ARCADIS Design & Consultancy for natural and built assets

Mr. Todd Caffoe
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Subject:
Revised Supplemental Final Engineering Report
Former Roehlen Engraving (NYSDEC Site #828077)
Henrietta, New York

Dear Mr. Caffoe:

Per your request, please find enclosed the *Revised Supplemental Final Engineering Report* (Revised SFE Report), prepared by Arcadis on behalf of Standex International Corporation (Standex), which summarizes the supplemental remedial action activities that were completed at the former Roehlen Engraving Site located in Henrietta, New York (site). The supplemental remedial action activities were performed at the site in accordance with the Administrative Order on Consent (AOC) (Index # B8-0247-94-04), the *Supplemental Remedial Design Work Plan* (Arcadis, September 2008) (including the New York State Department of Environmental Conservation [NYSDEC] August 26, 2008 comment letter, and Arcadis' September 23, 2008 response letter, which was collectively approved by the NYSDEC in a letter dated October 16, 2008), and the *Supplemental Remedial Design Work Plan Addendum (Revised July 2009)* (Arcadis, 2009) (which was approved by the NYSDEC in letter dated July 30, 2009).

As indicated in the NYSDEC's April 16, 2012 e-mail correspondence, a work plan was not required for the vapor intrusion investigation activities, which are also described within the enclosed Revised SFE Report. Based on the satisfactory results (as approved in Justin Demming's April 24, 2015 e-mail), as well as the successful completion of the supplemental remedial activities documented in the Revised SFE Report, Arcadis recommends that no further action be conducted at the site. As a result, because all of the AOC requirements executed between the NYSDEC and Standex (Index #B8-0247-94-04) have been met, Arcadis, on behalf of Standex, requests that the AOC be terminated and that the site, which is presently listed as a Class 4 site under the New York State Inactive Hazardous

Date:
November 16, 2015

Contact:
William B. Popham

Phone:
585 662 4022

Email:
bill.popham@arcadis.com

Our ref:
B0083317.0000

Waste Site Registry (defined as a site that has been properly closed, but requires continual site management, consisting of operation, maintenance, and monitoring), be formally “delisted” from the Registry.

If you have any questions, please contact me at 585.662.4022.

Sincerely,

Arcadis

William B. Popham
Senior Vice President

Copies:
Ms. Stacey Constas, Standex International Corporation
Mr. Aaron Richardson, Arcadis

ARCADIS Design & Consultancy for natural and built assets

Standex International Corporation

REVISED SUPPLEMENTAL FINAL ENGINEERING REPORT

Former Roehlen Engraving Site
Henrietta, New York

November 2015

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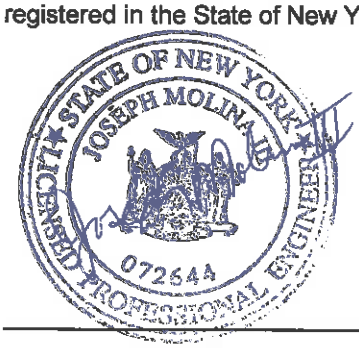
ACRONYMS AND ABBREVIATIONS

BASE	Building Assessment and Survey Evaluation
BBL	Blasland, Bouck & Lee, Inc.
CAMP	Community Air Monitoring Plan
CFC-11	trichlorofluoromethane
Consent Order	Administrative Order on Consent
FS	feasibility study
FS Report	*Feasibility Study Report*
HALRC	High Acres Landfill and Recycling Center
HASP	Health and Safety Plan
LNAPL	light non-aqueous phase liquid
LSL	Life Science Laboratories, Inc.
µg/L	micrograms per liter
mg/kg	milligrams per kilogram
mg/L	milligrams per liter
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
PCE	tetrachloroethene
PID	photoionization detector
ppm	parts per million
RCRA	Resource Conservation and Recovery Act
Revised SFE Report	Revised Supplemental Final Engineering Report
Revised SRD Work Plan	Supplemental Remedial Design Work Plan Addendum
RI	remedial investigation
RI Report	*Remedial Investigation Report*
ROD	Record of Decision
Roehlen	Roehlen Engraving
RSL	Regional Screening Level
site	former Roehlen Engraving site located at 701 Jefferson Road, Rochester, New York
SMP	Site Management Plan

SRD Work Plan	Supplemental Remedial Design Work Plan
Standex	Standex International Corporation
TCE	trichloroethene
TOGS	Technical and Operational Guidance Series
TWA	time-weighted average
µg/m^3	micrograms per cubic meter
USEPA	United States Environmental Protection Agency
VI	vapor intrusion
VOC	volatile organic compound
WM	Waste Management

CERTIFICATION STATEMENT

I certify that this document has been prepared in general conformance with the requirements of the Administrative Order on Consent (Index #B8-0247-94-04) entered into between the New York State Department of Environmental Conservation and Standex International Corporation (March 1995) for the development of this *Revised Supplemental Final Engineering Report* for the former Roehlen Engraving site located in Henrietta, New York. Furthermore, I certify that this *Revised Supplemental Final Engineering Report* was prepared by Arcadis under my signature and stamp as a Professional Engineer registered in the State of New York.



Joseph Molina III, P.E.

New York State P.E. No. 072644

11/13/15

Date

1 INTRODUCTION

On behalf of Standex International Corporation (Standex), Arcadis has prepared this *Revised Supplemental Final Engineering Report* (Revised SFE Report) to describe supplemental remedial activities conducted at the former Roehlen Engraving (Roehlen) site located at 701 Jefferson Road in Rochester, New York (site) (Figure 1). This Revised SFE Report has been prepared in accordance with the executed Administrative Order on Consent (Consent Order) between the New York State Department of Environmental Conservation (NYSDEC) and Standex (Index #B8-0247-94-04) (NYSDEC 1995) for the site (Site # 8-28-077), as well as the following documents and correspondence:

- Approved *Supplemental Remedial Design Work Plan* (SRD Work Plan) (Arcadis 2008a)
- NYSDEC letter dated August 26, 2008 and Arcadis' September 23, 2008 response letter (NYSDEC 2008a, 2008b, respectively) (Appendix A)
- Approved *Supplemental Remedial Design Work Plan Addendum* (Revised July 2009) (Revised SRD Work Plan) (Arcadis 2009)
- *Vapor Intrusion Sampling Work Plan* (Arcadis 2013)
- Subsequent correspondence between Arcadis and the NYSDEC

This Revised SFE Report summarizes the remedial activities completed at the site to:

1. Complete the excavation and offsite disposal of chromium-contaminated soils, as required by the Record of Decision (ROD) (NYSDEC 1994).
2. Complete excavation and disposal of the concrete slab and concrete containment pit wall and floor within and in close proximity to the former chrome plating room.
3. Conduct confirmatory soil sampling and analysis activities, as required by the NYSDEC.
4. Conduct confirmatory groundwater sampling and analysis activities, as required by the NYSDEC, as well as groundwater injection activities.
5. Conduct confirmatory soil vapor intrusion (VI) sampling and analysis activities, as required by the NYSDEC and New York State Department of Health (NYSDOH).

Appendix A includes NYSDEC approval of the above-referenced documents. Remedial activities that were presented in the approved work plans included the following:

- Removal of concrete and chromium-impacted soil beneath the former chrome plating room, with offsite disposal at approved facilities, with the objective of achieving the site-specific cleanup criteria of 35 milligrams per kilogram (mg/kg) established in the ROD (NYSDEC 1994).
- Collection and analysis of confirmatory soil samples to confirm that chromium concentrations remaining in the soil at the excavation limits are within acceptable limits.
- Backfilling the excavated areas and restoring the area to the pre-existing grade or, if desired, to a lower grade specified by the site owner that may lend itself to the future development of the site.

- Installation of one new groundwater monitoring well within the restored, former chrome plating room excavation area and collecting groundwater samples and analyzing for chromium and volatile organic compounds (VOCs).
- Installation of a soil vapor sampling probes area after completion of the excavation activities, and collecting soil vapor samples and analyzing for VOCs.
- Preparing reports documenting completion of each of the work plans, summarizing soil excavation activities, groundwater and soil vapor sampling and analysis activities, and soil VI sampling activities at the site.

1.1 Site Description and History

The site is located on the northern 4 acres of the 12.8-acre former Roehlen facility, and is bordered by several businesses. Figure 1 presents the location of the former Roehlen facility, and Figure 2 presents the pre-excavation site plan for the facility.

The former Roehlen facility was used in the manufacturing of embossing rolls (used for texturizing a wide variety of materials). The rolls were mill-engraved and, if necessary, electroplated with chrome to create a surface resistant to corrosion. The plate-cleaning, rinse, and chrome tanks associated with this process were previously located in the plating room at the southwestern corner of the manufacturing building. These tanks were contained inside a secondary containment area (plating pit) with a collection sump in the southwestern corner of the containment area. The plating procedure required using chromium plating solutions and muriatic acid. On occasion during past facility operations, carryover of these fluids, as a result of moving plates and rolls into and out of the plating area occurred in the containment area, as well as on the plating room floor. The containment area, which is approximately 15 feet long by 35 feet wide and approximately 11.5 feet deep, is constructed of filled concrete block walls with a parged surface and poured concrete floor. When the containment area was installed, there may have been a joint between the upper lip of the pit and the floor of the plating room. In 1992, the floor and curbing were sealed with a polymeric quartz containment system.

In 1988, Roehlen discovered a possible release of chromium from the plating room after installation of a hand-dug, shallow groundwater monitoring well (MW-1) located in the floor of the facility's plating pit. Roehlen voluntarily conducted a Phase I Assessment to evaluate soil and groundwater conditions at the facility. The Phase I Assessment revealed the presence of hexavalent chromium in groundwater and soils beneath the plating room floor and containment area. Hexavalent chromium concentrations detected in the groundwater ranged from 0.01 to 210 parts per million (ppm). Extraction procedure toxicity levels of hexavalent chromium measured in the soils outside the plating room floor and containment area ranged from 0.087 to 0.062 ppm (NYSDEC 1991).

Based on these findings, Roehlen negotiated a Consent Order with the NYSDEC, which was executed in March 1995. Prior to this, Roehlen retained Blasland, Bouck & Lee, Inc. (BBL) to conduct a remedial investigation/feasibility study (RI/FS) for the site. In 1993, BBL conducted the RI and FS in accordance with an NYSDEC-approved RI/FS Work Plan (Law Environmental 1991), with revised RI and FS documents being completed in 1994 (Remedial Investigation Report [RI Report] and Feasibility Study Report [FS Report]) (BBL 1994a, 1994b, respectively). Based on the recommendations contained in the

RI and FS Reports, the NYSDEC prepared a ROD for the site, dated March 1994, that identified the selected remedial alternative, which included:

- Excavation and offsite disposal of soils that exceed the site-specific soil cleanup level of 35 mg/kg of total chromium within the vadose zone.
- Installation and operation of a groundwater recovery system.
- Evaluation of the effectiveness of the existing wastewater treatment system to treat recovered groundwater.
- Long-term monitoring of site groundwater quality.

Roehlen retained BBL Environmental Services, Inc. (BBL's construction affiliate) to develop and implement a Remedial Design Work Plan addressing the remedial action activities to be conducted in accordance with the Consent Order (NYSDEC 1995). BBL prepared the *Remedial Design Work Plan* (BBL 1995), which was submitted to the NYSDEC and approved by the NYSDEC in a letter dated September 18, 1995. The remedial action activities specified in the *Remedial Design Work Plan* included removal of chromium-impacted soil from the site; however, the *Remedial Design Work Plan* did not include removal of chromium-impacted soil under the chrome plating room because this was an active manufacturing facility. As a result, the *Remedial Design Work Plan* included construction and operation of a groundwater collection system in the chrome plating area to address impacted groundwater at that location.

The soil removal and groundwater collection system installation activities were performed in accordance with the *Remedial Design Work Plan* (BBL 1995) in October 1995. Subsequent to the completion of the remedial action and installation of the groundwater collection system, BBL prepared a *Final Engineering Report Remedial Actions* (BBL 1996) that documented the completed remedial action activities.

The groundwater collection system operated until 2004 when its operation was terminated, as agreed to by the NYSDEC and documented in a letter to the NYSDEC from BBL dated August 3, 2004. While in operation, periodic groundwater sampling and operation and maintenance events were conducted at the site, the results of which were reported to the NYSDEC.

Based on discussions with the NYSDEC during a January 30, 2006 meeting, BBL informed the NYSDEC that it was Standex's intention to sell the property to a developer, who, upon acquiring the property, would demolish the building with the intent of redeveloping the property. As initially discussed with the NYSDEC in 1995, BBL also informed the NYSDEC that upon completion of demolition activities (when/if it occurred), Standex would remove chromium-impacted soils under the former chrome plating room that were inaccessible during the October 1995 remedial action activities. As a result of this meeting, the NYSDEC submitted a letter on April 26, 2006 (Appendix A), stating that the NYSDEC could not guarantee that the site will be delisted from the Registry of Inactive Hazardous Waste Sites without restrictions after any soil removal activities are completed within the former chrome plating room (NYSDEC 2006). However, based on the following assumptions:

- Soil excavation will be performed to remove chromium-impacted soils above the site-specific cleanup concentration of 35 mg/kg within the limited groundwater contamination plume.

- Follow-up groundwater sampling in the affected area will be conducted 3 months after the excavation is backfilled.

The NYSDEC provided the following possible outcomes:

1. If the soil remedial activities meet the cleanup goal and the residual groundwater contamination is below the NYSDEC's Technical and Operational Guidance Series (TOGS) 1.1.1 (NYSDEC 1998) standard for chromium and VOCs in groundwater, no further action is required and the site can be delisted without deed restrictions.
2. If the soil remedial activities achieve the site-specific cleanup criteria of 35 mg/kg for chromium and the residual VOC concentrations in groundwater are above the NYSDEC's TOGS 1.1.1 standards, the following two options would be available:
    a. "Any structure built over the affected area would require post-construction evaluation for VI and may require that buildings be constructed with a sub-slab mitigation system. A Site Management Plan (SMP) would be required to specify design requirements and operation of a sub-slab mitigation system and management of contaminated groundwater during future excavations in the affected area. Additionally, a deed restriction would be required prohibiting groundwater usage, incorporating the SMP, and requiring periodic certifications that the deed restrictions are in place and being implemented. The site can be delisted after these restrictions are in place."
    b. "Construction of occupied buildings would be prohibited within the affected area. An SMP would be required to address management of contaminated groundwater during future excavations in the affected areas. A deed restriction would be required, which incorporates the SMP, prohibits the use of groundwater, prohibits construction of occupied buildings in the affected area, and specifies periodic certifications that the deed restrictions are in place and being implemented. The site can be delisted after these restrictions are in place."
3. If the soil remedial activities achieve the site-specific cleanup criteria of 35 mg/kg for chromium and the residual chromium concentrations in groundwater are above the NYSDEC's TOGS 1.1.1 standards, but VOC concentrations in groundwater are below the NYSDEC's TOGS 1.1.1 standards, the following option would be available:
    a. "An SMP would be required for the affected area. The SMP would specify requirements for management of contaminated groundwater during future excavations in the affected area. A deed restriction would be required, which incorporates the SMP, prohibits the use of groundwater, and provides for periodic certifications that the deed restriction is in place. The site can be delisted after these restrictions are in place."

In addition to these remedial requirements, the NYSDEC also requested in their correspondence, dated August 26, 2008, that five soil vapor sampling probes be installed within the general location of the former chrome plating room area and sampled for VOCs.

1.2 Report Organization

Following this section (Section 1), this Revised SFE Report is organized into the following sections:

- *Section 2 – Project Organization and Responsibilities*: Provides a description of the parties involved with implementation of the supplemental remedial activities.
- *Section 3 – Supplemental Soil Remedial Activities*: Describes the supplemental remedial construction activities (i.e., soil removal) completed in 2008.
- *Section 4 – Groundwater Remedial Activities*: Describes the remedial activities completed following the 2008 excavation to address site groundwater.
- *Section 5 – Soil Vapor Monitoring*: Describes the sampling and analysis activities completed in 2010 to investigate soil vapor concerns.
- *Section 6 – Indoor Air and Soil Vapor Intrusion Monitoring Activities*: Describes the three rounds of indoor air and sub-slab soil vapor sampling conducted inside the restaurant that has been constructed at the site.
- *Section 7 – Site Closure*: Describes Arcadis' recommendation that no further action be conducted at the site.
- *Section 8 – References*: Lists references cited throughout this Revised SFE Report.

2 PROJECT ORGANIZATION AND RESPONSIBILITIES

This section describes the project organization and responsibilities of those who participated in the supplemental remedial activities for the site.

2.1 Responsible Party

In accordance with the Consent Order (NYSDEC 1995), Standex is responsible for implementation of the supplemental remedial activities for the site to achieve the remedial objectives.

2.2 Arcadis

Standex retained Arcadis to provide design/build services associated with this project, which includes the following responsibilities:

- Preparing work plans
- Interacting and communicating with the NYSDEC, as necessary, to obtain the NYSDEC's approval of work plans
- Implementing the approved work plans
- Providing construction management and obtaining the necessary documentation during the performance of the remedial action activities to confirm compliance with the approved work plans
- Interacting and communicating with the NYSDEC and Standex during the supplemental remedial action activities
- Preparing this Revised SFE Report

During implementation of the remedial action activities, Arcadis used various subcontractors to assist with specific site activities, which included the following:

- *Remedial Subcontractor* – Royal Environmental, Inc. provided labor and equipment to implement soil removal, backfilling, and restoration activities.
- *Offsite Analytical Laboratory* – Life Science Laboratories, Inc. (LSL) provided laboratory analysis of waste characterization soil and water samples, imported backfill soil samples, and confirmatory soil samples from the excavation. Columbia Analytical Services, Inc. provided laboratory analysis of the pre-excavation groundwater samples. TestAmerica, Inc. provided laboratory analysis of the soil vapor and indoor air samples.
- *Waste Management Subcontractor(s)* – Waste Technology Services, Inc. provided offsite transportation and disposal services for the impacted soil, concrete, and contaminated water generated at the site during the supplemental removal action activities.
- *Well Driller* – Nothnagle Drilling, Inc. provided groundwater monitoring well abandonment services.

2.3 New York State Department of Environmental Conservation

NYSDEC Region 8 served as the primary regulatory agency for this project and interacted and communicated with Standex and Arcadis to confirm compliance with the approved SRD Work Plan (Arcadis 2008a), as well as the ROD (NYSDEC 1994) and Consent Order (NYSDEC 1995).

3 SUPPLEMENTAL SOIL REMEDIAL ACTIVITIES

Supplemental remedial actions were conducted at the site in accordance with the SRD Work Plan (Arcadis 2008a), the NYSDEC comment letter (NYSDEC 2008a), and Arcadis' response to the NYSDEC comment letter (Arcadis 2008b) (Appendix A). The supplemental remedial action activities generally consisted of excavation and offsite disposal of chromium-impacted soil within the unsaturated zone below the chrome plating room area, as well as below the chrome plating room containment area. Abandonment of select groundwater monitoring wells was also completed. Figure 3 shows the final limits of excavation during implementation of the supplemental remedial activities, as well as the limits of excavation from the previous soil remedial action conducted at the site. Figure 4 shows the location of all confirmatory soil samples collected during the supplemental remedial action activities. Appendix B includes photographs of various stages of the soil and concrete removal and site restoration activities. Detailed information related to the supplemental remedial action activities is presented below.

3.1 Pre-Mobilization Activities

The following activities were completed prior to initiating supplemental remedial action activities at the site:

- Pre-excavation confirmatory sampling and analysis
- Waste characterization sampling and analysis and waste profile approvals
- Groundwater sampling and analysis to document pre-excavation conditions
- Sampling and analysis of general fill materials from Dolomite's Spencerport, New York quarry to confirm that the material was an acceptable backfill source for use at the site

These pre-mobilization activities are categorized and described in more detail below.

3.1.1 Pre-Excavation Confirmatory Sampling and Analysis

On June 2, 2008, Arcadis collected eight pre-excavation confirmatory soil samples from test pits excavated along (identified as SW-01 through SW-08) the perimeter of the anticipated limits of excavation, as established in the SRD Work Plan (Arcadis 2008a) for the shallow portion of the soil excavation (i.e., outside of the containment area). Test pits were excavated to 6 feet below existing grade (proposed depth of excavation in this area), and were horizontally located approximately 25 to 30 feet apart along the perimeter of the anticipated shallow excavation limits. Additional test pits and soil sampling outward from those initial test pits were completed, and the samples were held for possible future use to establish final excavation limits. At each test pit, a soil sample was collected at approximately 5.5 feet below existing grade and submitted to LSL for chromium analysis. The analytical results, presented in Appendix C and summarized in Table 1, were compared to the site-specific cleanup criteria of 35 mg/kg of chromium to determine the excavation limits. Two of these soil samples, SW-01 (41 mg/kg) and SW-02 (250 mg/kg), exceeded the site-specific cleanup criteria; the remaining six samples (SW-03 through SW-08) were below the site-specific cleanup criteria and were used to define the limits of excavation. Additional soil samples (SW-09 through SW-14) were also collected at this time, but were never submitted to LSL for analysis because they were not required to establish excavation limits.

