoring will be performed at the downwind perimeter location at regular intervals and at a minimum of once per half hour during times when organic vapors, explosive gases or particulates exceed established limits for 5 minutes or longer until such time as work zone concentrations decrease to below the perimeter monitoring action levels. If sustained concentrations of organic vapors, explosive gas, or particulates are detected in excess of the threshold values identified in Section 8.2.2 at the downwind perimeter location for a period of 5 minutes or longer, the actions identified in Section 8.2.2 shall be taken.

8.2 Monitoring Action Levels

8.2.1 On-site Levels

The PID or other appropriate instrument(s) will be used as specified in this Health and Safety Plan. Methane gas will be monitored with the "combustible gas" option on the combustible gas meter or other appropriate instrument(s) in accordance with this plan. In addition, fugitive dust/particulate concentrations will be monitored using a real-time particulate monitor as specified in this plan. Readings obtained in the breathing zone may be interpreted (with regard to other site conditions) as follows for on-site Benchmark personnel:

- Total atmospheric concentrations of unidentified vapors or gases ranging from 0 to background on the PID) - Continue operations under Level D.
- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings above background to *5* ppm on the PID (vapors not suspected of containing high levels of chemicals toxic to the skin) - Continue operations under Level C.

- Total atmospheric concentrations of unidentified vapors or gases yielding sustained readings of 5 to 50 ppm above background on the PID - Continue operations under Level B, re-evaluate and alter (if possible) construction methods to achieve lower vapor concentrations.

- Total atmospheric concentrations of unidentified vapors or gases above 50 ppm on the PID - Discontinue operations and exit the work zone immediately.

The explosimeter will be used to monitor levels of both combustible gases and oxygen during construction activities. Action levels based on the instrument readings shall be as follows:

- Less than 10% LEL - Continue engineering operations with caution.

- 10-25% LEL - Continuous monitoring with extreme caution, determine source/cause of elevated reading.

- Greater than 25% LEL - Explosion hazard, evaluate source and leave the Work Zone.

- 19.5% - 21% oxygen - proceed with extreme caution; attempt to determine potential source of oxygen displacement.

- Less than 19.5% oxygen - leave work zone immediately.

- 21-25% oxygen - Continue engineering operations with caution.

- Greater than 25% oxygen - Fire hazard potential, leave Work Zone immediately.

The particulate monitor will be used to monitor respirable dust concentrations during all intrusive activities. Action levels based on the instrument readings shall be as follows:

- Less than 50 mg/m^3 - Continue field operations.

- 50-150 mg/m^3 - Don dust/particulate mask or equivalent

- Greater than 150 mg/m^3 - Don dust/particulate mask or equivalent. Initiate engineering controls to reduce respirable dust concentration (viz., wetting of excavated soils or tools at discretion of Site Safety and Health Officer).

Readings with the combustible gas meter, particulate monitor and organic vapor analyzers will be recorded and documented in the Health and Safety Logbook. All instruments will be calibrated before use and the procedure will be documented in the Health and Safety Logbook.

8.2.2 Community Air Monitoring

In addition to the action levels prescribed in Section 8.2.1 for Benchmark personnel on-site, the following criteria shall also be adhered to for the protection of the downwind community consistent with NYSDOH requirements (see Appendix C):

Organic Vapor Community Air Monitoring:

Community air monitoring will be performed at the downwind perimeter of the exclusion zone on a continuous basis during intrusive activities performed outdoors that may be reasonably expected to potentially release organic vapors, or when sustained readings are detected in the work zone (i.e., proximate to the source of the intrusive activity). Otherwise, the monitoring will be performed on an hourly basis. A photoionization detector or other equipment will be suitable to the types of contaminants known or suspected to be present will be used, and will be capable of measuring and integrating over a 15-minute running average period. All air monitoring equipment will be calibrated daily. The 15-minute average concentrations will be compared to the levels specified below.

- If the 15-minute ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone exceeds 5 ppm above background, work activities will be halted and monitoring continued. If the organic vapor decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If the ambient air concentration of organic vapors at the downwind perimeter of the exclusion zone persists at levels above 5 ppm over background but less than 25 ppm, activities must be halted, the source of vapors identified, corrective actions to abate the emissions taken, and monitoring continued. After these steps, work activities can resume provided that: the organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest off-site potential receptor or residential or 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 exclusion zone, work activities must be shut down and the following activities will be performed:

  - All Emergency Response Contacts as listed in this Health and Safety Plan and the Emergency Response Plan (Appendix B) will be advised.

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

  - Air monitoring will be continued at 1/2 the distance from the exclusion zone to the nearest receptor. All readings will be recorded and will be available for New York State Department of Environmental Conservation (DEC) and Department of Health (DOH) personnel to review.

Explosive Vapor Community Air Monitoring

Explosive vapor community air monitoring will be performed at the downwind perimeter of the site on a continuous basis whenever sustained atmospheric concentrations of greater than 10% of the LEL are recorded in the exclusion zone. If sustained atmospheric concentrations of greater than 10% LEL are recorded at the downwind site perimeter, the local Fire Department will be contacted (see Appendix B for phone number).

Airborne Particulate Community Air Monitoring

Respirable (PM-10) particulate monitoring will be performed on a continuous basis at the upwind and downwind perimeter of the exclusion zone. The monitoring will be performed using real-time monitoring equipment capable of measuring PM-10 and

integrating over a period of 15-minutes for comparison to the airborne particulate action levels. The equipment will be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration will be visually assessed during all work activities. All readings will be recorded and will be available for NYSDEC and NYSDOH review. Readings will be interpreted as follows:

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (ug/m^3) greater than the background (upwind perimeter) reading 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 provided that the downwind PM-10 particulate levels do not exceed 150 ug/m^3 above the upwind level and that visible dust is not migrating from the work area.

- If, after implementation of dust suppression techniques downwind PM-10 levels are greater than 150 ug/m^3 above the upwind level, work activities must be stopped and dust suppression controls re-evaluated. Work can resume provided that supplemental dust suppression measures and/or other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 ug/m^3 of the upwind level and in preventing visible dust migration.

Pertinent emergency response information including the telephone number and address of the Fire Department are included in Appendix B - Emergency Response Plan.

9.0 SPILL RELEASE/RESPONSE

This chapter of the HASP describes the potential for and procedures related to spills or releases of known or suspected petroleum and/or hazardous substances on the Site. The purpose of this Section of the HASP is to plan appropriate response, control, counter-measures and reporting, consistent with OSHA requirements in 29 CFR 1910.120(b)(4)(ii)(J) and (j)(1)(viii). The spill containment program addresses the following elements:

- Potential hazardous material spills and available controls.
- Initial notification and evaluation.
- Spill response.
- Post-spill evaluation.

9.1 Potential Spills and Available Controls

An evaluation was conducted to determine the potential for hazardous material and oil/petroleum spills at this Site. For the purpose of this evaluation, hazardous materials posing a significant spill potential are considered to be:

- CERCLA Hazardous Substances as identified in 40 CFR Part 302, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Extremely Hazardous Substances as identified in 40 CFR Part 355, Appendix A, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).
- Hazardous Chemicals as defined under Section 311(e) of the Emergency Planning and Community Right-To-Know Act of 1986, where such chemicals are present or will be stored in excess of 10,000 lbs.
- Toxic Chemicals as defined in 40 CFR Part 372, where such chemicals are present or will be stored in excess of 10,000 lbs.

- Chemicals regulated under 6NYCRR Part 597, where such materials pose the potential for release in excess of their corresponding Reportable Quantity (RQ).

Oil/petroleum products are considered to pose a significant spill potential whenever the following situations occur:

- the potential for a "harmful quantity" of oil (including petroleum and non-petroleum-based fuels and lubricants) to reach navigable waters of the U.S. exists (40 CFR Part 112.4). Harmful quantities are considered by USEPA to be volumes of 1,000 gallons or more, or lesser quantities that either form a visible sheen on the water or violate applicable water quality standards.