On June 12, 2008, Arcadis collected an additional soil sample (SW-18) from approximately 5 feet east of sample location SW-02 to define the limit of excavation at that point. Additional soil samples (SW-15 through SW-17) were also collected from the northern portion of the former chrome plating room to further delineate the limits of contamination in that area. Data from these samples were below the site-specific cleanup criteria and were, therefore, used to define the northern, eastern, and southern walls of the excavation. An additional sample east of sample location SW-01 was not collected during this sampling event, as this area was inaccessible at that time. Delineation of the excavation area with confirmatory soil sampling at this location was completed at the time of the excavation and is described in Section 3.7.

As previously discussed with the NYSDEC, the collection of confirmatory sidewall soil samples along the western sidewall of the excavation area was not necessary, as this limit of the excavation would extend up to the eastern limit of the soil excavation completed in 1995, which had been backfilled with clean material.

3.1.2 Waste Characterization Sampling/Analysis and Waste Disposal Approval

Waste characterization samples for water, concrete, and soil were collected on June 2, 2008. The water sample was collected directly from accumulated water within the containment area. A representative composite concrete sample was collected from the concrete structures of the chrome plating room area. A mini excavator was utilized to collect composite soil samples representing the soil designated for offsite disposal from the former chrome plating room area. All samples were analyzed by LSL.

Analytical results for the accumulated water (Table 3) within the containment area (sample “Containment Pit-01”) and for water pumped from the excavation that temporarily stayed in the frac tank (sample “Frac Tank”) indicated that this water would need to be managed offsite as a Resource Conservation and Recovery Act (RCRA) hazardous waste due to a concentration of chromium (74 milligrams per liter [mg/L] and 63 mg/L, respectively) that exceeded the regulatory level (5 mg/L). Analytical results of the soil (sample WC-4) and concrete (sample WC-Concrete) (Table 4) analyses indicated that each of these wastes will be managed offsite as non-hazardous wastes.

Waste profiles for each waste stream, anticipated to be generated at the site during the supplemental remedial action activities, were completed and submitted with the applicable analytical data from the waste characterization sampling to the designated disposal facilities for approval. Appendix D presents the laboratory analytical results of the waste characterization sampling, and are summarized in Tables 3 and 4.

RCRA hazardous wastewater was disposed at the Envirite of Ohio facility located in Canton, Ohio. The chromium-impacted concrete and soil was disposed offsite as a non-hazardous waste at Waste Management’s (WM’s) High Acres Landfill and Recycling Center (HALRC), located in Perinton, New York.

3.1.3 Pre-Excavation Groundwater Sampling and Analysis

On August 11, 2008, as requested in the NYSDEC’s August 26, 2008 comment letter, under Item 7, (NYSDEC 2008a) (Appendix A), Arcadis collected groundwater samples from four existing monitoring wells (MW-2, MW-4, MW-7, and MW-18) at the site. At each location, groundwater samples were collected using low-flow sampling techniques, and the samples were submitted to Columbia Analytical

Services for chromium and VOC analysis. Analytical results were compared to New York State Groundwater Standards TOGS 1.1.1 and are presented in Table 5. Samples collected from MW-2 (6,250 micrograms per liter [µg/L] of chromium) and MW-7 (89 µg/L of chromium) exceeded the chromium standard (50 µg/L), and the sample collected from MW-7 (24 µg/L cis-1,2-dichloroethene) exceeded the standard for cis-1,2-dichloroethene (5 µg/L).

As a result of the deep soil excavation associated with the former containment area in the plating room, both monitoring wells MW-2 and MW-7 were removed as part of the excavation. The laboratory report for this analytical data is included in Appendix E. Groundwater quality results will be discussed in more detail in an addendum to this Revised SFE Report, which will be submitted upon receipt and review of the scheduled post-soil removal groundwater sampling, as discussed in Section 4.1 in this Revised SFE Report.

3.1.4 Sampling and Analysis of Imported Backfill Materials

Samples were collected from the proposed imported backfill source (Dolomite Products Co.'s Ogden Plant) on October 22, 2008, and submitted to LSL for analyses. The analytical results were compared to the NYSDEC's Technical and Administrative Guidance Memorandum No. 4046 recommended soil cleanup objectives to confirm that the material was suitable to be placed within excavated areas. These analytical results indicated that the material was acceptable for use as backfill at the site. Appendix F presents the results, and are summarized in Table 6.

3.2 Mobilization and Site Preparation Activities

As part of the mobilization activities, construction equipment and miscellaneous materials were mobilized to the site to prepare for supplemental remedial action activities. Several general site preparation activities were performed before intrusive soil excavation activities were initiated. The various site preparation activities are summarized below.

3.2.1 Utilities Stakeout

Registered underground utilities within or directly adjacent to the site were located by the appropriate utility companies. This location survey was accomplished by contacting Dig Safely New York prior to commencing excavation activities. No registered utilities were identified within the limits of the excavation area.

3.2.2 Locating Excavation Limits

Pre-excavation confirmatory soil samples that met the cleanup objectives for chromium were located on June 2 and June 12, 2008, and marked out by placing stakes in the ground to identify the location of each pre-excavation confirmatory sample location. This established the horizontal limits of the proposed excavation, with the exception of the area (east of sample SW -01) where additional post-excavation confirmatory soil sampling was still required. The stakes were labeled accordingly and maintained in the field during excavation activities.

3.2.3 Site Security

To deter unauthorized access to the work area, temporary high-visibility orange construction fencing was installed along the perimeter of the work area during all remedial work activities. The security fencing was maintained for the duration of the supplemental remedial actions.

3.3 Wastewater Management

Based on prior analytical results, on November 10, 2008, just prior to the initiation of soil removal activities within the former chrome plating room area, approximately 22,800 gallons of accumulated wastewater within the containment area was pumped directly into tank trailers for offsite disposal. The water was pumped and transported by Envirite to their Canton, Ohio facility for treatment as a RCRA hazardous waste (D007).

During soil remedial activities within the containment area, additional groundwater and accumulated stormwater was generated and pumped to a temporary storage tank (frac tank) staged at the site. Approximately 7,370 gallons of additional water was generated over the course of the soil remedial activities. As a result, a waste characterization water sample was collected on November 18, 2008. The analytical results for this sample indicated that the additional water generated would also be managed as a RCRA hazardous waste due to the concentration of chromium (63,000 µg/L).

On December 4, 2008, this wastewater was pumped directly into tank trailers. The temporary storage tank was thoroughly cleaned using a high pressure steam cleaner before being demobilized from the site. The wash water from this decontamination process was also pumped to the tank trailers and ultimately transported and disposed offsite to Envirite's Canton, Ohio facility for treatment as a RCRA hazardous waste.

Appendix G includes a summary of all water shipments disposed offsite, as well as copies of completed manifests and certificates of disposal.

3.4 Monitoring Well Abandonment

On November 10 and 11, 2008, select existing monitoring/recovery wells at the site, as approved by the NYSDEC, were decommissioned in accordance with the Groundwater Monitoring Well Decommissioning Procedures (NYSDEC 2003). As discussed with the NYSDEC, monitoring wells MW-4 and MW-18 were left in place for potential future monitoring. Of the 27 existing monitoring/recovery wells, 16 were decommissioned. Nine monitoring/recovery wells could not be located due to demolition activities; however, three of these nine wells (MW-1, MW-5, and RW-2) were located within the excavation limits and were ultimately removed during excavation activities.

3.5 Soil and Concrete Excavation

3.5.1 Contaminated Soil Beneath Slab

On November 10, 2008, Arcadis mobilized equipment and materials to the site to implement the chromium-impacted soil excavation portion of the approved SRD Work Plan (Arcadis 2008a). A CAT 330 excavator and demolition ball were used to separate and size concrete from areas outside of the containment area. On November 11, 2008, Arcadis began direct-loading concrete, as well as soil mixed

with sized concrete into transport vehicles for offsite transportation and disposal. After all surface concrete had been removed from the areas outside of the containment area, soil beneath the former concrete floor continued to be excavated and loaded for offsite transportation and disposal.

The northern, southern, and western limits of the soil excavation outside of the containment area was completed to approximately 6 (western side) to 7 (eastern side) feet below existing grade, to the limits established by the pre-excavation confirmatory soil sampling described in Section 3.1.1, and to the limits of the 1995 soil excavation, and as shown on Figure 3. At the southeastern corner of the excavation area, where previously completed soil sampling did not confirm the excavation limits (i.e., east of sample SW-01), additional confirmatory sampling was conducted (as described in Section 3.7). As previously discussed with the NYSDEC, the western limit of the excavation was considered confirmed by visual observation that a change from native material to the imported fill material placed during the soil excavation completed in 1995 was clearly encountered. As excavation activities were completed, confirmatory soil samples were collected from the bottom of the excavation to confirm that the cleanup objectives had been achieved at the vertical limits of excavation. At one location, on the eastern side of the containment area, the confirmatory bottom sample (B-01 – 51.0 mg/kg of chromium) indicated that the cleanup objectives had not been reached. At this location, an additional 12 inches of soil was removed, and an additional confirmatory sample (B-06) was collected. The analytical result for this sample (B-06 – 20.0 mg/kg of chromium) was below the cleanup criteria; therefore, no additional excavation was required in this area.

On November 12, 2008, additional excavation was completed along the former west wall of the building, north of the main excavation limits. This additional excavation was completed to remove soil at the former building foundation along the extent of the 1995 soil excavation. At the northern end of this additional excavation, traces of a light non-aqueous phase liquid (LNAPL) and staining within the soil and standing water was observed within the excavation at a location to the east at approximately 3 feet below existing grade. At the request of the NYSDEC, both the water and the stained soil (west wall) were sampled and analyzed for VOCs. Based on these analytical results, additional excavation was completed to remove all visual LNAPL and stained soil at this location. With the approval of the NYSDEC's onsite representative, further confirmatory samples were not required at this location. Based on visual observation to confirm that all impacts (LNAPL and stained soil) were removed from this area, no additional confirmatory samples were required by the NYSDEC. The final limits of excavation, including this additional excavation, are shown on Figure 3. Table 7 presents a summary of the analytical results.

3.5.2 Former Containment Area

Excavation of the containment area began on November 14, 2008, by removing the block walls and approximately 1 foot of soil, in a horizontal direction, beyond the block walls. A demolition ball was then used to size and remove the concrete floor of the containment area. The sized concrete, as well as approximately 1 foot of soil beneath the concrete floor, was then excavated and removed. As described in Section 3.7, post-excavation confirmatory sampling indicated that additional excavation was required from the eastern and southern sidewalls, as well as from the southern half of the bottom of the excavation. Additional excavation and sampling continued between November 17 and November 24, 2008, until soil samples from the excavation limits confirmed that cleanup objectives had been achieved. This confirmatory soil sampling is discussed in Section 3.7.

A total of 1,898.42 tons of soil (with sized concrete) and 423.82 tons of sized concrete were removed from the site and disposed offsite at WM's HALRC facility. Appendix G includes a summary of all shipments of soil and concrete for offsite disposal, as well as completed manifests and certificates of disposal.

3.6 Offsite Transportation and Disposal

All wastewater generated during the soil excavation was transported and disposed offsite as a RCRA hazardous waste (D007) at Envirite's Canton, Ohio facility. All concrete and soil (with sized concrete) generated during the soil and concrete removal activities discussed in this Revised SFE Report were transported and disposed offsite as a non-hazardous waste at WM's HALRC facility.

After each solid waste transport vehicle was loaded, a canvas tarpaulin was placed over the top of the container and secured. Prior to exiting the site, either a RCRA hazardous waste manifest (for liquid materials) or a non-hazardous waste manifest (for soil and concrete) was completed and signed for each transport vehicle, the hauling permit was verified, and the appropriate placards/labels were affixed to the transport vehicles.

3.7 Post-Excavation Confirmatory Soil Sampling and Analysis

As described in Section 3.1.1, pre-excavation confirmatory soil samples (SW-01 through SW-08 and SW-15 through SW-18) were collected prior to the initiation of excavation activities, whereas post-excavation confirmatory soil samples (SW-20 through SW-27 and B-01 through B-13) were collected during excavation activities. The pre-excavation confirmatory sampling delineated the horizontal limits of the shallow excavation, outside of the containment area, with the exception of the area east of sample SW-01.

Sidewall samples (both pre-excavation and post-excavation), to determine horizontal limits, were collected at a minimum frequency of one sample for every 30 linear feet of sidewall, and bottom samples to determine vertical limits were collected at a minimum frequency of one sample for every 900 square feet of excavation. All confirmatory soil samples were submitted to LSL for chromium analysis, and the analytical results were compared to the site-specific cleanup criteria for chromium (35 mg/kg). The concentrations indicated in parentheses in this section represent the chromium concentration for the sample indicated.

3.7.1 Former Chrome Room Area Excavation

As shown on Figure 4, sidewall sample SW-20 was collected approximately 10 feet outside of sample SW-01 to horizontally delineate this area of the shallow excavation, which had not been completely delineated during the pre-mobilization confirmatory soil sampling, as described in Section 3.1.1. Because the chromium concentration for sidewall sample SW-20 (390 mg/kg) exceeded the site-specific cleanup criteria (35 mg/kg), additional soil was excavated and sidewall sample SW-21 was collected at the new excavation limit (approximately 5 feet outside of sample SW-20). The analytical result for sidewall sample SW-21 (26 mg/kg) indicated that the site-specific cleanup criteria had been achieved at this location; therefore, the shallow excavation had been completely delineated horizontally.

Bottom samples B-01 through B-05 were collected at the locations shown on Figure 4 to confirm that the vertical limits of the shallow excavation had been achieved. Bottom samples B-2 through B-4 were below the cleanup objective of 35 mg/kg. Because the chromium concentration for bottom sample B-01 (51 mg/kg) exceeded the site-specific cleanup criteria, this area was excavated an additional 1 foot vertically and resampled (B-06). The analytical results for bottom sample B-06 was 20 mg/kg, which is below the cleanup objective. Laboratory analytical results for bottom sample B-05 reported a chromium concentration of 37.0 mg/kg. However, after discussing these results with the NYSDEC, it was determined by the NYSDEC that the soil removal in this location was adequate to satisfy the intentions of the cleanup objective for the site.

3.7.2 Former Chrome Room Containment Area Excavation

Soil samples SW-22 through SW-27 were collected from the sidewalls of the deep (i.e., containment area) excavation, at the locations indicated on Figure 4, to confirm that the horizontal limits of the deep excavation had been achieved. Analysis of sidewall soil samples SW-23 (60 mg/kg) and SW-25 (47 mg/kg) for chromium exceeded the site-specific cleanup criteria. Therefore, excavation of the eastern sidewall and the southern sidewall continued to the east (approximately 2 feet) and the south (approximately 6 feet) to remove the additional soil (SW-23 and SW-25 locations). Sidewall soil samples SW-26 and SW-27 were then collected from the eastern and southern sidewalls, respectively, and analyzed for chromium for confirmation purposes. Post-excavation sidewall soil samples SW-22 (21 mg/kg), SW-24 (21 mg/kg), SW-26 (21 mg/kg), and SW-27 (22 mg/kg) represent the final excavation limits of the deep containment pit excavation confirming that the cleanup objective for chromium (35 mg/kg) was achieved.

Bottom samples B-07 and B-08 were collected from the base of the northern and southern halves, respectively, of the containment area excavation. The analytical result for bottom sample B-07 (19 mg/kg) indicated that the northern half of the containment area excavation had been vertically delineated at approximately 13 feet below existing grade. The analytical result for bottom sample B-08 (64 mg/kg) exceeded the site-specific cleanup criteria; therefore, an additional 1 foot of soil was excavated and removed from the southern half of the containment area excavation, and an additional bottom sample (B-09) was collected. Because the analytical result for bottom sample B-09 (190 mg/kg) also failed to meet the cleanup criteria, an additional 1 foot of soil was excavated, and bottom sample B-10 was collected. The analytical result for bottom sample B-10 (160 mg/kg) also exceeded the site-specific cleanup criteria; therefore, further excavation was required. After removing an additional 1 foot of soil, bottom sample B-11 (56 mg/kg) was collected. The analytical result for bottom sample B-11 again failed to meet the site-specific cleanup criteria. As a result, an additional 2 feet of soil was then excavated and removed, with the bottom of the excavation now at approximately 18 feet below existing grade. At this point, a bottom sample (B-12) was collected and a test pit was excavated an additional 3 feet within the bottom and another soil bottom sample (assessment) (B-13) was collected. The analytical results for bottom samples B-12 (17 mg/kg) and B-13 (26 mg/kg) confirmed that the cleanup criteria was achieved at approximately 18 feet below grade, and therefore, excavation activities were complete and no further excavation was conducted.

The locations of all confirmatory soil samples are shown on Figure 4. Analytical results for confirmatory sidewall and bottom samples are summarized in Tables 1 and 2, respectively. Each of these tables

include the depth below ground surface of each soil sample. For consistency, the “ground surface” used to obtain these depths was an elevation equal to the concrete slab of the former chrome plating room. Appendix C includes the analytical laboratory reports with validation results.

3.8 Air Monitoring Plan

Air monitoring was performed at the site to evaluate the potential for worker exposure and contaminant migration from the work zone. Air monitoring activities were performed in accordance with the procedures specified in the approved SRD Work Plan (Arcadis 2008a), the Health and Safety Plan (HASP), and the Community Air Monitoring Plan (CAMP) (Appendix B and E, respectively, of the approved SRD Work Plan).

3.8.1 Airborne Particulate Monitoring

Continuous particulate dust monitoring was performed in accordance with the SRD Work Plan (Arcadis 2008a). Dustrak TSI 8520 monitors were used at discrete onsite monitoring stations: one upwind of the site perimeter and two downwind of the work activities at the site perimeter. The particulate meters were positioned such that the sample inlet was located at a height approximating the breathing zone and provided a continuous readable particulate dust concentration. A 5-minute time-weighted average (TWA) was also recorded for each meter and is presented in Appendix H.

Locations of the three particulate meters were established each day, prior to commencing site activities, depending on the predominant wind direction at the start of the day’s activities and relocated, as necessary, to maintain their respective positions (i.e., upwind or downwind).

On one occasion, at approximately 4:05 pm on November 11, 2008, the recorded TWA dust reading at a downwind location was above the particulate action level of 150 micrograms per cubic meter ($\mu g/m^3$) greater than the upwind reading. Upon this detection, site activities were halted, a cause for the detection was investigated, and upon not finding an apparent cause, site activities resumed. An evaluation of the air monitoring instrument was conducted and the instrument appeared to be functioning properly. No exceedances occurred at the other downwind monitoring location at the time of this single exceedance. Following this incident, site activities were inspected, and no source of potential fugitive dust was observed. No other incidents of elevated dust readings were observed during this project.

3.8.2 Airborne Volatile Organic Compound Monitoring

Continuous VOC monitoring was conducted during intrusive activities in accordance with the SRD Work Plan (Arcadis 2008a). Monitoring was accomplished by mounting RAE Systems Minirae 2000 photoionization detectors (PIDs) at discrete onsite monitoring stations: one upwind of the site perimeter and two downwind of work activities at the site perimeter. The PIDs were positioned such that the sample inlet was located at a height approximating the breathing zone and provided a continuous readable total VOC concentration, and monitored airborne organic compounds that had an ionization potential within the limits of the PID lamp, including constituents classified as VOCs and semivolatile organic compounds. A 5-minute TWA was also recorded for each PID and is presented in Appendix H.

Locations of the three PIDs were established each day, prior to commencing site activities, depending on the predominant wind direction at the start of the day's activities, and relocated, as necessary, to maintain their respective positions (i.e., upwind or downwind).

No exceedances of the action levels presented in the HASP or CAMP were observed.

3.9 Backfilling and Restoration

After the final limits of excavation had been reached and the cleanup objectives achieved, the excavation area was backfilled. Backfill material was supplied by a commercial gravel pit. The backfill material was placed and compacted in lifts of approximately 12 inches. Approximately 1,760 tons of backfill was imported and placed at the site.

4 GROUNDWATER REMEDIAL ACTIVITIES

Groundwater remedial actions were conducted at the site in accordance with the SRD Work Plan (Arcadis 2008a) and the Revised SRD Work Plan (Arcadis 2009). Following the 2008 excavation, groundwater monitoring activities (including installation and sampling of new monitoring wells) were conducted. Results of these monitoring activities necessitated groundwater remedial action activities, which consisted of injection of an organic carbon solution to facilitate bioprecipitation of hexavalent chromium in groundwater. Detailed information related to the groundwater remedial action activities is presented below.

4.1 Post-2008 Excavation Groundwater Monitoring

Arcadis mobilized to the site in February 2009 to install a new groundwater monitoring well (MW-26) within the footprint of the deepest portion of the 2008 excavation area (Figure 5). Following development of MW-26, groundwater samples were collected from MW-26, as well as from existing monitoring wells MW-4 and MW-18. All samples were submitted to LSL, located in Syracuse, New York, for total chromium and VOC analysis.

Analytical results of the groundwater samples (Table 8 and Figure 6) indicated that chromium (16,000 µg/L) and trichloroethene (TCE) (5.31 µg/L) impacts were present at monitoring well MW-26 above their respective NYSDEC TOGS Ambient Water Quality Standards and Guidance Values (chromium = 50 µg/L; TCE = 5 µg/L). At monitoring wells MW-4 and MW-18, chromium and VOCs were not present above the NYSDEC TOGS Guidance Values.

In April 2009, Arcadis re-mobilized to the site to collect additional groundwater samples from monitoring well MW-26 to determine if the chromium present was hexavalent or trivalent chromium. At the same time, additional samples were collected from monitoring wells MW-4 and MW-18, and temporary wells were installed to allow groundwater samples to be collected from the area surrounding the 2008 excavation. All samples were analyzed for both hexavalent and total chromium.

Analytical results of this investigation (Table 9 and Figure 7) indicated that both total chromium and hexavalent chromium concentrations were above their respective NYSDEC TOGS standard (50 µg/L for both compounds) at monitoring well MW-26 and test well TW-4. Appendix I provides the complete laboratory results for each sampling event.

The combined results of the February and April 2009 groundwater sampling events indicated that, following the 2008 excavation activities, hexavalent chromium was present in concentrations exceeding the NYSDEC TOGS value of 50 µg/L. The concentration of hexavalent chromium observed at monitoring well MW-26 ranged from 12,000 µg/L (March 2009) to 2,400 µg/L (April 2009), and the concentration observed at test well TW-4 was 3,500 µg/L (April 2009). In addition, a low-level concentration of TCE (5.32 µg/L) was also detected at MW-26, in excess of the NYSDEC TOGS value of 5 µg/L.

4.2 In-Situ Anaerobic Bioprecipitation

Based on the groundwater monitoring results presented above, as proposed in the NYSDEC-approved Revised SRD Work Plan (Arcadis 2009), Arcadis implemented an in-situ anaerobic bioprecipitation via

injection of a dilute organic carbon solution to facilitate remediation of hexavalent chromium in groundwater.

In August 2009, two injection wells (IW-1 and IW-2) and one new monitoring well (MW-27) were installed at the site (Figure 5). New monitoring well MW-27 was located in the approximate location of test well TW-4, and the injection wells (IW-1 and IW-2) were located adjacent to monitoring wells MW-26 and MW-27, respectively.

Following well development, Arcadis began gravity injection of a dilute organic carbon (5% molasses) solution at injection wells IW-1 and IW-2. After observing that the gravity injection process was not achieving the desired injection rate, 11 temporary injection points were installed around the treatment area (i.e., the area surrounding monitoring wells MW-26 and MW-27) (Figure 5). The organic carbon solution was then injected via a pump at each injection point location. Using the pump injection, 5,800 gallons of organic carbon solution was injected into the treatment area, with all injection activities being completed on September 5, 2009.

4.3 Post-Injection Monitoring

As detailed in the Revised SRD Work Plan (Arcadis 2009), groundwater samples were scheduled to be collected at a frequency of 1, 4, 8, and 12 months after the injection activities had been completed. As discussed in Arcadis' April 2, 2010 letter to the NYSDEC, the 8-month sampling event was moved up by 1 month to coincide with a soil vapor sampling event, which is discussed later herein. During each of these groundwater sampling events, groundwater samples were collected, in accordance with the NYSDEC-approved SRD Work Plan (Arcadis 2009), from monitoring wells MW-26 and MW-27 and analyzed for VOCs, hexavalent chromium, and total chromium.

As indicated by the September 2010 sampling event, following the organic carbon injection activities, hexavalent chromium has decreased to a non-detectable concentration at monitoring wells MW-26 and MW-27 (same location as the former TW-4 location). The concentration of TCE at MW-26 initially increased to a concentration of 10.4 µg/L (October 2009) immediately following the organic carbon injection, then steadily decreased to a concentration of 1.30 µg/L observed during the September 2010 sampling event. Increased concentrations of other VOCs, including cis-1,2-dichloroethene, acetone, 2-butanone, and toluene, were observed at MW-26, which are further discussed below:

- The increase of cis-1,2-dichloroethene is not unexpected given that this is a daughter product generated through the degradation of TCE, which has been enhanced by the organic carbon injection activities.
- The one-time increase of acetone (95.4 µg/L detected in January 2010) is an anomaly and is a common laboratory contaminant.
- The increase of 2-butanone and toluene concentrations (which are not site constituents of concern) coincided with the installation of a roadway around monitoring well MW-26. During the installation of the roadway, the protective surface cover for MW-26 was pushed downward onto the "J-plug" that seals the well, causing the "J-plug" to be crushed. Without the protective seal of the "J-plug" in place, contaminants may have been allowed to enter the well via surface-water infiltration from an unknown

source. After discovery of the crushed “J-plug,” the polyvinyl chloride riser was cut down to a lower elevation and a new seal cap was installed.

No NYSDEC TOGS values were exceeded for VOCs either before or after the injection activities at monitoring well MW-27.

4.4 Groundwater Monitoring Conclusions and Recommendations

Results of the groundwater sampling conducted following the 2008 excavation activities indicate that the organic carbon injection activities were effective in reducing the concentration of hexavalent chromium to below NYSDEC TOGS values.

The only pre-injection VOC exceeding guidance values was TCE, which has also been reduced to below NYSDEC TOGS values following the injection activities.

The subsequent increase in other VOCs observed during the groundwater sampling is believed to be either an anomaly (acetone), the result of surface-water infiltration (2-butanone and toluene), or the direct result of the enhanced degradation of TCE (cis-1,2-dichloroethene). The concentrations of acetone, 2-butanone, and toluene observed during the last round of groundwater sampling are below their respective NYSDEC TOGS values; therefore, no further sampling is recommended.

The increasing concentrations of cis-1,2-dichloroethene, in combination with the decreasing concentrations of TCE observed following the injection activities, are likely the result of TCE degradation, which is expected to continue until complete degradation of TCE, as well as cis-1,2-dichloroethene, is achieved. Therefore, no further groundwater sampling is recommended.

5 SOIL VAPOR MONITORING

During the February 2009 groundwater sampling event, as requested by the NYSDEC, Arcadis attempted to collect five soil vapor samples. However, soil vapor samples could not be collected at that time due to a high groundwater table (less than 2 feet below ground surface). As discussed with the NYSDEC at that time, it was determined that soil vapor sampling would be re-attempted when the water table was lower and after the organic carbon injections were implemented.

After the organic carbon injection activities were completed, a site meeting was conducted with representatives of Arcadis, the NYSDEC, and NYSDOH to discuss the schedule and location for the collection of soil vapor samples. As described in Arcadis' April 2, 2010 letter to the NYSDEC, a sampling schedule was agreed to and included the collection of two samples, one north and one south of the 2008 excavation area.

5.1 Soil Vapor Sampling

On April 16, 2010, Arcadis collected two soil vapor samples, one collected north (SV-N-1) and one collected south (SV-S-1) of the 2008 excavation area (Figure 5) and submitted to TestAmerica, Inc.'s Burlington, Vermont laboratory for VOC analysis.

The preliminary analytical results were presented to the NYSDEC in an e-mail dated May 19, 2010. Based on their review of these results, the NYSDEC responded with a letter dated June 3, 2010, requesting additional soil vapor sampling at the onsite restaurant that had been constructed at the site due to the detection of site-related VOCs in the soil vapor samples collected in April 2010.

As described in a letter dated June 23, 2010, Arcadis proposed to collect a sample at a point closer to, but not inside of, the onsite restaurant, as well as re-sampling near the SV-S-1 sample location. As a result, in September 2010, Arcadis collected a second set of soil vapor samples (SV-N-2 and SV-S-2) at the locations shown on Figure 5. All of the soil vapor sampling was conducted in accordance with the procedures detailed in the NYSDEC-approved SRD Work Plan (Arcadis 2008a). The samples were submitted to TestAmerica, Inc.'s Burlington, Vermont laboratory for VOC analysis.

5.2 Soil Vapor Sampling Results

Soil vapor analytical data (Table 10 and Figure 8) for both sampling events has been compared to United States Environmental Protection Agency (USEPA) Regional Screening Levels (RSLs) for Industrial Air (http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm) adjusted for comparison to soil gas values. Consistent with the USEPA (2002) guidance, indoor air screening levels were converted to soil vapor screening levels using a conservative attenuation factor of 0.1:

1. The only compound detected at the soil vapor sampling location immediately adjacent to the building (SV-N-2) above the calculated USEPA soil vapor RSL was chloroform (10 µg/m^3), which was only slightly above the RSL of 5 µg/m^3. It should be noted that chloroform is often detected in soil vapor related to the public water supply, and the results are not related to any historical site uses and is not a site constituent of concern. All of the other compounds in this sample were detected below the calculated USEPA soil vapor RSLs, indicating that all soil vapor results are below levels that are of a potential concern for indoor air.

2. At SV-N-2, TCE was the only VOC detected that is addressed in the NYSDOH's Guidance for Evaluating Soil VI in New York State (i.e., Matrix 1 and 2). However, the concentration of TCE (2.9 µg/m^3) detected in sample SV-N-2 was below the 5 µg/m^3 threshold concentration listed in Soil Vapor/Indoor Air Matrix 1 of the NYSDOH guidance, indicating VI is not of concern.
3. For the SV-S-2 sample collected on the southern side of the 2008 excavation area, the only compounds detected above the calculated USEPA soil vapor RSLs were benzene (31 µg/m^3) and chloroform (30 µg/m^3). Both benzene and chloroform are associated with many common household products and are not related to site activities and/or are not site constituents of concern. In addition, the results are not significantly greater than their screening levels of 16 µg/m^3 and 5 µg/m^3, respectively.
4. The concentrations of trichlorofluoromethane (CFC-11) detected in sample SV-S-1 (67,000 µg/m^3) and SV-S-2 (10,000 µg/m^3) indicate that this compound is present near the sample locations. However, CFC-11 is not a site constituent of concern and is not related to any historical site activities. Additionally, the lack of a current or planned building structure in this area would indicate that the screening levels used here may be overly conservative for this location.

Appendix J provides the complete laboratory results for each sampling event.

5.3 Soil Vapor Monitoring Conclusions and Recommendations

The soil vapor monitoring results represent worst-case conditions because the samples were collected approximately 1 foot above the groundwater table. Studies have shown that samples collected directly above the water table are expected to be most representative of sub-slab soil gas results (DiGiulio and Cody 2006).

There is no existing or historical evidence of contaminants of concern or source areas under the footprint of the existing building. The source of VOCs at the site was removed during the 2008 excavation activities at the site, and any low-levels of contaminants remaining were treated by the organic carbon injection activities that were completed in 2009, as evidenced by the declining concentration of TCE observed in the groundwater analytical results.

When viewing multiple lines of evidence as a whole, the soil vapor assessment conducted at the site indicates that site-related contaminants are not present in soil vapor immediately adjacent to the current building foundation.

The soil vapor assessment conducted on the southern side of the property also indicates that site-related contaminants are not present at concentrations that would require further investigation. Therefore, no further soil vapor sampling is warranted.

6 INDOOR AIR AND SOIL VAPOR INTRUSION MONITORING ACTIVITIES

A complete soil VI investigation was requested to be performed at the Chili's Restaurant at the site in the NYSDEC's August 15, 2011 letter. Three VI sampling events were conducted (May 7, 2012, February 25, 2013, and March 11, 2014) at the site, each consisting of collecting paired sub-slab soil vapor and indoor air samples within the Chili's Restaurant. Arcadis performed the 2012 and 2014 sampling events, while Benchmark Environmental Engineering & Science, PLLC performed the 2013 sampling event, with oversight by Arcadis. All sub-slab soil vapor and indoor air sampling activities were conducted in accordance with the NYSDOH VI guidance (2006). Details of the sampling events, previously reported to the NYSDEC and NYSDOH in the Sub-Slab Soil Vapor and Indoor Air Sampling Reports, dated August 8, 2012, May 1, 2013, and April 29, 2014, are provided below.

6.1 Indoor Air and Soil Vapor Intrusion Sample Methods

For each sampling event, two soil vapor sampling points were installed through the concrete slab: one sampling point was established in the general seating area of the restaurant and the second sampling point was set in the office area. The relative sampling locations (which were approved by the NYSDOH) were reused for each sampling event, with the sub-slab sampling points located within 6 inches of the sampling points used during the previous sampling events.

At both locations, the soil vapor points were installed by drilling a ½-inch hole through the concrete slab and into the sub-slab material, with the drill cuttings being immediately removed with a whisk broom. Teflon® tubing, ¼-inch in diameter, was inserted approximately 2 inches below the concrete slab, and the gap between the tubing and the hole was plugged with VOC-free modeling clay. The other end of the tubing was connected to a Swagelok T-fitting, with a flow controller (with vacuum gauge) and SUMMA® canister.

A shroud was placed over the sample point and filled with a helium tracer gas. Using a graduated syringe, the Teflon® tubing was purged through the T-fitting. The purged air was collected and screened for both helium and VOCs. A field measurement of helium concentration in the purge confirmed that the sampling point was not leaking and sample collection could begin. The SUMMA® canister valve was opened and the time and initial vacuum was recorded. Both the sub-slab and a paired indoor air sample (located adjacent to the sub-slab sampling point) were started at the same time.

Approximately 22 to 23 hours after sampling began, monitoring of the vacuum began on all SUMMA® canisters. Once the vacuum on any canister dropped below 6 inches of mercury, or after 24 hours of sample collection (whichever occurred first), the SUMMA® canister valve was closed, terminating the sample collection. The time and final vacuum, as well as other pertinent information, were recorded on sampling logs (see Appendix K).

A chain of custody was completed, and the samples were submitted to an analytical laboratory for analysis of VOCs via USEPA Method TO-15.

6.2 Indoor Air and Soil Vapor Intrusion Results

Table 11 and Figure 9 present the indoor air and sub-slab soil vapor analytical results for the 2012, 2013, and 2014 sampling events. Appendix J provides the complete laboratory results for each sampling event, with the results being compared to the NYSDOH Air Guidelines and the 90th percentile background levels from the USEPA Building Assessment and Survey Evaluation (BASE) database, as outlined in the NYSDOH VI guidance (2006) (Table 1).

The NYSDOH VI guidance (2006) presents indoor air guidelines for methylene chloride, tetrachloroethene (PCE), and TCE. None of these constituents exceeded air guideline values for indoor air. In addition, with the exception of chloroform, all detected constituents were below indoor air background levels.

Consistent with the NYSDOH VI guidance (2006), indoor air and sub-slab soil vapor data were evaluated together using chemical-specific matrices. The matrices recommend actions to be taken, if necessary, based on indoor air and sub-slab soil vapor results (NYSDOH 2006). Matrix 1 provides recommendations for carbon tetrachloride, TCE, and vinyl chloride, while Matrix 2 provides recommendations for 1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, and PCE. Based on detected concentrations of TCE in sub-slab soil vapor, the matrix comparison of indoor air and sub-slab soil vapor data indicate that monitoring/mitigation was the recommended action for the office area. For all other chemicals and locations, the matrix result is to take no further action (Table 12).

6.3 Indoor Air and Soil Vapor Intrusion Monitoring Conclusions and Recommendations

Three rounds of sub-slab soil vapor and indoor air samples (over three heating seasons) have been collected from two locations within the Chili's Restaurant and have been compared to NYSDOH air guidelines and background values from the USEPA BASE database. Based on this comparison, the following conclusions can be made:

- Indoor air results for methylene chloride, TCE, and PCE have remained below both the NYSDOH air guidelines and background levels during all three sampling events.
- Sub-slab and indoor air concentrations of TCE have remained consistently low over the three sampling events.

As discussed with the NYSDEC and NYSDOH and documented in the April 29, 2014 Sub-Slab Soil Vapor and Indoor Air Sampling Report, and consistent with the NYSDOH's Stable Plume Monitoring Decisions – Matrix 1 Structure (Appendix L), it is our understanding, based on the following, that no further monitoring will be required:

- Previous remedial actions have removed the source area, and historical data indicate that groundwater quality is continually improving.
- Three consecutive sampling events (in different heating seasons) where sub-slab and indoor air data are consistent (sub-slab concentrations less than 200 µg/m^3 and indoor air concentrations less than 0.5 µg/m^3).
- There are no building or site-specific conditions that warrant additional monitoring.

7 SITE CLOSURE

Based on the successful implementation of the SRD Work Plan and Revised SRD Work Plan (Arcadis 2008a, 2009, respectively), as well as the satisfactory results (as approved in the NYSDOH's e-mail of April 24, 2015) of the VI investigation, Arcadis recommends that no further action be conducted at this site. As a result, because all of the Consent Order requirements executed between the NYSDEC and Standex (Index #B8-0247-94-04) have been met, Arcadis, on behalf of Standex, requests that the Consent Order be terminated and that this site, which is presently listed as a Class 4 site under the New York State Inactive Hazardous Waste Site Registry (defined as a site that has been properly closed, but requires continual site management, consisting of operation, maintenance, and monitoring), be formally "delisted" from the Registry. With your approval, Arcadis will initiate "field" closure activities by formally abandoning the two groundwater monitoring wells that remain onsite.

8 REFERENCES

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TABLES

Table 1
Analytical Summary of Confirmatory Sidewall Samples

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Location ID:	Site-	SW-01	SW-02	SW-03	SW-04	SW-05	SW-06	SW-07	SW-08	SW-15	SW-16
Sample Depth (bgs):	Specific	5.5'	5.5'	5.5'	5.5'	5.5'	5.5'	5.5'	5.5'	5.5'	5.5'
Date Collected:	Cleanup	06/02/08	06/02/08	06/02/08	06/02/08	06/02/08	06/02/08	06/02/08	06/02/08	06/12/08	06/12/08
Units:	Criteria	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Inorganics											
Chromium	35.0	41.0	250	31.0	26.0 [28.0]	33.0	26.0	27.0	22.0	30.0	25.0

Location ID:	Site-	SW-17	SW-18	SW-20	SW-21	SW-22	SW-23	SW-24	SW-25	SW-26	SW-27
Sample Depth (bgs):	Specific	5.5'	5.5'	5.5'	5.5'	13'	13'	13'	13'	13'	16'
Date Collected:	Cleanup	06/12/08	06/12/08	11/11/08	11/14/08	11/14/08	11/14/08	11/14/05	11/17/08	11/17/08	11/19/08
Units:	Criteria	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Inorganics											
Chromium	35.0	24.0	25.0	390	26.0	21.0	60.0	21.0	47.0	21.0	22.0

Notes:
[ ] = results of field duplicate
bgs = below ground surface
mg/kg = milligrams per kilogram
Final Confirmatory Samples Highlighted
Sample locations exceeding 35 ppm required additional excavation

Table 2
Analytical Summary of Confirmatory Bottom Samples

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Location ID:	Site-	B-01	B-02	B-03	B-04	B-05	B-06	B-07	B-08	B-09	B-10	B-11	B-12	B-13
Sample Depth (bgs):	Specific	6'	6'	6'	6'	6'	7'	13'	13'	14'	15'	16'	18'	21'
Date Collected:	Cleanup	11/11/08	11/11/08	11/12/08	11/12/08	11/12/08	11/14/08	11/14/08	11/14/08	11/17/08	11/19/08	11/20/08	11/24/08	11/24/08
Units:	Criteria	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Inorganics														
Chromium	35.0	51.0	23.0	28.0	26.0 [21.0]	37.0 *	20.0	19.0	64.0	190	160	56.0	17.0	26.0

Notes:
[ ] = results of field duplicate
bgs = below ground surface
mg/kg = milligrams per kilogram
Final Confirmatory Samples Highlighted
Sample locations exceeding 35 ppm required additional excavation
* = Laboratory analytical results for bottom sample B-05 reported a chromium concentration of 37.0 mg/kg. However, after discussing these results with the NYSDEC, it was determined by the NYSDEC that the soil removal in this location was adequate to satisfy the intentions of the cleanup objective for the site.