- the potential for any amount of petroleum to reach any waters of NY State, including groundwater, exists. Petroleum, as defined by NY State in 6NYCRR Part 612, is a petroleum-based heat source, energy source, or engine lubricant/maintenance fluid.

- the potential for any release, to soil or water, of petroleum from a bulk storage facility regulated under 6NYCRR Part 612. A regulated petroleum storage facility is defined by NY State as a Site having stationary tank(s) and intra-facility piping, fixtures and related equipment with an aggregate storage volume of 1100 gallons or greater.

The evaluation indicates that, based on Site history and the scope of work, a hazardous material spill is not likely to occur during investigation efforts. However, the procedures identified below will be followed in the event of an unanticipated release.

9.2 Initial Spill Notification and Evaluation

Any worker who discovers a hazardous substance or oil/petroleum spill will immediately notify the Project Manager and SSHO. The worker will, to the best of his/her ability, report the material involved, the location of the spill, the estimated quantity of material spilled, the direction/flow of the spill material, related fire/explosion incidents, if any, and any associated injuries. The Emergency Response Plan presented in Appendix B of this HASP will immediately be implemented if an emergency release has occurred.

Following initial report of a spill, the Project Manager will make an evaluation as to whether the release exceeds RQ levels. If an RQ level is exceeded, the Project Manager will notify the Site owner who will in turn notify NYSDEC at 1-800-457-7362 within 2 hours of spill discovery. The Project Manager will also determine what additional agencies are to be contacted regarding the release, and will follow-up with written reports as required by the applicable regulations.

9.3 Spill Response

For all spill situations, the following general response guidelines will apply:

- Only those personnel involved in overseeing or performing containment operations will be allowed within the spill area. If necessary, the area will be roped, ribboned or otherwise blocked off to prevent unauthorized access.
- Appropriate PPE, as specified by the SSHO, will be donned before entering the spill area.
- Ignition points will be extinguished/removed if fire or explosion hazards exist.
- Surrounding reactive materials will be removed.
- Drains or drainage in the spill area will be blocked to prevent inflow of spilled materials or applied materials.

For minor spills, the Benchmark will maintain a Spill Control and Containment Kit in the Field Office or other readily accessible storage location. The kit will consist of, at a minimum, a 50 lb. bag of "speedy dry" granular absorbent material, absorbent pads, shovels, empty 5-gallon pails and an empty open-top 55-gallon drum. Spilled materials will be absorbed, and shoveled into a 55-gallon drum for proper disposal (USEPA approval will be secured for on-site treatment of the impacted soils/absorbent materials, if applicable). Impacted soils will be hand-excavated to the point that no visible signs of contamination remains, and will be drummed with the absorbent.

In the event of a major release or a release that threatens surface water, a spill response contractor will be called to the Site. The response contractor may use heavy equipment (viz., excavator, backhoe, etc.) to berm the soils surrounding the spill site or create diversion trenching to mitigate overland migration or release to navigable waters. Where feasible, pumps will be used to transfer free liquid to storage containers. Spill control/cleanup contractors in the Western New York area that may be contacted for assistance (in order of preference) include:

- The Environmental Service Group of NY, Inc.: (716) 695-6720
- Op-Tech: (716) 873-7680
- Environmental Products and Services, Inc.: (716) 447-4700

9.4 Post-Spill Evaluation

If a reportable quantity of hazardous material or oil/petroleum is spilled as determined by the Project Manager, a written report will be prepared as indicated in Section 9.2. The report will identify the root cause of the spill, type and amount of material released, date/time of release, response actions, agencies notified and/or involved in cleanup, and procedures to be implemented to avoid repeat incidents. In addition, all re-useable spill cleanup and containment materials will be decontaminated, and spill kit supplies/disposable items will be replenished.

10.0 HEAT/COLD STRESS MONITORING

Although most Site Investigation activities will occur in a climate controlled environment, measures will be taken to minimize heat/cold stress to Benchmark employees working outdoors. The Site Safety and Health Officer and/or his or her designee will be responsible for monitoring Benchmark field personnel for symptoms of heat/cold stress.

10.1 Heat Stress Monitoring

Personal protective equipment may place an employee at risk of developing heat stress, a common and potentially serious illnesses often encountered at construction, landfill, waste disposal, industrial or other unsheltered sites. The potential for heat stress is dependent on a number of factors, including environmental conditions, clothing, workload, physical conditioning and age. Personal protective equipment may severely reduce the body's normal ability to maintain temperature equilibrium (via evaporation and convection), and require increased energy expenditure due to its bulk and weight.

Proper training and preventive measures will mitigate the potential for serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat related illness. To avoid heat stress, the following steps should be taken:

- Adjust work schedules.
- Modify work/rest schedules according to monitoring requirements.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must approximately equal the amount of water lost in sweat (i.e., eight fluid ounces

must be ingested for approximately every 1 lb of weight lost). The normal thirst mechanism is not sensitive enough to ensure that enough water will be consumed to replace lost perspiration. When heavy sweating occurs, workers should be encouraged to drink more.

- Train workers to recognize the symptoms of heat related illness.

Heat-Related Illness - Symptoms:

- Heat rash may result from continuous exposure to heat or humid air.

- Heat cramps are caused by heavy sweating with inadequate electrolyte replacement. Signs and symptoms include: muscle spasms; pain in the hands, feet and abdomen.

- Heat exhaustion occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration. Signs and symptoms include: pale, cool, moist skin; heavy sweating; dizziness; nausea; fainting.

- Heat stroke is the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury and death occur. Competent medical help must be obtained. Signs and symptoms are: red, hot, usually dry skin; lack of or reduced perspiration; nausea; dizziness and confusion; strong, rapid pulse; coma.

The monitoring of personnel wearing protective clothing should commence when the ambient temperature is 70 degrees Fahrenheit or above. For monitoring the body's recuperative ability to excess heat, one or more of the following techniques should be used as a screening mechanism.

- Heart rate may be measured by the radial pulse for 30 seconds as early as possible in the resting period. The rate at the beginning of the rest period should not exceed 100 beats per minute. If the rate is higher, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest periods stay the same, If the pulse rate is 100 beats per minute at the beginning of the nest rest period, the following work cycle should be further shortened by 33%.

- Body temperature may be measured orally with a clinical thermometer as early as possible in the resting period. Oral temperature at the beginning of the rest period

should not exceed 99.6 degrees Fahrenheit. If it does, the next work period should be shortened by 10 minutes (or 33%), while the length of the rest period remains the same. However, if the oral temperature exceeds 99.6 degrees Fahrenheit at the beginning of the next period, the work cycle may be further shortened by 33%. Oral temperature should be measured at the end of the rest period to make sure that it has dropped below 99.6 degrees Fahrenheit. No Benchmark employee will be permitted to continue wearing semi-permeable or impermeable garments when his/her oral temperature exceeds 100.6 degrees Fahrenheit.

10.2 Cold Stress Monitoring

Exposure to cold conditions may result in frostbite or hypothermia, each of which progresses in stages as shown below.

- **Frostbite** occurs when body tissue (usually on the extremities) begins to freeze. The three states of frostbite are:

    1) **Frostnip** - This is the first stage of the freezing process. It is characterized by a whitened area of skin, along with a slight burning or painful sensation. Treatment consists of removing the victim from the cold conditions, removal of boots and gloves, soaking the injured part in warm water (102 to 108 degrees Fahrenheit) and drinking a warm beverage. Do not rub skin to generate friction/ heat.

    2) **Superficial Frostbite** - This is the second stage of the freezing process. It is characterized by a whitish gray area of tissue which will be firm to the touch but will yield little pain. The treatment is identical for Frostnip.

    3) **Deep Frostbite** - In this final stage of the freezing process the affected tissue will be cold, numb and hard and will yield little to no pain. Treatment is identical to that for Frostnip.