Table 3
Analytical Summary of Waste Characterization Samples - Water

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: / Date Collected:	Units	Containment Pit-01 06/02/08	Frac Tank 11/18/08
Volatile Organic Compounds			
1,1,1-Trichloroethane	µg/L	ND	ND
1,1,2,2-Tetrachloroethane	µg/L	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	ND	ND
1,1,2-Trichloroethane	µg/L	ND	ND
1,1-Dichloroethane	µg/L	ND	ND
1,1-Dichloroethene	µg/L	ND	ND
1,2,4-Trichlorobenzene	µg/L	ND	ND
1,2-Dibromo-3-chloropropane	µg/L	ND	ND
1,2-Dibromoethane	µg/L	ND	ND
1,2-Dichlorobenzene	µg/L	ND	ND
1,2-Dichloroethane	µg/L	ND	ND
1,2-Dichloropropane	µg/L	ND	ND
1,3-Dichlorobenzene	µg/L	ND	ND
1,4-Dichlorobenzene	µg/L	ND	ND
2-Butanone	µg/L	ND	ND
2-Hexanone	µg/L	ND	ND
4-Methyl-2-pentanone	µg/L	ND	ND
Acetone	µg/L	ND	20.1
Benzene	µg/L	ND	ND
Bromodichloromethane	µg/L	ND	ND
Bromoform	µg/L	ND	ND
Bromomethane (Methyl Bromide)	µg/L	ND	ND
Carbon disulfide	µg/L	ND	ND
Carbon tetrachloride	µg/L	ND	ND
Chlorobenzene	µg/L	ND	ND
Chloroethane	µg/L	ND	ND
Chloroform	µg/L	ND	ND
Chloromethane	µg/L	ND	ND
cis-1,2-Dichloroethene	µg/L	ND	12.8
cis-1,3-Dichloropropene	µg/L	ND	ND
Cyclohexane	µg/L	ND	ND
Dibromochloromethane	µg/L	ND	ND
Dichlorodifluoromethane	µg/L	ND	ND
Ethylbenzene	µg/L	ND	ND
Isopropylbenzene	µg/L	ND	ND
Methyl acetate	µg/L	ND	ND
Methyl Tert Butyl Ether	µg/L	ND	ND
Methylcyclohexane	µg/L	ND	ND

Table 3
Analytical Summary of Waste Characterization Samples - Water

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: / Date Collected:	Units	Containment Pit-01 06/02/08	Frac Tank 11/18/08
Methylene chloride	µg/L	ND	ND
Styrene	µg/L	ND	1.50
Tetrachloroethene	µg/L	ND	ND
Toluene	µg/L	ND	ND
trans-1,2-Dichloroethene	µg/L	ND	ND
trans-1,3-Dichloropropene	µg/L	ND	ND
Trichloroethene	µg/L	10.3	16.9
Trichlorofluoromethane	µg/L	123	102
Vinyl chloride	µg/L	ND	6.48
Xylene (total)	µg/L	ND	ND
Semivolatile Organic Compounds			
1,1'-Biphenyl	µg/L	ND	ND
2,2'-oxybis(1-Chloropropane)	µg/L	ND	ND
2,4,5-Trichlorophenol	µg/L	ND	ND
2,4,6-Trichlorophenol	µg/L	ND	ND
2,4-Dichlorophenol	µg/L	ND	ND
2,4-Dimethylphenol	µg/L	ND	ND
2,4-Dinitrophenol	µg/L	ND	ND
2,4-Dinitrotoluene	µg/L	ND	ND
2,6-Dinitrotoluene	µg/L	ND	ND
2-Chloronaphthalene	µg/L	ND	ND
2-Chlorophenol	µg/L	ND	ND
2-Methylnaphthalene	µg/L	ND	ND
2-Methylphenol	µg/L	ND	ND
2-Nitroaniline	µg/L	ND	ND
2-Nitrophenol	µg/L	ND	ND
3,3'-Dichlorobenzidine	µg/L	ND	ND
3-Nitroaniline	µg/L	ND	ND
4,6-Dinitro-2-methylphenol	µg/L	ND	ND
4-Bromophenyl phenyl ether	µg/L	ND	ND
4-Chloro-3-methylphenol	µg/L	ND	ND
4-Chloroaniline	µg/L	ND	ND
4-Chlorophenyl phenyl ether	µg/L	ND	ND
4-Methylphenol	µg/L	ND	ND
4-Nitroaniline	µg/L	ND	ND
4-Nitrophenol	µg/L	ND	ND
Acenaphthene	µg/L	ND	ND
Acenaphthylene	µg/L	ND	ND
Acetophenone	µg/L	ND	ND

Table 3
Analytical Summary of Waste Characterization Samples - Water

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: / Date Collected:	Units	Containment Pit-01 06/02/08	Frac Tank 11/18/08
Anthracene	µg/L	ND	ND
Atrazine	µg/L	ND	ND
Benzaldehyde	µg/L	ND	ND
Benzo[a]anthracene	µg/L	ND	ND
Benzo[a]pyrene	µg/L	ND	ND
Benzo[b]fluoranthene	µg/L	ND	ND
Benzo[g,h,i]perylene	µg/L	ND	ND
Benzo[k]fluoranthene	µg/L	ND	ND
bis(2-Chloroethoxy)methane	µg/L	ND	ND
bis(2-Ethylhexyl)phthalate	µg/L	ND	90
Butyl benzyl phthalate	µg/L	ND	12
Caprolactam	µg/L	ND	ND
Carbazole	µg/L	ND	ND
Chrysene	µg/L	ND	ND
Dibenz[a,h]anthracene	µg/L	ND	ND
Dibenzofuran	µg/L	ND	ND
Diethyl phthalate	µg/L	ND	ND
Dimethyl phthalate	µg/L	ND	ND
Di-n-butyl phthalate	µg/L	ND	ND
Di-n-octyl phthalate	µg/L	ND	ND
Fluoranthene	µg/L	ND	ND
Fluorene	µg/L	ND	ND
Hexachlorobenzene	µg/L	ND	ND
Hexachlorobutadiene	µg/L	ND	ND
Hexachlorocyclopentadiene	µg/L	ND	ND
Hexachloroethane	µg/L	ND	ND
Indeno[1,2,3-cd]pyrene	µg/L	ND	ND
Isophorone	µg/L	ND	ND
Naphthalene	µg/L	ND	ND
Nitrobenzene	µg/L	ND	ND
N-Nitroso-di-n-propylamine	µg/L	ND	ND
N-Nitrosodiphenylamine	µg/L	ND	ND
Pentachlorophenol	µg/L	ND	ND
Phenanthrene	µg/L	ND	ND
Phenol	µg/L	ND	ND
Pyrene	µg/L	ND	ND
Metals			
Arsenic	mg/L	ND	ND

Table 3
Analytical Summary of Waste Characterization Samples - Water

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: / Date Collected:	Units	Containment Pit-01 06/02/08	Frac Tank 11/18/08
Barium	mg/L	ND	ND
Cadmium	mg/L	ND	ND
Chromium	mg/L	74	63
Lead	mg/L	ND	ND
Mercury	mg/L	ND	ND
Selenium	mg/L	ND	ND
Silver	mg/L	ND	ND
Miscellaneous			
Flashpoint	deg C	>60	>60
Reactive Cyanide	mg/kg	ND	ND
Reactive Sulfide	mg/kg	ND	ND
pH	SU	7.63	8.31

Notes:
> = greater than
deg C = degrees Celsius
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
ND = not detected
SU = standard units
µg/L - micrograms per liter

Table 4
Analytical Summary of Waste Characterization Samples - Soil and Concrete

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: / Date Collected:	Units	WC-4 06/02/08	WC-Concrete 06/02/08
Volatile Organic Compounds			
1,1-Dichloroethene	mg/L	ND	ND
1,2-Dichloroethane	mg/L	ND	ND
2-Butanone	mg/L	ND	ND
Benzene	mg/L	ND	ND
Carbon tetrachloride	mg/L	ND	ND
Chlorobenzene	mg/L	ND	ND
Chloroform	mg/L	ND	ND
Tetrachloroethene	mg/L	ND	ND
Trichloroethene	mg/L	ND	ND
Vinyl chloride	mg/L	ND	ND
Semivolatile Organic Compounds			
(3+4)-Methylphenol	mg/L	ND	ND
1,4-Dichlorobenzene	mg/L	ND	ND
2,4,5-Trichlorophenol	mg/L	ND	ND
2,4,6-Trichlorophenol	mg/L	ND	ND
2,4-Dinitrotoluene	mg/L	ND	ND
2-Methylphenol	mg/L	ND	ND
Hexachlorobenzene	mg/L	ND	ND
Hexachlorobutadiene	mg/L	ND	ND
Hexachloroethane	mg/L	ND	ND
Nitrobenzene	mg/L	ND	ND
Pentachlorophenol	mg/L	ND	ND
Pyridine	mg/L	ND	ND
Metals			
Mercury	mg/L	ND	ND
Arsenic	mg/L	ND	ND
Barium	mg/L	0.54	ND
Cadmium	mg/L	ND	ND
Chromium	mg/L	ND	ND
Lead	mg/L	ND	ND
Selenium	mg/L	ND	ND
Silver	mg/L	ND	ND
Miscellaneous			
pH	SU	8.41	8.11
Ignitability		0	0
Reactive Cyanide	mg/kg	ND	ND
Reactive Sulfide	mg/kg	ND	ND

Notes:
mg/kg = milligrams per kilogram
mg/L = milligrams per liter
ND = compound was analyzed for but not detected
SU = standard units

Table 5
Analytical Summary of Pre-Excavation Groundwater Samples

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta , New York

Sample ID / Date	NYSDEC TOGS Value	MW-2 8/11/2008	MW-4 8/11/2008	MW-7 8/11/2008	MW-18 8/11/2008
Metals (mg/L)					
Chromium	50	6250	10 U	89	19.2
Volatile Organic Compounds (mg/L)					
Acetone	50	20 U	20 U	20 U	20 U
Benzene	1	5 U	5 U	5 U	5 U
Bromodichloromethane	50	5 U	5 U	5 U	5 U
Bromoform	50	5 U	5 U	5 U	5 U
Bromomethane	5	5 U	5 U	5 U	5 U
2-Butanone (MEK)	50	10 U	10 U	10 U	10 U
Carbon Disulfide	NA	10 U	10 U	10 U	10 U
Carbon Tetrachloride	5	5 U	5 U	5 U	5 U
Chlorobenzene	5	5 U	5 U	5 U	5 U
Chloroethane	5	5 U	5 U	5 U	5 U
Chloroform	7	5 U	5 U	5 U	5 U
Chloromethane	NA	5 U	5 U	5 U	5 U
Dibromochloromethane	50	5 U	5 U	5 U	5 U
1,1-Dichloroethane	5	5 U	5 U	5 U	5 U
1,2-Dichloroethane	0.6	5 U	5 U	5 U	5 U
1,1-Dichloroethene	5	5 U	5 U	5 U	5 U
cis-1,2-Dichloroethene	5	5 U	5 U	24	5 U
trans-1,2-Dichloroethene	5	5 U	5 U	5 U	5 U
1,2-Dichloropropane	1	5 U	5 U	5 U	5 U
cis-1,2-Dichloropropene	NA	5 U	5 U	5 U	5 U
trans-1,2-Dichloropropene	NA	5 U	5 U	5 U	5 U
Ethylbenzene	5	5 U	5 U	5 U	5 U
2-Hexzanone	50	10 U	10 U	10 U	10 U
Methylene chloride	5	5 U	5 U	5 U	5 U
4-Methyl-2-pentanone	NA	10 U	10 U	10 U	10 U
Styrene	5	5 U	5 U	5 U	5 U
1,1,2,2-Tetrachloroethane	5	5 U	5 U	5 U	5 U
Tetrachloroethene	5	5 U	5 U	5 U	5 U
Toluene	5	5 U	5 U	5 U	5 U
1,1,1-Trichloroethane	5	5 U	5 U	5 U	5 U
1,1,2-Trichloroethane	1	5 U	5 U	5 U	5 U
Trichloroethene	5	5 U	5 U	5 U	5 U
Vinyl chloride	2	5 U	5 U	5 U	5 U
o-Xylene	5	5 U	5 U	5 U	5 U
m- & p- Xylene	5	5 U	5 U	5 U	5 U

Notes:
Shaded cells exceed NYSDEC TOGS value.
mg/L = milligrams per liter
NA = not applicable
NYSDEC = New York State Department of Environmental Conservation
TOGS = Technical and Operational Guidance Series 1.1.1
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.

Table 6
Analytical Summary of Imported Backfill Sample

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Location ID: / Date Collected:	Units	NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives	GenFill 10/22/08
PCBs			
Aroclor-1016	mg/kg	NA	0.02 U [0.0203 U]
Aroclor-1221	mg/kg	NA	0.02 U [0.0203 U]
Aroclor-1232	mg/kg	NA	0.02 U [0.0203 U]
Aroclor-1242	mg/kg	NA	0.02 U [0.0203 U]
Aroclor-1248	mg/kg	NA	0.02 U [0.0203 U]
Aroclor-1254	mg/kg	NA	0.02 U [0.0203 U]
Aroclor-1260	mg/kg	NA	0.02 U [0.0203 U]
Volatile Organic Compounds			
1,1,1-Trichloroethane	µg/kg	800	2.9 U [2.9 U]
1,1,2,2-Tetrachloroethane	µg/kg	600	2.9 U [2.9 U]
1,1,2-trichloro-1,2,2-trifluoroethane	µg/kg	6000	2.9 U [2.9 U]
1,1,2-Trichloroethane	µg/kg	NA	2.9 U [2.9 U]
1,1-Dichloroethane	µg/kg	200	2.9 U [2.9 U]
1,1-Dichloroethene	µg/kg	400	2.9 U [2.9 U]
1,2,4-Trichlorobenzene	µg/kg	3400	5.8 U [5.8 U]
1,2-Dibromo-3-chloropropane	µg/kg	NA	5.8 UJ [5.8 UJ]
1,2-Dibromoethane	µg/kg	NA	2.9 U [2.9 U]
1,2-Dichlorobenzene	µg/kg	7900	2.9 U [2.9 U]
1,2-Dichloroethane	µg/kg	100	2.9 U [2.9 U]
1,2-Dichloropropane	µg/kg	NA	2.9 U [2.9 U]
1,3-Dichlorobenzene	µg/kg	1600	2.9 U [2.9 U]
1,4-Dichlorobenzene	µg/kg	8500	2.9 U [2.9 U]
2-Butanone	µg/kg	300	46 U [47 U]
2-Hexanone	µg/kg	NA	5.8 U [5.8 U]
4-Methyl-2-pentanone	µg/kg	1000	5.8 U [5.8 U]
Acetone	µg/kg	200	46 UJ [47 UJ]
Benzene	µg/kg	60	2.9 U [2.9 U]
Bromodichloromethane	µg/kg	NA	2.9 U [2.9 U]
Bromoform	µg/kg	NA	2.9 U [2.9 U]
Bromomethane	µg/kg	NA	5.8 U [5.8 U]
Carbon Disulfide	µg/kg	2700	2.9 U [2.9 U]
Carbon Tetrachloride	µg/kg	600	2.9 U [2.9 U]
Chlorobenzene	µg/kg	1700	2.9 U [2.9 U]
Chloroethane	µg/kg	1900	5.8 U [5.8 U]
Chloroform	µg/kg	300	2.9 U [2.9 U]
Chloromethane	µg/kg	NA	5.8 U [5.8 U]
cis-1,2-Dichloroethene	µg/kg	NA	2.9 U [2.9 U]
cis-1,3-Dichloropropene	µg/kg	NA	2.9 U [2.9 U]
Cyclohexane	µg/kg	NA	2.9 U [2.9 U]
Dibromochloromethane	µg/kg	NA	2.9 U [2.9 U]
Dichlorodifluoromethane	µg/kg	NA	5.8 U [5.8 U]
Ethylbenzene	µg/kg	5500	2.9 U [2.9 U]
Isopropylbenzene	µg/kg	NA	2.9 U [2.9 U]
Methyl acetate	µg/kg	NA	23 U [23 U]
Methyl tert-butyl ether	µg/kg	NA	2.9 U [2.9 U]
Methylcyclohexane	µg/kg	NA	2.9 U [2.9 U]
Methylene Chloride	µg/kg	100	5.8 U [5.8 U]
Styrene	µg/kg	NA	2.9 U [2.9 U]
Tetrachloroethene	µg/kg	1400	2.9 U [2.9 U]
Toluene	µg/kg	1500	2.9 U [2.9 U]
trans-1,2-Dichloroethene	µg/kg	NA	2.9 U [2.9 U]

Table 6
Analytical Summary of Imported Backfill Sample

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Location ID: / Date Collected:	Units	NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives	GenFill 10/22/08
trans-1,3-Dichloropropene	µg/kg	NA	2.9 U [2.9 U]
Trichloroethene	µg/kg	700	2.9 U [2.9 U]
Trichlorofluoromethane	µg/kg	NA	5.8 U [5.8 U]
Vinyl Chloride	µg/kg	200	5.8 U [5.8 U]
Xylenes (total)	µg/kg	1200	5.8 U [5.8 U]
Semivolatile Organic Compounds			
1,1'-Biphenyl	µg/kg	NA	390 U [390 U]
2,2'-oxybis(1-Chloropropane)	µg/kg	NA	390 U [390 U]
2,4,5-Trichlorophenol	µg/kg	100	2,000 U [2,000 U]
2,4,6-Trichlorophenol	µg/kg	NA	390 U [390 U]
2,4-Dichlorophenol	µg/kg	400	390 U [390 U]
2,4-Dimethylphenol	µg/kg	NA	390 U [390 U]
2,4-Dinitrophenol	µg/kg	200 or MDL	2,000 UJ [2,000 UJ]
2,4-Dinitrotoluene	µg/kg	NA	390 U [390 U]
2,6-Dinitrotoluene	µg/kg	1000	390 U [390 U]
2-Chloronaphthalene	µg/kg	NA	390 U [390 U]
2-Chlorophenol	µg/kg	800	390 U [390 U]
2-Methylnaphthalene	µg/kg	36400	390 U [390 U]
2-Methylphenol	µg/kg	100 or MDL	390 U [390 U]
2-Nitroaniline	µg/kg	430 or MDL	2,000 U [2,000 U]
2-Nitrophenol	µg/kg	330 or MDL	390 U [390 U]
3,3'-Dichlorobenzidine	µg/kg	NA	780 U [790 U]
3-Nitroaniline	µg/kg	500 or MDL	2,000 U [2,000 U]
4,6-Dinitro-2-methylphenol	µg/kg	NA	2,000 U [2,000 U]
4-Bromophenyl-phenylether	µg/kg	NA	390 U [390 U]
4-Chloro-3-Methylphenol	µg/kg	240 or MDL	390 U [390 U]
4-Chloroaniline	µg/kg	220 or MDL	390 U [390 U]
4-Chlorophenyl-phenylether	µg/kg	NA	390 U [390 U]
4-Methylphenol	µg/kg	900	390 U [390 U]
4-Nitroaniline	µg/kg	NA	2,000 U [2,000 U]
4-Nitrophenol	µg/kg	100 or MDL	2,000 U [2,000 U]
Acenaphthene	µg/kg	50000	390 U [390 U]
Acenaphthylene	µg/kg	41000	390 U [390 U]
Acetophenone	µg/kg	NA	390 U [390 U]
Anthracene	µg/kg	50000	390 U [390 U]
Atrazine	µg/kg	NA	390 U [390 U]
Benzaldehyde	µg/kg	NA	390 U [390 U]
Benzo(a)anthracene	µg/kg	224 or MDL	390 U [390 U]
Benzo(a)pyrene	µg/kg	61 or MDL	390 U [390 U]
Benzo(b)fluoranthene	µg/kg	1100	390 U [390 U]
Benzo(g,h,i)perylene	µg/kg	50000	390 U [390 U]
Benzo(k)fluoranthene	µg/kg	1100	390 U [390 U]
bis(2-Chloroethoxy)methane	µg/kg	NA	390 U [390 U]
bis(2-Ethylhexyl)phthalate	µg/kg	50000	42 J [390 U]
Butylbenzylphthalate	µg/kg	50000	390 U [390 U]
Caprolactam	µg/kg	NA	390 U [390 U]
Carbazole	µg/kg	NA	390 U [390 U]
Chrysene	µg/kg	400	390 U [390 U]
Dibenzo(a,h)anthracene	µg/kg	14 or MDL	390 U [390 U]
Dibenzofuran	µg/kg	6200	390 U [390 U]
Diethylphthalate	µg/kg	7100	390 U [390 U]
Dimethylphthalate	µg/kg	2000	390 U [390 U]

Table 6
Analytical Summary of Imported Backfill Sample

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Location ID: / Date Collected:	Units	NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives	GenFill 10/22/08
Di-n-Butylphthalate	µg/kg	8100	390 U [390 U]
Di-n-Octylphthalate	µg/kg	50000	390 U [390 U]
Fluoranthene	µg/kg	50000	390 U [390 U]
Fluorene	µg/kg	50000	390 U [390 U]
Hexachlorobenzene	µg/kg	410	390 U [390 U]
Hexachlorobutadiene	µg/kg	NA	390 U [390 U]
Hexachlorocyclopentadiene	µg/kg	NA	390 U [390 U]
Hexachloroethane	µg/kg	NA	390 U [390 U]
Indeno(1,2,3-cd)pyrene	µg/kg	3200	390 U [390 U]
Isophorone	µg/kg	4400	390 U [390 U]
Naphthalene	µg/kg	13000	390 U [390 U]
Nitrobenzene	µg/kg	200 or MDL	390 U [390 U]
N-Nitroso-di-n-propylamine	µg/kg	NA	390 U [390 U]
N-Nitrosodiphenylamine	µg/kg	NA	390 U [390 U]
Pentachlorophenol	µg/kg	1000 or MDL	2,000 U [2,000 U]
Phenanthrene	µg/kg	50000	390 U [390 U]
Phenol	µg/kg	30 or MDL	390 U [390 U]
Pyrene	µg/kg	50000	390 U [390 U]
Dissolved Inorganics			
Arsenic	mg/kg	7.5 or SB	1.80 [1.70]
Barium	mg/kg	300 or SB	18.0 [19.0]
Cadmium	mg/kg	1 or SB	0.0920 J [0.0760 J]
Chromium	mg/kg	10 or SB	6.80 [7.50]
Lead	mg/kg	SB	4.50 [4.30]
Mercury	mg/kg	0.1	0.0150 J [0.0100 J]
Selenium	mg/kg	2 or SB	0.340 J [0.350 J]
Silver	mg/kg	SB	1.20 U [1.20 U]
Miscellaneous			
Percent Moisture	%	NA	15 [16.2]
Herbicides			
2,4,5-TP	mg/kg	NA	0.078 U [0.080 U]
2,4-D	mg/kg	0.5	0.78 U [0.80 U]
Pesticides			
4,4'-DDD	mg/kg	2.9	0.0039 U [0.0039 U]
4,4'-DDE	mg/kg	2.1	0.0039 U [0.0039 U]
4,4'-DDT	mg/kg	2.1	0.0039 U [0.0039 U]
Aldrin	mg/kg	0.041	0.0020 U [0.0020 U]
Alpha-BHC	mg/kg	0.11	0.0020 U [0.0020 U]
Alpha-Chlordane	mg/kg	NA	0.0020 U [0.0020 U]
Beta-BHC	mg/kg	0.2	0.0020 U [0.0020 U]
Delta-BHC	mg/kg	0.3	0.0020 U [0.0020 U]
Dieldrin	mg/kg	0.044	0.0039 U [0.0039 U]
Endosulfan I	mg/kg	0.9	0.0020 U [0.0020 U]
Endosulfan II	mg/kg	0.9	0.0039 U [0.0039 U]
Endosulfan Sulfate	mg/kg	1	0.0039 U [0.0039 U]
Endrin	mg/kg	0.1	0.0039 U [0.0039 U]
Endrin Aldehyde	mg/kg	NA	0.0039 U [0.0039 U]
Endrin Ketone	mg/kg	NA	0.0039 U [0.0039 U]
Gamma-BHC (Lindane)	mg/kg	0.06	0.0020 U [0.0020 U]
Gamma-Chlordane	mg/kg	0.54	0.0020 U [0.0020 U]

Table 6
Analytical Summary of Imported Backfill Sample

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Location ID: / Date Collected:	Units	NYSDEC TAGM 4046 Recommended Soil Cleanup Objectives	GenFill 10/22/08
Heptachlor	mg/kg	0.1	0.0020 U [0.0020 U]
Heptachlor Epoxide	mg/kg	0.02	0.0020 U [0.0020 U]
Methoxychlor	mg/kg	NA	0.020 U [0.020 U]
Toxaphene	mg/kg	NA	0.020 U [0.020 U]

Notes:
[ ] = results of field duplicate
% = percent
2,4-D = 2,4-dichlorophenoxyacetic acid
2,4,5-TP = 2,4,5-trichlorophenoxyacetic acid
BHC = benzene hexachloride
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
J = Indicates an estimated value.
MDL = method detection limit
mg/kg = milligrams per kilogram
NA = not applicable
NYSDEC = New York State Department of Environmental Conservation
PCB = polychlorinated biphenyl
SB = site background
TAGM = Technical and Administrative Guidance Memorandum
U = The compound was analyzed for but not detected. The associated value is the compound quantitation limit.
UJ = The compound was not detected above the reported quantitation limit. However, the reported quantitation limit is approximate.
µg/kg = micrograms per kilogram

Table 7
Analytical Summary of Additional Waste Characterization Samples - Soil

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: Matrix: Date Collected:	Units	West Wall Soil 11/12/08	West Wall Aqueous 11/12/08
Volatile Organic Compounds			
1,1,1-Trichloroethane	ppb	52	0.92
1,1,2,2-Tetrachloroethane	ppb	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	ppb	ND	ND
1,1,2-Trichloroethane	ppb	ND	ND
1,1-Dichloroethane	ppb	73	3.05
1,1-Dichloroethene	ppb	ND	ND
1,2,4-Trichlorobenzene	ppb	ND	ND
1,2-Dibromo-3-chloropropane	ppb	ND	ND
1,2-Dibromoethane	ppb	ND	ND
1,2-Dichlorobenzene	ppb	ND	ND
1,2-Dichloroethane	ppb	ND	ND
1,2-Dichloroethane-d4	ppb	240	11.2
1,2-Dichloropropane	ppb	ND	ND
1,3-Dichlorobenzene	ppb	ND	ND
1,4-Dichlorobenzene	ppb	ND	ND
1-Propene, 2-methyl-	ppb	NA	1.54 J
2-Butanone	ppb	ND	59.7
2-Hexanone	ppb	ND	11.4
2-Propenal, 2-methyl-	ppb	NA	23.5 J
4-Bromofluorobenzene	ppb	440 S	9.29
4-Methyl-2-pentanone	ppb	ND	11.5
Acetaldehyde	ppb	NA	2.67 J
Acetone	ppb	ND	364 D
Benzene	ppb	ND	ND
Benzene, 1,3,5-trimethyl-	ppb	160 J	NA
Bromodichloromethane	ppb	ND	ND
Bromoform	ppb	ND	ND
Bromomethane	ppb	ND	1.40
Butanal	ppb	NA	3.67 J
Butanal, 3-methyl-	ppb	NA	1.73 J
Carbon disulfide	ppb	ND	ND
Carbon tetrachloride	ppb	ND	ND
Chlorobenzene	ppb	ND	ND
Chloroethane	ppb	7.7 J	0.87 J
Chloroform	ppb	ND	ND
Chloromethane	ppb	ND	0.54 J
cis-1,2-Dichloroethene	ppb	ND	ND
cis-1,3-Dichloropropene	ppb	ND	ND
Cyclohexane	ppb	ND	ND
D-Limonene	ppb	190 J	NA
Decane	ppb	610 J	NA
Decane, 4-methyl-	ppb	160 J	NA
Dibromochloromethane	ppb	ND	ND
Dichlorodifluoromethane	ppb	ND	ND

Table 7
Analytical Summary of Additional Waste Characterization Samples - Soil

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: Matrix: Date Collected:	Units	West Wall Soil 11/12/08	West Wall Aqueous 11/12/08
Ethylbenzene	ppb	6.2 J	ND
Isopropylbenzene	ppb	7.3 J	ND
Methyl acetate	ppb	ND	ND
Methyl tert-butyl ether	ppb	ND	ND
Methylcyclohexane	ppb	6.4 J	ND
Methylene chloride	ppb	ND	4.24
Naphthalene, decahydro-, trans-	ppb	180 J	NA
Naphthalene, decahydro-2-methyl-	ppb	220 J	NA
Propanal, 2-methyl-	ppb	NA	1.51 J
Styrene	ppb	ND	ND
Tetrachloroethene	ppb	ND	ND
Toluene	ppb	7.0 J	ND
Toluene-d8	ppb	320	9.84
trans-1,2-Dichloroethene	ppb	ND	ND
trans-1,3-Dichloropropene	ppb	ND	ND
Trichloroethene	ppb	22	0.13 J
Trichlorofluoromethane	ppb	ND	ND
Undecane	ppb	700 J	NA
unknown	ppb	190 J	NA
unknown hydrocarbon	ppb	200 J	NA
unknown (11.68)	ppb	NA	2.09 J
unknown (13.07)	ppb	NA	2.23 J
unknown (13.22)	ppb	NA	4.71 J
unknown (19.68)	ppb	NA	2.67 J
Vinyl chloride	ppb	ND	ND
Xylenes (total)	ppb	64	ND

Notes:
J = Indicates an estimated value.
NA = not analyzed
ND = non-detectable
ppb = parts per billion, mg/kg for soils, mg/L for aqueous
S = Indicates spike recovery was outside acceptable recovery limits.

Table 8
Analytical Summary of Post-Excavation Groundwater Sampling Results

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: / Date Collected:	Units	NYSDEC TOGS	MW-26 02/24/09	MW-26 03/16/09	MW-26 04/30/09	MW-26 10/08/09	MW-26 01/05/10	MW-26 04/15/10	MW-26 09/08/10	TW-4 04/30/09	MW-27 10/08/09	MW-27 01/05/10	MW-27 04/15/10	MW-27 09/08/10
Metals														
Chromium, total	µg/L	50	16000	14000	3700	760	200	990	340	3780	14	60	150	29
Chromium, trivalent	µg/L	NA	NA	2400	1300	760	149	990	340	280	14	49	89	29
Chromium, hexavalent	µg/L	50	NA	12000	2400	ND	51	ND	ND	3500	ND	11	61	ND
Volatile Organics														
1,1,1-Trichloroethane	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-trifluoroethane	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,1,2-Trichloroethane	µg/L	1	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,1-Dichloroethane	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,1-Dichloroethene	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,2,4-Trichlorobenzene	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,2-Dibromo-3-chloropropane	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,2-Dibromoethane	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,2-Dichlorobenzene	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,2-Dichloroethane	µg/L	0.6	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,2-Dichloropropane	µg/L	1	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,3-Dichlorobenzene	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
1,4-Dichlorobenzene	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
2-Butanone (MEK)	µg/L	50	1.00 J	NA	NA	24.3	219 D	133	10.2 J	NA	ND	ND	ND	ND
2-Hexanone	µg/L	50	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
4-Methyl-2-pentanone	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Acetone	µg/L	50	35.1	NA	NA	10.9	95.4 D	14.4	6.30 J	NA	1.73 J	1.04 J	1.02 J	2.67 J
Benzene	µg/L	1	ND	NA	NA	ND	ND	0.14 J	ND	NA	ND	ND	ND	ND
Bromodichloromethane	µg/L	50	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Bromoform	µg/L	50	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Bromomethane (Methyl Bromide)	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Carbon disulfide	µg/L	NA	0.17 J	NA	NA	0.27 J	ND	0.16 J	ND	NA	ND	ND	ND	ND
Carbon tetrachloride	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Chlorobenzene	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Chloroethane	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Chloroform	µg/L	7	0.11 J	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Chloromethane	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
cis-1,2-Dichloroethene	µg/L	5	4.72	NA	NA	8.94	19.6	27.9	80.3	NA	0.71	0.64	0.48 J	0.62
cis-1,3-Dichloropropene	µg/L	0.4	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Cyclohexane	µg/L	NA	ND	NA	NA	0.10 J	0.11 J	0.16 J	0.22 J	NA	ND	ND	ND	ND
Dibromochloromethane	µg/L	50	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Dichlorodifluoromethane	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Ethylbenzene	µg/L	5	ND	NA	NA	ND	0.19 J	0.13 J	ND	NA	ND	ND	ND	ND
Isopropylbenzene	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Methyl acetate	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Methyl Tert Butyl Ether	µg/L	NA	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Methylcyclohexane	µg/L	NA	ND	NA	NA	0.11 J	ND	0.20 J	0.26 J	NA	ND	ND	ND	ND
Methylene chloride	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Styrene	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Tetrachloroethene	µg/L	5	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Toluene	µg/L	5	0.13 J	NA	NA	9.48	103 D	27.8	2.48	NA	ND	ND	ND	ND
trans-1,2-Dichloroethene	µg/L	5	0.58	NA	NA	0.95	1.25	1.47	2.58	NA	ND	ND	ND	ND
trans-1,3-Dichloropropene	µg/L	0.4	ND	NA	NA	ND	ND	ND	ND	NA	ND	ND	ND	ND
Trichloroethene	µg/L	5	5.31	NA	NA	10.4	3.77	2.99	1.30	NA	1.71	1.93	1.37	1.34
Trichlorofluoromethane	µg/L	NA	1.30	NA	NA	0.17 J	ND	ND	ND	NA	0.18 J	0.63 J	0.40 J	0.29 J
Vinyl chloride	µg/L	2	ND	NA	NA	0.36 J	0.42 J	0.69 J	0.96 J	NA	ND	ND	ND	ND
Xylene (total)	µg/L	5	ND	NA	NA	ND	0.65 J	0.37 J	ND	NA	ND	ND	ND	ND

Notes:
1. Samples were collected by Arcadis and submitted to Life Science Laboratories of Syracuse, New York for laboratory analysis.
2. Shaded cells indicate exceedance of NYSDEC TOGS.
3. Test Well TW-4 was located at approximately the same location as MW-27, prior to the installation of MW-27.

D = Concentration was detected in a diluted sample. Result from original sample exceeded the calibration range.
J = Estimated value. Result is less than reporting limit (volatile organic compounds).
NA = not analyzed
ND = not detected
NYSDEC TOGS = New York State Department of Environmental Conservation Technical and Operational Guidance Series Ambient Water Quality Standards and Guidance Values
µg/L = micrograms per liter

Table 9
Analytical Summary of Test Well Sampling Results

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample ID: / Date Collected:	Units	NYSDEC TOGS	TW-1 04/30/09	TW-2 04/30/09	TW-3 04/30/09	TW-4 04/30/09	TW-5 04/30/09	TW-6 04/30/09	TW-7 04/30/09	TW-8 04/30/09
Metals										
Chromium, total	µg/L	50	83	18	25	3800	32	NS	24	19
Chromium, trivalent	µg/L	NA	83	<10	20	280	<10	NS	<10	<10
Chromium, hexavalent	µg/L	50	ND	26	ND	3500	45	NS	28	17

Sample ID: / Date Collected:	Units	NYSDEC TOGS	TW-9 04/30/09	TW-10 04/30/09	TW-11 04/30/09	TW-12 04/30/09	MW-4 04/30/09	MW-18 04/30/09	MW-26 04/30/09	RW-2 04/30/09
Metals										
Chromium, total	µg/L	50	8.2 J	20	6.8 J	42	14	42	3700	13
Chromium, trivalent	µg/L	NA	<10	<10	<10	<10	14	42	1300	13
Chromium, hexavalent	µg/L	50	ND	19	ND	37	ND	ND	2400	ND

Notes:
1. Samples were collected by Arcadis and submitted to Life Science Laboratories of Syracuse, New York for laboratory analysis.
2. Shaded cells indicate exceedance of NYSDEC TOGS.

< = less than
J = Estimated value. Result is less than reporting limit (volatile organic compounds).
NA = not applicable
ND = not detected
NS = not sampled; insufficient volume from well
NYSDEC TOGS = New York State Department of Environmental Conservation Technical and Operational Guidance Series Ambient Water Quality Standards and Guidance Valu
µg/L = micrograms per liter

Table 10
Analytical Summary of Soil Vapor Sampling Results

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample Location: / Sample Date: / Compound	USEPA Soil Vapor Screening Level[1] (µg/m^3)	SV-N-1 4/16/2010 (µg/m^3)	SV-N-2 9/8/2010 (µg/m^3)	SV-S-1 4/16/2010 (µg/m^3)	SV-S-2 9/8/2010 (µg/m^3)
1,1,1-Trichloroethane	220,000	---	---	---	---
1,1-Dichloroethane	77	1.7	1.6	---	---
1,1-Dichloroethene	8,800	---	---	---	---
1,1,2-Trichloro-1,2,2-Trifluoroethane	1,300,000	---	---	---	---
1,2-Dichloroethane	NA	5.2	---	---	---
1,2,4-Trimethylbenzene	310	79	5.9	---	---
1,3,5-Trimethylbenzene	NA	21	2.3	---	---
2,2,4-Trimethylpentane	NA	---	---	---	---
4-Ethyltoluene	NA	22	1.6	---	---
Acetone	1,400,000	95	100	---	---
Benzene	16	7.0	5.1	---	31
Bromodichloromethane	3	6.2	---	---	---
Carbon Disulfide	31,000	4.0	3.2	---	---
Carbon Tetrachloride	20	---	---	---	---
Chloroform	5	11	10	---	30
Chloromethane	3,900	---	---	---	---
cis-1,2-Dichloroethene	NA	150	42	---	---
Cumene	18,000	---	---	---	---
Cyclohexane	260,000	6.5	5.6	---	96
Dibromochloromethane	5	1.7	---	---	---
Ethylbenzene	49	33	3.8	---	---
Freon-22	NA	---	---	---	---
Methylene Chloride	260	---	---	---	---
Methyl Butyl Ketone	NA	3.9	---	---	---
Methyl Ethyl Ketone	220,000	21	27	---	---
Methyl Isobutyl Ketone	130,000	4.9	---	---	---
MTBE	470	---	6.3	---	
n-Butane	NA	---	---	---	---
n-Heptane	NA	20	8	---	780
n-Hexane	31,000	20	7	---	530
Tetrachloroethene	21	---	---	---	---
Tetrahydrofuran	NA	---	---	---	---
Toluene	220,000	87	16	---	63
trans-1,2-DCE	2,600	---	6.4	---	
Trichloroethene (TCE)	61	13	2.9	---	30
Trichlorofluoromethane (CFC-11)	31,000	84	2.9	67,000	10,000 D
Vinyl Chloride	28	38	1.9	---	---
Xylene (m,p)	31,000	140	16	---	44
Xylene (o)	31,000	48	5.3	---	---
Total Detected VOCs		**923.1**	**280.8**	**67,000**	**11,604**

Notes:
1. Compounds analyzed, but not included in this table were not detected at a concentration above the reporting limit.
2. Shaded cells indicate an exceedance of the USEPA Soil Vapor Screening Level.
3. Samples were analyzed using USEPA Method TO-15.

[1] = USEPA Soil Vapor Screening Level is calculated using the USEPA Regional Screening Level for Industrial Indoor Air, and multiplying by a conservative attenuation factor of 10 (to convert from indoor air to soil vapor).