- **Hypothermia** is a serious cold stress condition occurring when the body loses heat at a rate faster than it is produced. If untreated, hypothermia may be fatal. The stages of hypothermia may not be clearly defined or visible at first, but generally include:

    1) Shivering

    2) Apathy (i.e., a change to an indifferent or uncaring mood)

3) Unconsciousness

4) Bodily freezing

Employees exhibiting signs of hypothermia should be treated by medical professionals. Steps that can be taken while awaiting help include:

1) Remove the victim from the cold environment and remove wet or frozen clothing. (Do this carefully as frostbite may have started.)

2) Perform active re-warming with hot liquids for drinking (Note: do not give the victim any liquid containing alcohol or caffeine) and a warm water bath (102 to 108 degrees Fahrenheit).

3) Perform passive re-warming with a blanket or jacket wrapped around the victim.

In any potential cold stress situation, it is the responsibility of the Site Health and Safety Officer to encourage the following:

- Education of workers to recognize the symptoms of frostbite and hypothermia.
- Workers should dress warmly, with more layers of thin clothing as opposed to one thick layer.
- Personnel should remain active and keep moving.
- Personnel should be allowed to take shelter in a heated areas, as necessary.
- Personnel should drink warm liquids (no caffeine or alcohol if hypothermia has set in).
- For monitoring the body's recuperation from excess cold, oral temperature recordings should occur:
    - At the Site Safety Technicians discretion when suspicion is based on changes in a worker's performance or mental status.
    - At a workers request.
    - As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20 degrees Fahrenheit

or wind chill less than 30 degrees Fahrenheit with precipitation).

- As a screening measure whenever anyone worker on Site develops hypothermia.

Any person developing moderate hypothermia (a core body temperature of 92 degrees Fahrenheit) will not be allowed to return to work for 48 hours without the recommendation of a qualified medical doctor.

11.0 WORK ZONES AND SITE CONTROL

Work zones around the areas designated for investigation activities will be established by Benchmark on a daily basis and communicated to all employees and other Site users by the SSHO. It shall be the Site Safety and Health Officer's responsibility to ensure that all Site workers are aware of the work zone boundaries and to enforce proper procedures in each area. The zones will include:

- Exclusion Zone ("Hot Zone") - The area where contaminated materials may be exposed, excavated or handled and all areas where contaminated equipment or personnel may travel. The zone will be delineated by flagging tape. All personnel entering the Exclusion Zone must wear the prescribed level of personal protective equipment identified in Section 7.

- Contaminant Reduction Zone - The zone where decontamination of personnel and equipment takes place. Any potentially contaminated clothing, equipment and samples must remain in the Contaminant Reduction Zone until decontaminated.

- Support Zone - The part of the Site that is considered non-contaminated or "clean." Support equipment will be located in this zone, and personnel may wear normal work clothes within this zone.

In the absence of other task-specific work zone boundaries established by the SSHO, the following boundaries will apply to all investigation activities involving disruption or handling of Site soils, sediment or groundwater:

- Exclusion Zone: 50 foot radius from the outer limit of the sampling activity.

- Contaminant Reduction Zone: 100 foot radius from the outer limit of the sampling activity.

- Support Zone: Areas outside the Contaminant Reduction Zone.

Access of non-essential personnel to the Exclusion and Contaminant Reduction Zones will be strictly controlled by Benchmark. Only personnel who are essential to the completion of the task will be allowed access to these areas and only if they are wearing the prescribed level

of protection. Entrance of all personnel must be approved by the SSHO.

The Contractor will maintain a Health and Safety Logbook containing the names of workers and their level of protection. The zone boundaries may be changed by the SSHO as environmental conditions warrant, and to respond to the necessary changes in work locations on-site.

12.0 DECONTAMINATION

12.1 Decontamination For Benchmark Employees

The degree of decontamination required is a function of a particular task and the environment within which it occurs. The following decontamination procedure will remain flexible, thereby allowing the decontamination crew to respond appropriately to the changing environmental conditions which may arise at the Site. All Benchmark personnel on-site shall follow the procedure below.

Station 1 - Equipment Drop: Deposit visibly contaminated (if any) re-useable equipment used in the contamination reduction and exclusion zones (tools, containers, monitoring instruments, radios, clipboards, etc.) on plastic sheeting.

Station 2 - Boots and Gloves Wash and Rinse: Scrub outer boots and outer gloves. Deposit tape and gloves in waste disposal container.