--- = compound not detected above reporting limit

µg/m^3 - micrograms per cubic meter

USEPA = United States Environmental Protection Agency

Table 11
Analytical Summary of Indoor Air and Sub-Slab Soil Vapor Sampling Results

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample Type:	NYSDOH Indoor Air Guideline	USEPA BASE Database - 90th Percentile	Indoor Air						Sub-Slab Soil Vapor					
Sample Location:			Office	Seating Area	Office	Seating Area	Office	Seating Area	Office	Seating Area	Office	Seating Area	Office	Seating Area
Sample Date:			5/7/2012	5/7/2012	2/25/2013	2/25/2013	3/11/2014	3/11/2014	5/7/2012	5/7/2012	2/25/2013	2/25/2013	3/11/2014	3/11/2014
Units:	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³	µg/m³
1,1,1-Trichloroethane	---	20.6	0.11 U	0.11 U	0.85 U	0.85 U	1.1 U	1.1 U	0.11 U	1.6 U	1.5 U	1.8 U	1.1 U	4.4 U
1,1,2,2-Tetrachloroethane	---	---	NA	NA	0.21 U	0.21 U	1.4 U	1.4 U	NA	NA	0.38 U	0.44 U	1.4 U	5.5 U
1,1,2-Trichloro-1,2,2-Trifluoroethane (Freon TF)	---	---	**0.61 J**	**0.64 J**	**0.56**	**0.54**	1.5 U	1.5 U	**0.69 J**	2.3 U	**0.58**	**0.74**	**5.3**	**7.7**
1,1,2-Trichloroethane	---	1.5	NA	NA	0.85 U	0.85 U	1.1 U	1.1 U	NA	NA	1.5 U	1.8 U	1.1 U	4.4 U
1,1-Dichloroethane	---	0.7	0.093 U	0.093 U	0.63 U	0.64 U	0.81 U	0.81 U	0.093 U	1.4 U	1.1 U	1.3 U	0.81 U	3.2 U
1,1-Dichloroethene	---	1.4	0.34 U	0.34 U	0.62 U	0.62 U	0.79 U	0.79 U	0.34 U	5.1 U	1.1 U	1.3 U	0.79 U	3.2 U
1,2,4-Trimethylbenzene	---	9.5	0.1 U	**0.71 J**	NA	NA	0.98 U	0.98 U	**2.6**	1.6 U	NA	NA	0.98 U	3.9 U
1,2-Dibromoethane	---	1.5	NA	NA	0.24 U	0.24 U	1.5 U	1.5 U	NA	NA	0.43 U	0.50 U	1.5 U	6.1 U
1,2-Dichlorobenzene	---	1.2	NA	NA	1.9 U	1.9 U	1.2 U	1.2 U	NA	NA	3.4 U	3.9 U	1.2 U	4.8 U
1,2-Dichloroethane	---	0.9	0.073 U	0.073 U	0.63 U	0.64 U	0.81 U	0.81 U	0.073 U	1.1 U	1.1 U	1.3 U	0.81 U	3.2 U
1,2-Dichloropropane	---	1.6	NA	NA	0.72 U	0.72 U	0.92 U	0.92 U	NA	NA	1.3 U	1.5 U	0.92 U	3.7 U
1,3,5-Trimethylbenzene	---	3.7	0.093 U	0.093 U	NA	NA	0.98 U	0.98 U	**1.7**	1.4 U	NA	NA	0.98 U	3.9 U
1,3-Butadiene	---	3	NA	NA	NA	NA	0.44 U	0.44 U	NA	NA	NA	NA	**1.8**	**23**
1,3-Dichlorobenzene	---	2.4	NA	NA	1.9 U	1.9 U	1.2 U	1.2 U	NA	NA	3.4 U	3.9 U	1.2 U	4.8 U
1,4-Dichlorobenzene	---	5.5	NA	NA	1.9 U	1.9 U	1.2 U	1.2 U	NA	NA	3.4 U	3.9 U	1.2 U	4.8 U
4-Ethyltoluene	---	3.6	0.074 U	0.074 U	NA	NA	0.98 U	0.98 U	**0.46 J**	1.1 U	NA	NA	0.98 U	3.9 U
4-Methyl-2-pentanone (Methyl Isobutyl Ketone)	---	6	0.14 U	0.14 U	1.3 U	1.3 U	2 U	2 U	0.14 U	2.1 U	2.3 U	2.6 U	2 U	8.2 U
Acetone	---	98.9	**19**	**19**	**8.2**	**8.9**	**16**	**16**	**66**	**18 J**	**14**	**37**	**21**	**230**
Benzene	---	9.4	**0.41 J**	**0.52 J**	**1.3**	**1.2**	**0.65**	**0.78**	**7.2**	**6.5 J**	**6.7**	**33**	**5.2**	**38**
Bromodichloromethane	---	---	0.08 U	0.08 U	0.21 U	0.21 U	1.3 U	1.3 U	0.08 U	1.2 U	0.38 U	0.44 U	1.3 U	5.4 U
Bromoform	---	---	NA	NA	1.6 U	1.6 U	2.1 U	2.1 U	NA	NA	2.9 U	3.4 U	2.1 U	8.3 U
Bromomethane	---	1.7	NA	NA	0.61 U	0.61 U	0.78 U	0.78 U	NA	NA	1.1 U	1.3 U	0.78 U	3.1 U
Carbon Disulfide	---	4.2	0.062 U	0.062 U	0.48 U	0.48 U	1.6 U	1.6 U	**2**	**6.6 J**	**4.3**	**140 D**	1.6 U	**49**
Carbon Tetrachloride	---	1.3	**0.36 J**	**0.44 J**	**0.56**	**0.55**	**0.38**	**0.47**	**0.42 J**	1.2 U	**0.51**	**0.36**	**0.4**	1 U
Chlorobenzene	---	0.9	NA	NA	0.72 U	0.72 U	0.92 U	0.92 U	NA	NA	1.3 U	1.5 U	0.92 U	3.7 U
Chloroethane	---	1.1	NA	NA	0.82 U	0.82 U	1.3 U	1.3 U	NA	NA	1.5 U	1.7 U	1.3 U	5.3 U
Chloroform	---	1.1	**4**	**1.3**	**2.6**	**1.1**	**6.1**	**1.8**	**1**	1.8 U	1.4 U	**22**	**1.3**	3.9 U
Chloromethane	---	3.7	**1.3**	**1.4**	**1**	**1.1**	1 U	**1.2**	**0.65 J**	1.1 U	1.1 U	1.3 U	1 U	4.1 U
cis-1,2-Dichloroethene (a)	---	1.9	0.33 U	0.33 U	0.62 U	0.62 U	0.79 U	0.79 U	**2.3**	5 U	1.1 U	1.3 U	**3**	3.2 U
cis-1,3-Dichloropropene	---	2.3	NA	NA	1.4 U	1.4 U	0.91 U	0.91 U	NA	NA	2.5 U	2.9 U	0.91 U	3.6 U
Cyclohexane	---	---	**0.21 J**	**0.3 J**	NA	NA	0.69 U	0.69 U	**6.1**	**11**	NA	NA	**2.2**	**13**
Dibromochloromethane	---	---	0.094 U	0.094 U	0.27 U	0.27 U	1.7 U	1.7 U	0.094 U	1.4 U	0.48 U	0.56 U	1.7 U	6.8 U
Dichlorodifluoromethane	---	16.5	**2.5**	**2.6**	NA	NA	2.5 U	**2.9**	**2.3 J**	**2200**	NA	NA	2.5 U	**310**
Ethylbenzene	---	5.7	0.065 U	**0.38 J**	1.3 U	1.3 U	0.87 U	0.87 U	**0.92**	**2.2 J**	**8.8**	**14**	**1.1**	3.5 U
Freon-22	---	---	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Methyl Butyl Ketone (2-Hexanone)	---	---	0.16 U	**0.38 J**	0.63 U	0.64 U	2 U	2 U	**0.93 J**	2.5 U	1.1 U	1.3 U	2 U	8.2 U
Methyl Ethyl Ketone (2-Butanone)	---	12	**2.6**	**2**	0.92 U	0.92 U	**2.5**	**2.3**	**5.9**	**4 J**	**3**	**6.9**	**4.2**	**91**
Methylene Chloride	60	10	**4.6 B**	**4.2 B**	**1.8**	**3**	**1.9**	**3.5**	**1.6 J B**	**4.6 J B**	**1**	**4.7**	1.7 U	6.9 U
MTBE	---	11.5	0.054 U	0.054 U	1.1 U	1.1 U	0.72 U	0.72 U	0.054 U	0.82 U	2.0 U	2.3 U	0.72 U	2.9 U
n-Heptane	---	---	**0.64 J**	**1.2**	NA	NA	**1.4**	0.82 U	**28**	**22**	NA	NA	**6.4**	**27**
n-Hexane	---	10.2	**0.65 J**	**0.74**	NA	NA	**1.7**	0.7 U	**26**	**24**	NA	NA	**5.1**	**28**
Styrene	---	1.9	0.047 U	**1.7**	1.3 U	**1.5**	0.85 U	0.85 U	**1**	0.71 U	2.4 U	2.8 U	0.85 U	3.4 U
Tetrachloroethene (PCE)	100	15.9	**1.8**	**4**	0.11 U	0.11 U	1.4 U	1.4 U	**1.1 J**	**5.1 J**	**0.64**	**0.93**	1.4 U	5.4 U
Tetrahydrofuran	---	---	**0.22 J**	**0.18 J**	NA	NA	15 U	15 U	**1.1 J**	1.3 U	NA	NA	15 U	59 U
Toluene	---	43	**1.1**	**3.2**	**1.9**	**3**	**0.99**	**0.93**	**6.3**	**16**	**39**	**110**	**7.3**	**30**
trans-1,2-DCE	---	---	0.091 U	0.091 U	0.62 U	0.62 U	0.79 U	0.79 U	**0.4 J**	1.4 U	1.1 U	1.3 U	0.79 U	3.2 U
trans-1,3-Dichloropropene	---	1.3	NA	NA	0.71 U	0.71 U	0.91 U	0.91 U	NA	NA	1.3 U	1.5 U	0.91 U	3.6 U
Trichloroethene (TCE)	5	4.2	**0.4 J**	**0.44 J**	**0.24**	**0.21**	**0.45**	**0.34**	**140**	**2.5 J**	**170 D**	**1.8**	**110**	**2.9**
Trichlorofluoromethane (CFC-11)	---	18.1	**1.4**	**1.4**	**1.4**	**1.4**	**1.3**	**1.5**	**4**	**43**	**2.8**	**56**	**1.9**	**7**
Vinyl Acetate	---	---	NA	NA	7.1 U	7.1 U	NA	NA	NA	NA	13 U	15 U	NA	NA
Vinyl Chloride	---	1.9	0.023 U	0.023 U	0.085 U	0.085 U	0.1 U	0.1 U	0.023 U	0.35 U	0.15 U	0.18 U	0.1 U	0.41 U
Xylene (m,p)	---	22.2	0.096 U	**1.1 J**	2.7 U	2.7 U	2.2 U	2.2 U	**6.1**	**12 J**	**37**	**77**	**4.3**	8.7 U
Xylene (o)	---	7.9	0.069 U	**0.35 J**	1.3 U	1.3 U	0.87 U	0.87 U	**2.1**	**3.8 J**	**9.6**	**25**	**1.5**	**3.8**

Notes:
1. Samples were analyzed using USEPA Method TO-15.
2. Detected concentrations presented in bold.
3. Shaded cells exceed USEPA BASE background value.
--- = not available
(a) = trans -1,2-dichlroethene used as a surrogate
B = Compound was found in the blank and sample.
D = Concentration is the result of a dilution.
J = Analyte detected at or below quantitation limits.
NA = not analyzed
NYSDOH = New York State Department of Health Indoor Air Guideline
U = Not detected at the reporting limit.
USEPA BASE = United States Environmental Protection Agency Building Assessment and Survey Evaluation
µg/m³ = micrograms per cubic meter

Table 12
Vapor Intrusion Sampling Results and NYSDOH Matrix Recommendations

Revised Supplemental Final Engineering Report
Former Roehlen Engraving Site
Henrietta, New York

Sample Location:	Office	Office	Office Matrix Decision [a]	Seating Area	Seating Area	Seating Matrix Decision [a]
Sample Type:	Indoor Air	Sub-Slab Soil Vapor		Indoor Air	Sub-Slab Soil Vapor	
Sample Date:	5/7/2012	5/7/2012		5/7/2012	5/7/2012	
Units:	µg/m^3	µg/m^3		µg/m^3	µg/m^3	
Carbon Tetrachloride	**0.36 J**	**0.42 J**	Background [b]	**0.44 J**	1.2 U	Background [b]
Trichloroethene (TCE)	**0.4 J**	**140**	Monitor/Mitigate	**0.44 J**	**2.5 J**	Background [b]
Vinyl Chloride	0.023 U	0.023 U	No further action	0.023 U	0.35 U	No further action
1,1,1-Trichloroethane	0.11 U	0.11 U	No further action	0.11 U	1.6 U	No further action
1,1-Dichloroethene	0.34 U	0.34 U	No further action	0.34 U	5.1 U	No further action
cis-1,2-Dichloroethene	0.33 U	**2.3**	No further action	0.33 U	5 U	No further action
Tetrachloroethene (PCE)	**1.8**	**1.1 J**	No further action	**4**	**5.1 J**	No further action

Sample Location:	Office	Office	Office Matrix Decision [a]	Seating Area	Seating Area	Seating Matrix Decision [a]
Sample Type:	Indoor Air	Sub-Slab Soil Vapor		Indoor Air	Sub-Slab Soil Vapor	
Sample Date:	2/25/2013	2/25/2013		2/25/2013	2/25/2013	
Units:	µg/m^3	µg/m^3		µg/m^3	µg/m^3	
Carbon Tetrachloride	**0.56**	**0.51**	Background [b]	**0.55**	**0.36**	Background [b]
Trichloroethene (TCE)	**0.24**	**170 D**	Monitor	**0.21**	**1.8**	No further action
Vinyl Chloride	0.085 U	0.15 U	No further action	0.085 U	0.18 U	No further action
1,1,1-Trichloroethane	0.85 U	1.5 U	No further action	0.85 U	1.8 U	No further action
1,1-Dichloroethene	0.62 U	1.1 U	No further action	0.62 U	1.3 U	No further action
cis-1,2-Dichloroethene	0.62 U	1.1 U	No further action	0.62 U	1.3 U	No further action
Tetrachloroethene (PCE)	0.11 U	**0.64**	No further action	0.11 U	**0.93**	No further action

Sample Location:	Office	Office	Office Matrix Decision [a]	Seating Area	Seating Area	Seating Matrix Decision [a]
Sample Type:	Indoor Air	Sub-Slab Soil Vapor		Indoor Air	Sub-Slab Soil Vapor	
Sample Date:	3/11/2014	3/11/2014		3/11/2014	3/11/2014	
Units:	µg/m^3	µg/m^3		µg/m^3	µg/m^3	
Carbon Tetrachloride	**0.38**	**0.4**	Background [b]	**0.47**	1 U	Background [b]
Trichloroethene (TCE)	**0.45**	**110**	Monitor/Mitigate	**0.34**	**2.9**	Background [b]
Vinyl Chloride	0.1 U	0.1 U	No further action	0.1 U	0.41 U	No further action
1,1,1-Trichloroethane	1.1 U	1.1 U	No further action	1.1 U	4.4 U	No further action
1,1-Dichloroethene	0.79 U	0.79 U	No further action	0.79 U	3.2 U	No further action
cis-1,2-Dichloroethene	0.79 U	**3**	No further action	0.79 U	3.2 U	No further action
Tetrachloroethene (PCE)	1.4 U	1.4 U	No further action	1.4 U	5.4 U	No further action

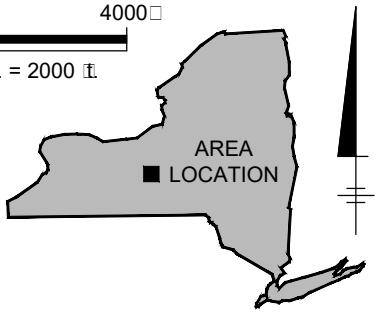
Notes:
1. Detected concentrations presented in bold.
(a) NYSDOH (2006) Soil Vapor/Indoor Air Matrix. Matrix 1 includes carbon tetrachloride, trichloroethene (TCE), and vinyl chloride; Matrix 2 includes 1,1,1-trichloroethane, 1,1-dichloroethene, cis-1,2-dichloroethene, and tetrachloroethene (PCE).
(b) Take reasonable and practical actions to identify source(s) and reduce exposures.
D = Concentration is the result of a dilution.
J = Analyte detected at or below quantitation limits.
NYSDOH = New York State Department of Health
U = Not detected at the reporting limit.
µg/m^3 = micrograms per cubic meter

FIGURES

REFERENCE: BASE MAP USGS 7.□ MIN. TOPO. WEST HENRIETTA, NY, 2013 □ PITTSFORD, NY, 2013.

0 2000□ 4000□

Approximate Scale: 1 in. = 2000 ft.



STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

SITE LOCATION MAP

ARCADIS Design & Consultancy for natural and built assets

FIGURE
1

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: ENVCAD LD:(Opt) PIC: W. POPHAM PM: W. POPHAM TM: (Opt.) TR: A. RICHARDSON LYR:(Opt)ON=*;OFF=*REF*
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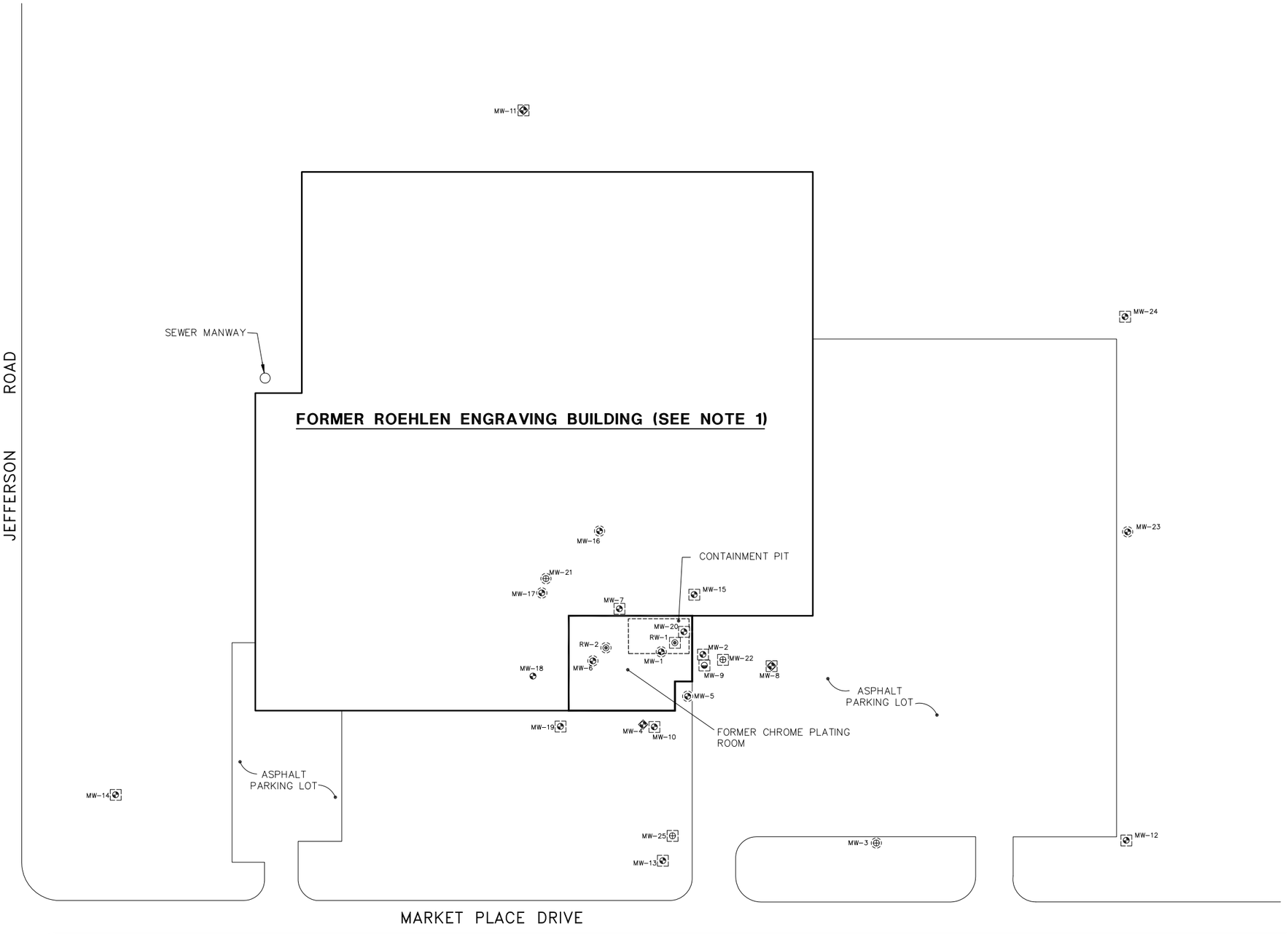

LEGEND:

- LACUSTRINE MONITORING WELL LOCATION
- TILL MONITORING WELL LOCATION
- BEDROCK MONITORING WELL LOCATION
- GROUND-WATER RECOVERY WELL LOCATION
- MONITORING WELL INSTALLED BY OTHERS
- DESTROYED MONITORING WELL
- DECOMMISSIONED MONITORING WELL

NOTE:

1. FORMER ROEHLEN ENGRAVING BUILDING DEMOLISHED IN APRIL/MAY 2008

2. ABANDONED MONITORING WELLS INDICATES WELLS THAT WERE DAMAGED DURING THE DEMOLITION ACTIVITIES, AND COULD NOT BE RELOCATED.

3. DECOMMISSIONED MONITORING WELLS INDICATES WELLS THAT WERE DECOMMISSIONED IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION'S GROUNDWATER MONITORING WELL DECOMMISSIONING PROCEDURES.