Station 3 - Tape, Outer Boot and Glove Removal: Remove tape, outer boots and gloves. Deposit tape and gloves in waste disposal container.

Station 4 - Canister or Mask Change: If worker leaves exclusive zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot cover donned, and worker returns to duty.

Station 5 - Outer Garment/Face Piece Removal: Protective suit removed and deposited in separate container provided by Contractor. Face piece or goggles are removed if used. Avoid touching face with fingers. Face piece and/or goggles deposited on plastic sheet. Hard hat removed and placed on plastic sheet.

Station 6 - Inner Glove Removal: Inner gloves are the last personal protective equipment to be removed. Avoid touching the outside of the gloves with bare fingers. Dispose of these gloves in waste disposal container.

Following PPE removal, personnel shall wash hands, face and forearms with absorbent wipes. If field activities proceed for a duration of 6 consecutive months or longer, shower facilities will be provided for worker use in accordance with OSHA 29 CFR 1910.120(n).

12.2 Decontamination For Medical Emergencies

In the event of a minor, non-life threatening injury, personnel should follow the decontamination procedures as defined, and then administer first-aid.

In the event of a major injury or other serious medical concern (e.g., heat stroke), immediate first-aid is to be administered and the victim transported to the hospital in lieu of further decontamination efforts unless exposure to a Site contaminant would be considered "Immediately Dangerous to Life or Health."

12.3 Decontamination Of Field Equipment

Decontamination of heavy equipment will be conducted by the subcontractor in accordance with his approved Health and Safety Plan in the Contamination Reduction Zone. As a minimum, this will include manually removing heavy soil clods, followed by high pressure water and detergent or steam cleaning.

Decontamination of all tools used for sample collection purposes will be conducted by Benchmark personnel. It is expected that all tools will be constructed of nonporous, nonabsorbent materials (i.e., metal) which will aid in the decontamination effort. Any tool or part of a tool made of porous, absorbent material (i.e., wood) will be placed into suitable containers and prepared for disposal.

13.0 CONFINED SPACE ENTRY

OSHA 29 CFR 1910.146 identifies a confined space as a space which is large enough and so configured that an employee can physically enter and do assigned work, has limited or restricted means for entry and exit, and is not intended for continuous employee occupancy. Confined spaces include, but are not limited to, trenches, storage tanks, process vessels, pits, sewers, tunnels, underground utility vaults, pipelines, sumps, wells, and excavations.

Confined space entry by Benchmark employees is not anticipated to be necessary to complete the Site investigation activities identified in Section 1.4. In the event that the scope of work changes or confined space entry appears necessary, the Project Manager will be consulted to determine if feasible engineering alternatives to confined space entry can be implemented. If confined space entry by Benchmark employees cannot be avoided through reasonable engineering measures, task-specific confined space entry procedures will be developed and a confined-space entry permit will be issued through Benchmark's corporate Health and Safety Director. Benchmark employees shall not enter a confined space without these procedures and permits in place.

14.0 FIRE PREVENTION AND PROTECTION

14.1 General Approach

Recommended practices and standards of the National Fire Protection Association (NFPA) and other applicable regulations will be followed in the development and application of Project Fire Protection Programs. When required by regulatory authorities, the project management will prepare and submit a Fire Protection Plan for the approval of the contracting officers, authorized representative or other designated official. Essential considerations for the Fire Protection Plan will include:

- Proper Site preparation and safe storage of combustible and flammable materials.
- Availability of coordination with private and public fire authorities.
- Adequate job-site fire protection and inspections for fire prevention.
- Adequate indoctrination and training of employees.

14.2 Equipment and Requirements

Fire extinguishers will be provided by Benchmark and are required to be provided by the subcontractor on all heavy equipment brought on-site. Fire extinguishers will be inspected, serviced, and maintained in accordance with the manufacturer's instructions. As a minimum, all extinguishers shall be checked monthly and weighed semi-annually, and recharged if necessary. Recharge or replacement shall be mandatory immediately after each use.