0 60' 120'

GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENVGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

PRE-EXCAVATION SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE 2

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: W. POPHAM PM: W. POPHAM TM:(Opt) TR: A. RICHARDSON LYR:(Opt)ON=*;OFF=*REF*
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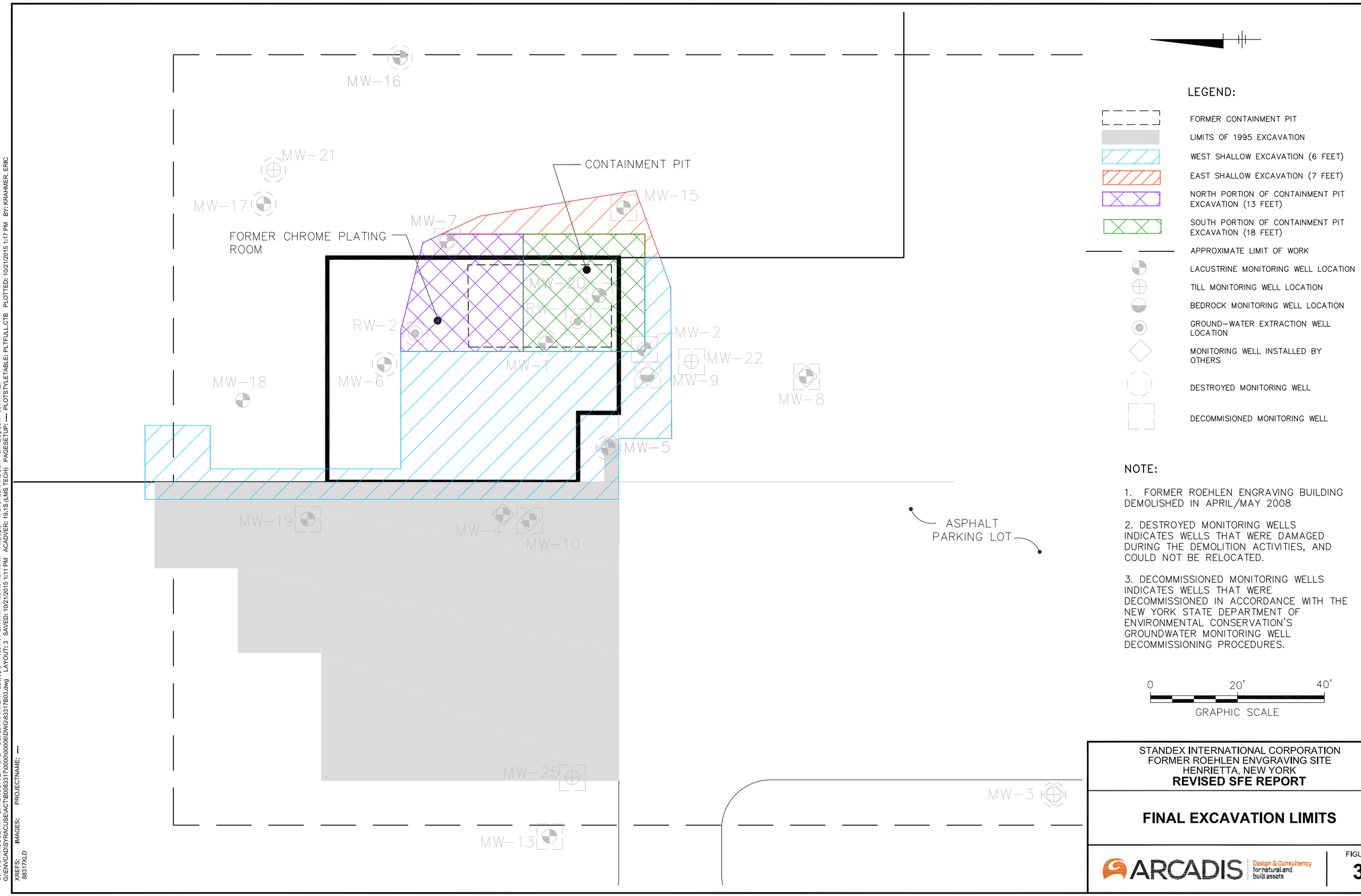

LEGEND:

- FORMER CONTAINMENT PIT
- LIMITS OF 1995 EXCAVATION
- WEST SHALLOW EXCAVATION (6 FEET)
- EAST SHALLOW EXCAVATION (7 FEET)
- NORTH PORTION OF CONTAINMENT PIT EXCAVATION (13 FEET)
- SOUTH PORTION OF CONTAINMENT PIT EXCAVATION (18 FEET)
- APPROXIMATE LIMIT OF WORK
- LACUSTRINE MONITORING WELL LOCATION
- TILL MONITORING WELL LOCATION
- BEDROCK MONITORING WELL LOCATION
- GROUND-WATER EXTRACTION WELL LOCATION
- MONITORING WELL INSTALLED BY OTHERS
- DESTROYED MONITORING WELL
- DECOMMISIONED MONITORING WELL

NOTE:

1. FORMER ROEHLEN ENGRAVING BUILDING DEMOLISHED IN APRIL/MAY 2008

2. DESTROYED MONITORING WELLS INDICATES WELLS THAT WERE DAMAGED DURING THE DEMOLITION ACTIVITIES, AND COULD NOT BE RELOCATED.

3. DECOMMISSIONED MONITORING WELLS INDICATES WELLS THAT WERE DECOMMISSIONED IN ACCORDANCE WITH THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION'S GROUNDWATER MONITORING WELL DECOMMISSIONING PROCEDURES.

0 20' 40'

GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENVGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

FINAL EXCAVATION LIMITS

ARCADIS Design & Consultancy for natural and built assets

FIGURE
3

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: W. POPHAM PM: W. POPHAM TM:(Opt) TR: A. RICHARDSON LYR:(Opt)ON="OFF"="REF"
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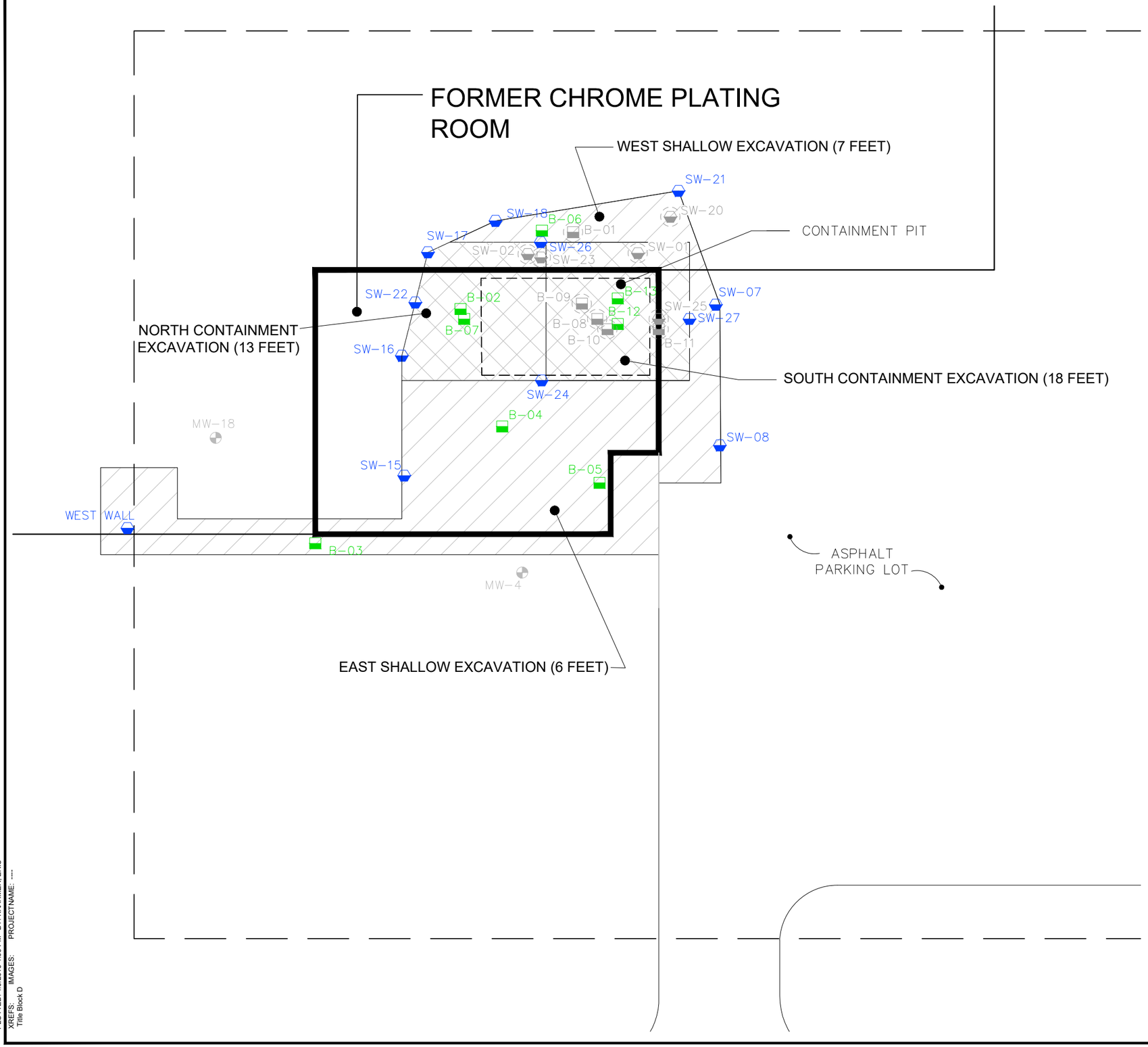

LEGEND:

- FORMER CONTAINMENT PIT
- WEST SHALLOW EXCAVATION (6 FEET)
- EAST SHALLOW EXCAVATION (7 FEET)
- NORTH CONTAINMENT PIT EXCAVATION (13 FEET)
- SOUTH CONTAINMENT PIT EXCAVATION (18 FEET)
- APPROXIMATE LIMIT OF WORK
- FINAL CONFIRMATORY SIDEWALL SAMPLE LOCATION
- FINAL CONFIRMATORY BOTTOM SAMPLE LOCATION
- CONFIRMATORY SIDEWALL SAMPLE LOCATION (LATER REMOVED)
- CONFIRMATORY BOTTOM SAMPLE LOCATION (LATER REMOVED)

NOTE:

FORMER ROEHLEN ENGRAVING BUILDING DEMOLISHED IN APRIL/MAY 2008.

0 20' 40'

GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENVGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

CONFIRMATORY SAMPLING LOCATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 4

CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: W. POPHAM PM: W. POPHAM TM:(Opt) TR: A. RICHARDSON LYR:(On)ON=*;OFF=*REF*
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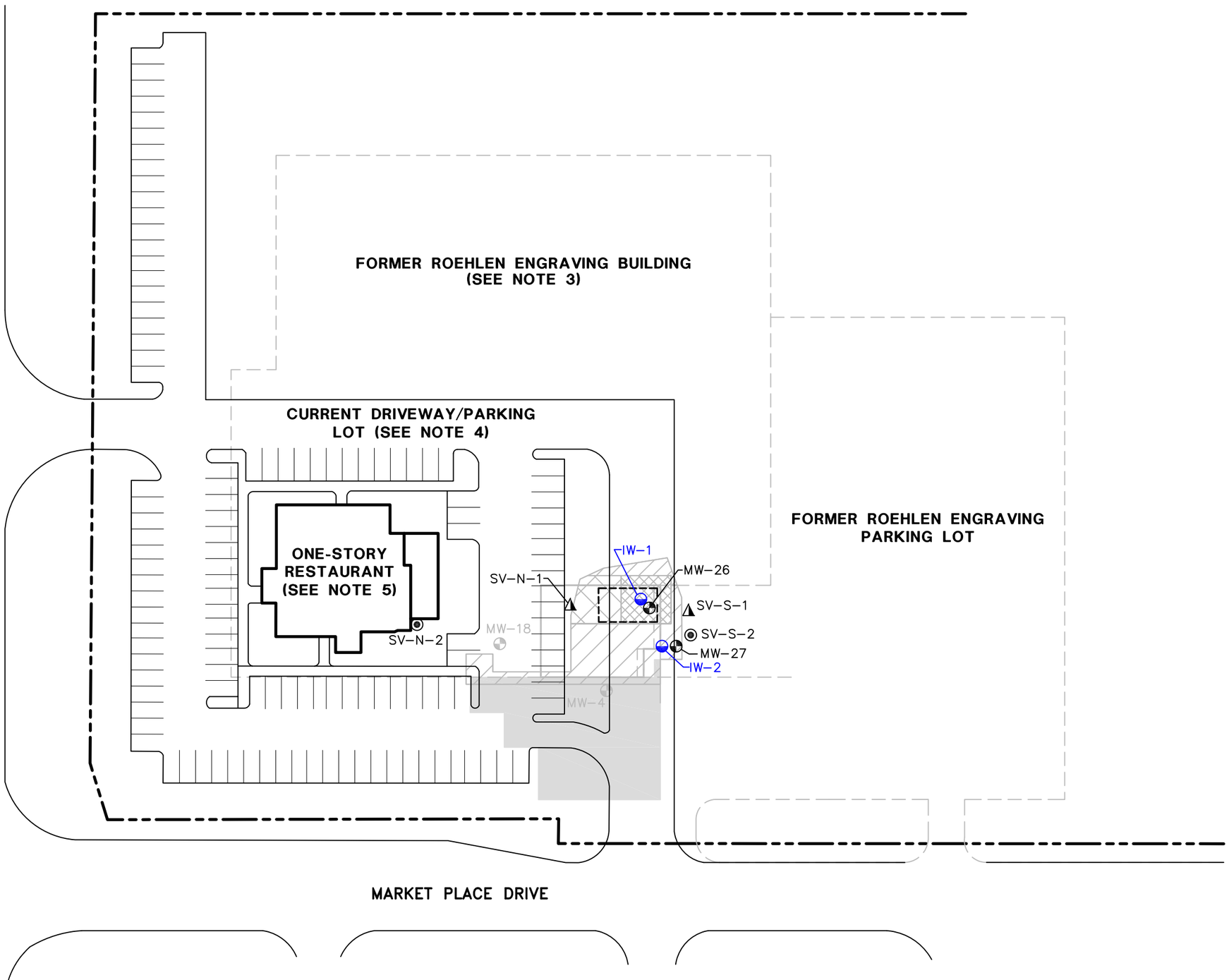


LEGEND:

- APPROXIMATE PROPERTY LINE
- FORMER CONTAINMENT PIT
- LIMITS OF 1995 EXCAVATION
- WEST SHALLOW EXCAVATION (6 FEET)
- EAST SHALLOW EXCAVATION (7 FEET)
- NORTH PORTION OF CONTAINMENT PIT EXCAVATION (13 FEET)
- SOUTH PORTION OF CONTAINMENT PIT EXCAVATION (18 FEET)
- LACUSTRINE MONITORING WELL LOCATION
- LACUSTRINE MONITORING WELL LOCATION (ABANDONED AUGUST 2009)
- SOIL VAPOR SAMPLE LOCATION (APRIL 2010)
- SOIL VAPOR SAMPLE LOCATION (SEPTEMBER 2010)
- INJECTION WELL LOCATION

NOTES:

1. CURRENT FEATURES (DRIVEWAY, PARKING LOT, AND BUILDING LOCATION) FROM A DRAWING BY CAMINA, WOOD, & MORRIS, PC., TITLED "OVERALL SITE PLAN", DATED 3/09, @ A SCALE OF 1" 50'.
2. ALL LOCATIONS ARE APPROXIMATE.
3. FORMER ROEHLEN ENGRAVING BUILDING DEMOLISHED IN APRIL/MAY 2008.
4. CURRENT DRIVEWAY/PARKING LOT INSTALLED NOVEMBER 2009.
5. ONE-STORY RESTAURANT CONSTRUCTION COMPLETED JANUARY 2010.

0 60' 120'

GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

POST-EXCAVATION SITE PLAN

ARCADIS Design & Consultancy for natural and built assets

FIGURE
5

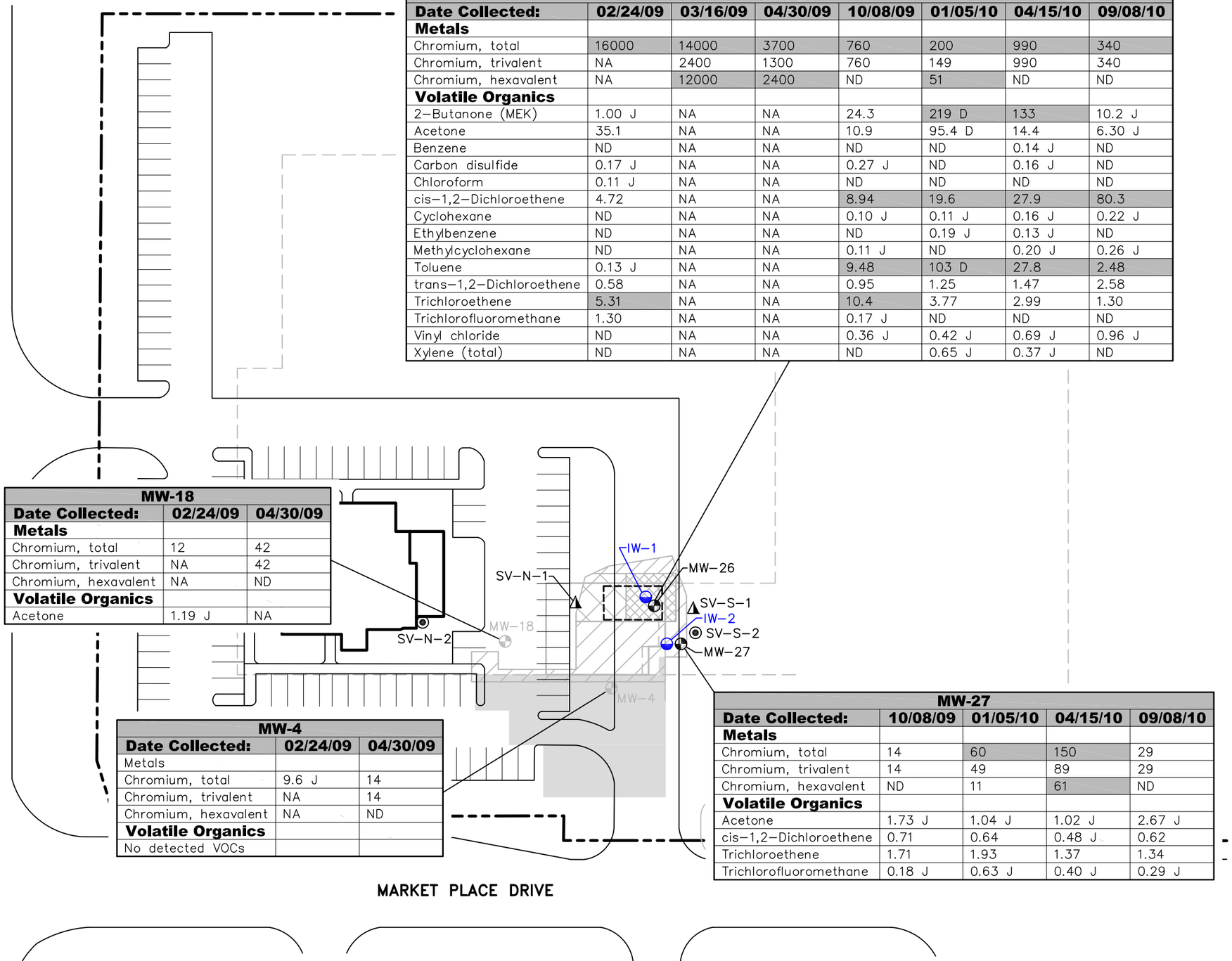
CITY: SYRACUSE NY DIV/GROUP: ENVCAD DB: E. KRAHMER LD:(Opt) PIC: W. POPHAM PM: W. POPHAM TM:(Opt) TR: A. RICHARDSON LYR:(Opt)ON=*;OFF=*REF*
G:\ENVCAD\SYRACUSE\ACTIB\083317\000\000006\DWG\83317B05.dwg LAYOUT: 5 SAVED: 10/21/2015 1:14 PM ACADVER: 19.1S (LMS TECH) PAGESETUP: ---- PLOTSTYLETABLE: PLTFULL.CTB PLOTTED: 10/21/2015 1:19 PM BY: KRAHMER, ERIC
XREFS: 88317XLB IMAGES: PROJECTNAME: ---