14.3 Flammable and Combustible Substances

All storage, handling or use of flammable and combustible substances will be under the supervision of qualified persons. All tanks, containers and pumping equipment, whether portable or stationary, which are used for the storage and handling of flammable and combustible liquids, will meet the recommendations of the National Fire Protection Association.

14.4 Hot Work

If the scope of work necessitates welding or blow torch operation, the hot work permit presented in Appendix A will be completed by the SSHO and reviewed/issued by the Project Manager.

15.0 EMERGENCY INFORMATION

In accordance with OSHA 29 CFR Part 1910, an Emergency Response Plan is attached to this HASP as Appendix B.

16.0 REFERENCES

1. Voluntary Cleanup IRM Investigation Work Plan, Former Brainerd Manufacturing Facility East Rochester, NY, March 2002

2. Supplemental Subsurface Site Investigation Report Former Brainerd Manufacturing Facility prepared by Sear Brown Group, June 2001

APPENDIX A

HOT WORK PERMIT FORM

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE, PLLC

HOT WORK PERMIT

PART 1 - INFORMATION

Issue Date:	
Date Work to be Performed: Start:	Finish (permit terminated):
Performed By:	
Work Area:	
Object to be Worked On:	

PART 2 - APPROVAL

(for 1, 2 or 3: mark Yes, No or NA)*

Will working be on or in:	Finish (permit terminated):	
1. Metal partition, wall, ceiling covered by combustible material?	yes	no
2. Pipes, in contact with combustible material?	yes	no
3. Explosive area?	yes	no

* = If any of these conditions exist (marked "yes"), a permit will not be issued without being reviewed and approved by Thomas H. Forbes (Corporate Health and Safety Director). Required Signature below.

PART 3 - REQUIRED CONDITIONS**

(Check all conditions that must be met)

	PROTECTIVE ACTION		PROTECTIVE EQUIPMENT
	Specific Risk Assessment Required		Goggles/visor/welding screen
	Fire or spark barrier		Apron/fireproof clothing
	Cover hot surfaces		Welding gloves/gauntlets/other:
	Move movable fire hazards, specifically		Wellintons/Knee pads
	Erect screen on barrier		Ear protection: Ear muffs/Ear plugs
	Restrict Access		B.A.: SCBA/Long Breather
	Wet the ground		Respirator: Type:
	Ensure adequate ventilation		Cartridge:
	Provide adequate supports		Local Exhaust Ventilation
	Cover exposed drain/floor or wall cracks		Extinguisher/Fire blanket
	Fire watch (must remain on duty during duration of permit)		Personal flammable gas monitor
	Issue additional permit(s):		

Other precautions:

** Permit will not be issued until these conditions are met.

SIGNATURES

Orginating Employee:	Date:
Project Manager:	Date:
Part 2 Approval:	Date:

APPENDIX B

EMERGENCY RESPONSE PLAN

APPENDIX B

EMERGENCY RESPONSE PLAN

Personnel Exposure

- Skin contact: Use copious amounts of soap and water. Wash/rinse affected area for at least 15 minutes. Decontaminate and provide medical attention. Eyewash stations will be provided on site. If necessary, transport to Rochester General Hospital.

- Inhalation: Move to fresh air and, if necessary, transport to Rochester General Hospital.

- Ingestion: Decontaminate and transport to Rochester General Hospital.

Personal Injury

Minor first-aid will be applied on-site as deemed necessary. In the event of a life threatening injury, the individual should be transported to Rochester General Hospital via ambulance. The Site Health and Safety Officer and/or the subcontractor's Health and Safety Officer will supply available chemical specific information to appropriate medical personnel as requested.

First aid kits will conform to Red Cross and other applicable good health standards, and shall consist of a weatherproof container with individually sealed packages for each type of item. First aid kits will be fully equipped before being sent out on each job and will be checked weekly by the Site Health and Safety Officer to ensure that the expended items are replaced.

Communications

Internal emergency communication systems are used to alert workers to danger, convey safety information, and maintain site control. Any effective system can be employed. Two-way radio headsets or field telephones are often used when work teams are far from the command post. Hand signals and air-horn blasts are also commonly

used. Every system must have a backup. It shall be the responsibility of the Site Health and Safety Officer and/or the subcontractor's Health and Safety Officer to ensure that an adequate method of internal communication is understood by all personnel entering the site. Unless all personnel are otherwise informed, the following signals shall be used.

1) Emergency signals by portable air horn, siren, or whistle: two short blasts, personal injury; continuous blast, emergency requiring site excavation.

2) Visual signals: hand gripping throat, out of air/cannot breathe; hands on top of head, need assistance; thumbs up, affirmative/ everything is OK; thumbs down, no/negative; grip partner's wrist or waist, leave area immediately.

Evacuation

In the event that an area must be evacuated due to an emergency, such as a chemical spill or a fire, workers shall exit upwind, if possible. Since work conditions and work zones within the site may be changing on daily basis, it shall be the responsibility of the Site Health and Safety Officer and/or the subcontractor's Health and Safety officer to review evacuation routes and procedures as necessary and to inform all site workers of any changes.

Adverse Weather Conditions

In the event of adverse weather conditions, the Site Health and Safety Officer in conjunction with the subcontractor's Health and Safety Officer will determine if engineering operations can continue without sacrificing the health and safety of site personnel. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat/cold stress;
- Inclement weather—related working conditions;

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EMERGENCY RESPONSE PLAN

- Limited visibility; and
- Potential for electrical storms.

Emergency Telephone Numbers

BENCHMARK ENVIRONMENTAL ENGINEERING & SCIENCE PROJECT & CORPORATE HEALTH AND SAFETY MANAGER: **Thomas Forbes**

(716)856-0599 (Work)
(716) 685-0062 (Home)

BENCHMARK SITE HEALTH AND SAFETY OFFICER: **Bryan Hann**

(716) 870-1165 (Mobile)
(716) 856-0599 (Work)
(716) 823-8005 (Home)

ROCHESTER GENERAL HOSPITAL	(585) 922-2000
EMERGENCY ROOM	(585) 922-2800
FIRE	911
AMBULANCE	911
CITY OF ROCHESTER POLICE	911
STATE EMERGENCY RESPONSE HOTLINE	(800) 457-7362
NATIONAL RESPONSE HOTLINE	(800) 424-8802

NEW YORK STATE DEPARTMENT OF HEALTH:

Mr. David Napier, P.E.	Mr. Michael Kadlec
South FitzHugh Street	2 University Place
Rochester, New York 14692	Albany, New York 12203

The site location is:

Former Brainerd Manufacturing Facility
115 N Washington St East Rochester, NY 14445

APPENDIX B

EMERGENCY RESPONSE PLAN

Directions to Hospital

The following directions describe the best route to **Rochester general Hospital** 1425 Portland Ave, Rochester NY, 14621 and Figure B-1 identifies the hospital route:

Start out going East on MONROE ST toward N WASHINGTON ST/NY-153.

Turn RIGHT onto W COMMERCIAL ST.

Merge onto I-490 W toward ROCHESTER.

Merge onto I-590 S/RT-590 N exit, via Exit Number 21.

Merge onto NY-590 N.

Take the RT-104 exit, exit 10A.

Merge onto NY-104 W.

Take the exit towards GOODMAN ST/PORTLAND AVE.

Stay straight to go onto NY-104 W.

Turn LEFT onto PORTLAND AVE.

Records and Reporting

It shall be the responsibility of each employer to establish and assure adequate records of all:

- Occupational injuries and illnesses;
- Accident investigations;
- Reports to insurance carrier or State compensation agencies;
- Reports required by client;
- Records and reports required by local, state, federal and/or international agencies;

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- Property or equipment damage;
- Third party injury or damage claims;
- Environmental testing logs;
- Explosive and hazardous substances inventories and records;
- Records of inspections and citations;
- Related correspondence; and
- Safety training.

APPENDIX C

NYSDOH COMMUNITY AIR MONITORING PLAN

APPENDIX 1A

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 non-intrusive 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.

VOC Monitoring, Response Levels, and Actions

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.