MW-26							
Date Collected:	**02/24/09**	**03/16/09**	**04/30/09**	**10/08/09**	**01/05/10**	**04/15/10**	**09/08/10**
Metals							
Chromium, total	16000	14000	3700	760	200	990	340
Chromium, trivalent	NA	2400	1300	760	149	990	340
Chromium, hexavalent	NA	12000	2400	ND	51	ND	ND
Volatile Organics							
2–Butanone (MEK)	1.00 J	NA	NA	24.3	219 D	133	10.2 J
Acetone	35.1	NA	NA	10.9	95.4 D	14.4	6.30 J
Benzene	ND	NA	NA	ND	ND	0.14 J	ND
Carbon disulfide	0.17 J	NA	NA	0.27 J	ND	0.16 J	ND
Chloroform	0.11 J	NA	NA	ND	ND	ND	ND
cis–1,2–Dichloroethene	4.72	NA	NA	8.94	19.6	27.9	80.3
Cyclohexane	ND	NA	NA	0.10 J	0.11 J	0.16 J	0.22 J
Ethylbenzene	ND	NA	NA	ND	0.19 J	0.13 J	ND
Methylcyclohexane	ND	NA	NA	0.11 J	ND	0.20 J	0.26 J
Toluene	0.13 J	NA	NA	9.48	103 D	27.8	2.48
trans–1,2–Dichloroethene	0.58	NA	NA	0.95	1.25	1.47	2.58
Trichloroethene	5.31	NA	NA	10.4	3.77	2.99	1.30
Trichlorofluoromethane	1.30	NA	NA	0.17 J	ND	ND	ND
Vinyl chloride	ND	NA	NA	0.36 J	0.42 J	0.69 J	0.96 J
Xylene (total)	ND	NA	NA	ND	0.65 J	0.37 J	ND

MW-18		
Date Collected:	**02/24/09**	**04/30/09**
Metals		
Chromium, total	12	42
Chromium, trivalent	NA	42
Chromium, hexavalent	NA	ND
Volatile Organics		
Acetone	1.19 J	NA

MW-4		
Date Collected:	**02/24/09**	**04/30/09**
Metals		
Chromium, total	9.6 J	14
Chromium, trivalent	NA	14
Chromium, hexavalent	NA	ND
Volatile Organics		
No detected VOCs		

MW-27				
Date Collected:	**10/08/09**	**01/05/10**	**04/15/10**	**09/08/10**
Metals				
Chromium, total	14	60	150	29
Chromium, trivalent	14	49	89	29
Chromium, hexavalent	ND	11	61	ND
Volatile Organics				
Acetone	1.73 J	1.04 J	1.02 J	2.67 J
cis–1,2–Dichloroethene	0.71	0.64	0.48 J	0.62
Trichloroethene	1.71	1.93	1.37	1.34
Trichlorofluoromethane	0.18 J	0.63 J	0.40 J	0.29 J



LEGEND:

- APPROXIMATE PROPERTY LINE
- FORMER CONTAINMENT PIT
- LIMITS OF 1995 EXCAVATION
- WEST SHALLOW EXCAVATION (6 FEET)
- EAST SHALLOW EXCAVATION (7 FEET)
- NORTH PORTION OF CONTAINMENT PIT EXCAVATION (13 FEET)
- SOUTH PORTION OF CONTAINMENT PIT EXCAVATION (18 FEET)
- LACUSTRINE MONITORING WELL LOCATION
- LACUSTRINE MONITORING WELL LOCATION (ABANDONED AUGUST 2009)
- SOIL VAPOR SAMPLE LOCATION (APRIL 2010)
- SOIL VAPOR SAMPLE LOCATION (SEPTEMBER 2010)
- INJECTION WELL LOCATION (ABANDONED SEPTEMBER 2009)

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER.
3. ONLY VOCs WITH DETECTED CONCENTRATIONS ARE PRESENTED.
4. SHADED CELLS INDICATE CONCENTRATION EXCEEDS NYSDEC TOGS 1.1.1 CRITERIA.
5. ND – NOT DETECTED.
6. NA – NOT ANALYZED.
7. J – ANALYTE DETECTED BELOW THE PRACTICAL QUANTITATION LIMIT.
8. D – ANALYTE DETECTED AT A SECONDARY DILUTION.

0 60' 120'

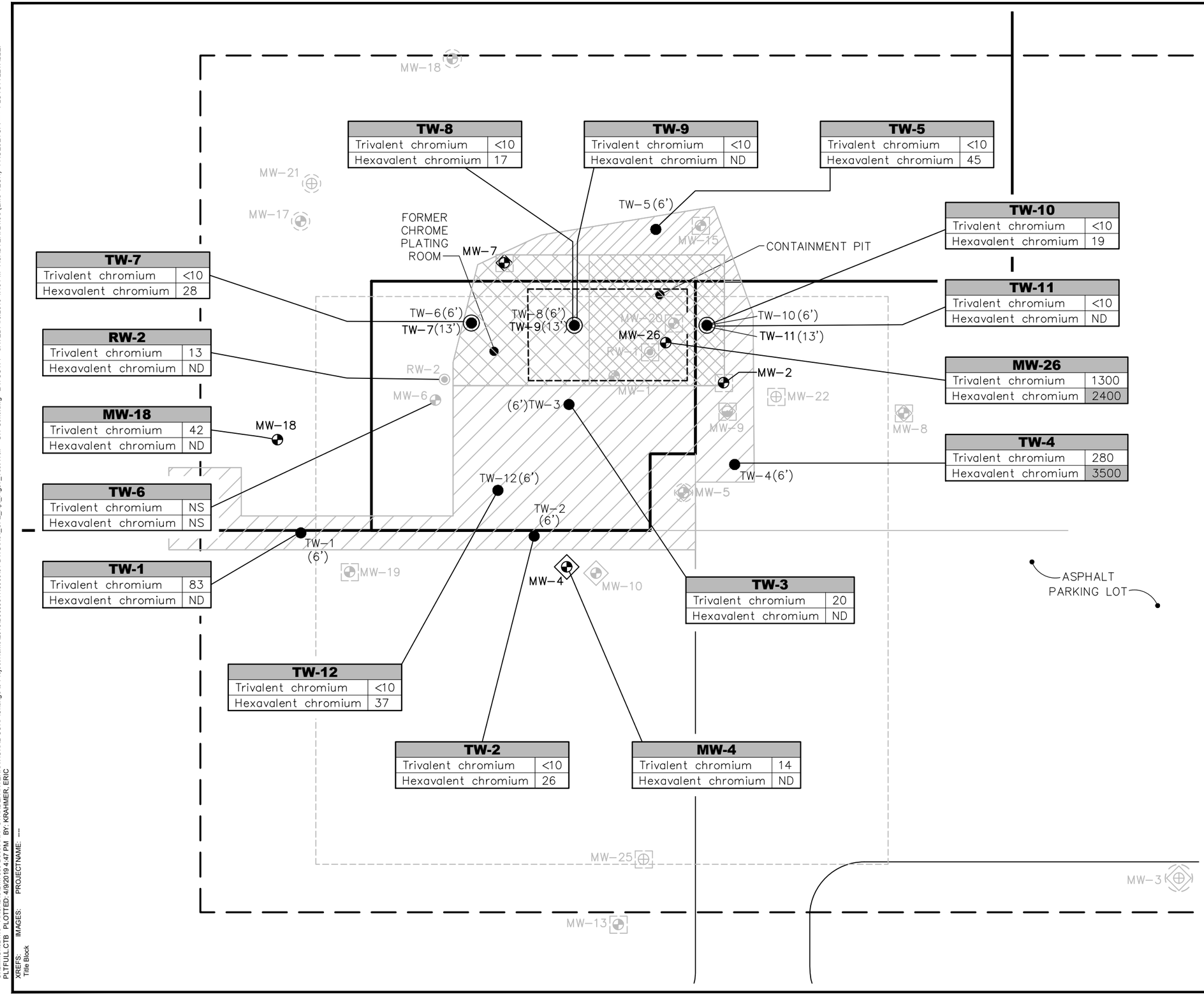
GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

POST-EXCAVATION GROUNDWATER CONCENTRATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 6



LEGEND:

- FORMER CONTAINMENT PIT
- LIMITS OF 1995 EXCAVATION
- WEST SHALLOW EXCAVATION (6 FEET)
- EAST SHALLOW EXCAVATION (7 FEET)
- NORTH PORTION OF CONTAINMENT PIT EXCAVATION (13 FEET)
- SOUTH PORTION OF CONTAINMENT PIT EXCAVATION (18 FEET)
- APPROXIMATE LIMIT OF WORK
- LACUSTRINE MONITORING WELL LOCATION
- TILL MONITORING WELL LOCATION
- BEDROCK MONITORING WELL LOCATION
- GROUND-WATER EXTRACTION WELL LOCATION
- MONITORING WELL INSTALLED BY OTHERS
- DESTROYED MONITORING WELL
- DECOMMISIONED MONITORING WELL
- 6 FOOT DEEP TEMPORARY WELL SAMPLED IN APRIL 2009
- 13 FOOT DEEP TEMPORARY WELL

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. SHADED CELLS INDICATE CONCENTRATION NYSDEC TOGS 1.1.1 CRITERIA.
3. ALL CONCENTRATIONS ARE IN MICROGRAMS/LITER.
4. ND – NOT DETECTED
5. NS – NOT SAMPLED–INSUFFICIENT VOLUME FROM WELL.
6. ALL SAMPLES COLLECTED IN APRIL 2009, PRIOR TO AUGUST 2009 INJECTION ACTIVITIES.

0 20' 40'

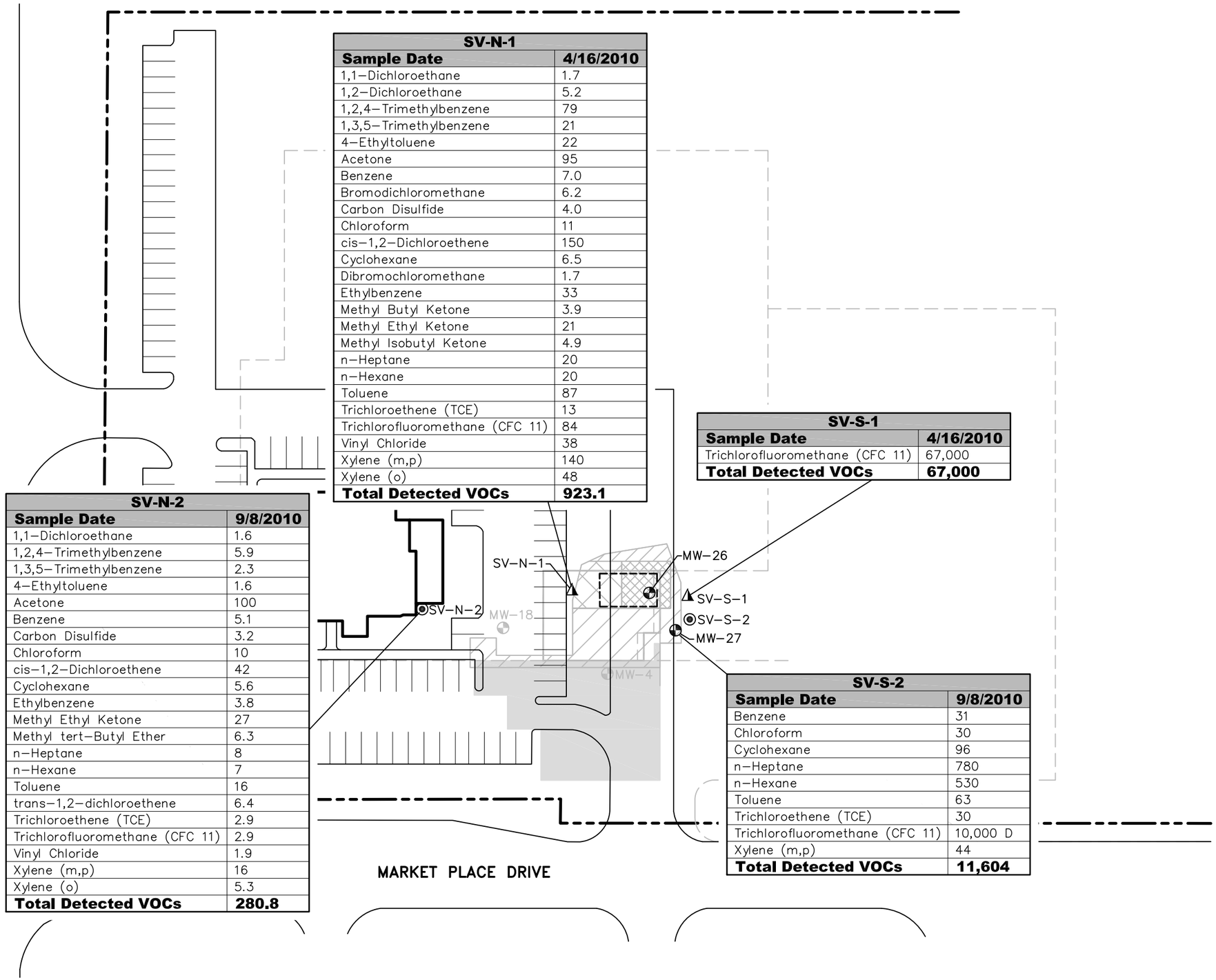
GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

PRE-INJECTION TEST/TEMPORARY WELL LOCATIONS AND GROUNDWATER CONCENTRATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 7



LEGEND:

- APPROXIMATE PROPERTY LINE
- FORMER CONTAINMENT PIT
- LIMITS OF 1995 EXCAVATION
- WEST SHALLOW EXCAVATION (6 FEET)
- EAST SHALLOW EXCAVATION (7 FEET)
- NORTH PORTION OF CONTAINMENT PIT EXCAVATION (13 FEET)
- SOUTH PORTION OF CONTAINMENT PIT EXCAVATION (18 FEET)
- LACUSTRINE MONITORING WELL LOCATION
- LACUSTRINE MONITORING WELL LOCATION (ABANDONED AUGUST 2009)
- SOIL VAPOR SAMPLE LOCATION (APRIL 2010)
- SOIL VAPOR SAMPLE LOCATION (SEPTEMBER 2010)

NOTES:

1. ALL LOCATIONS ARE APPROXIMATE.
2. ALL CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER CUBIC METER.
3. ONLY VOCs WITH DETECTED CONCENTRATIONS ARE PRESENTED.
4. D – ANALYTE DETECTED AT A SECONDARY DILUTION.

0 60' 120'

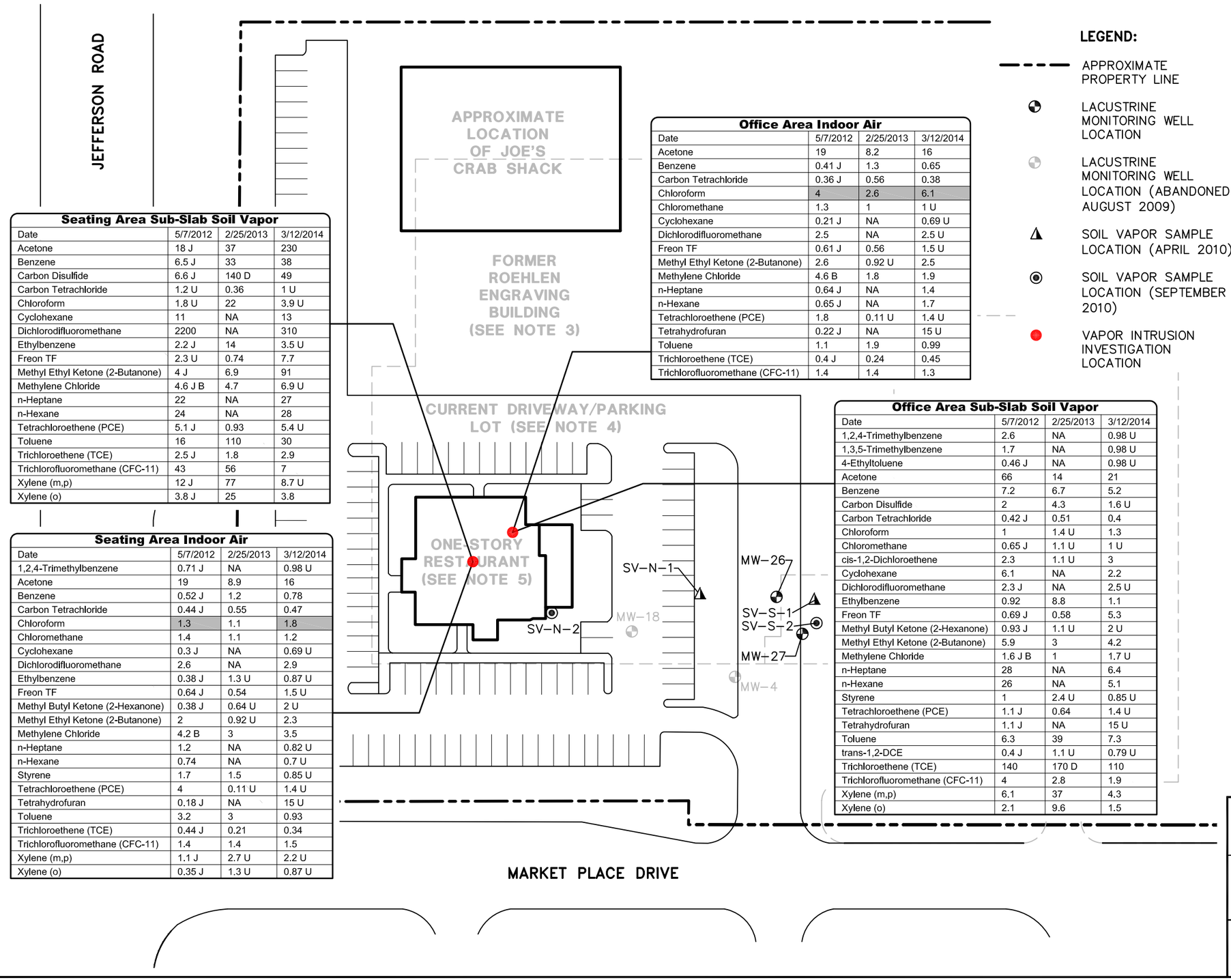
GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

SOIL VAPOR VOC CONCENTRATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE 8



Seating Area Sub-Slab Soil Vapor

Date	5/7/2012	2/25/2013	3/12/2014
Acetone	18 J	37	230
Benzene	6.5 J	33	38
Carbon Disulfide	6.6 J	140 D	49
Carbon Tetrachloride	1.2 U	0.36	1 U
Chloroform	1.8 U	22	3.9 U
Cyclohexane	11	NA	13
Dichlorodifluoromethane	2200	NA	310
Ethylbenzene	2.2 J	14	3.5 U
Freon TF	2.3 U	0.74	7.7
Methyl Ethyl Ketone (2-Butanone)	4 J	6.9	91
Methylene Chloride	4.6 J B	4.7	6.9 U
n-Heptane	22	NA	27
n-Hexane	24	NA	28
Tetrachloroethene (PCE)	5.1 J	0.93	5.4 U
Toluene	16	110	30
Trichloroethene (TCE)	2.5 J	1.8	2.9
Trichlorofluoromethane (CFC-11)	43	56	7
Xylene (m,p)	12 J	77	8.7 U
Xylene (o)	3.8 J	25	3.8

Seating Area Indoor Air

Date	5/7/2012	2/25/2013	3/12/2014
1,2,4-Trimethylbenzene	0.71 J	NA	0.98 U
Acetone	19	8.9	16
Benzene	0.52 J	1.2	0.78
Carbon Tetrachloride	0.44 J	0.55	0.47
Chloroform	1.3	1.1	1.8
Chloromethane	1.4	1.1	1.2
Cyclohexane	0.3 J	NA	0.69 U
Dichlorodifluoromethane	2.6	NA	2.9
Ethylbenzene	0.38 J	1.3 U	0.87 U
Freon TF	0.64 J	0.54	1.5 U
Methyl Butyl Ketone (2-Hexanone)	0.38 J	0.64 U	2 U
Methyl Ethyl Ketone (2-Butanone)	2	0.92 U	2.3
Methylene Chloride	4.2 B	3	3.5
n-Heptane	1.2	NA	0.82 U
n-Hexane	0.74	NA	0.7 U
Styrene	1.7	1.5	0.85 U
Tetrachloroethene (PCE)	4	0.11 U	1.4 U
Tetrahydrofuran	0.18 J	NA	15 U
Toluene	3.2	3	0.93
Trichloroethene (TCE)	0.44 J	0.21	0.34
Trichlorofluoromethane (CFC-11)	1.4	1.4	1.5
Xylene (m,p)	1.1 J	2.7 U	2.2 U
Xylene (o)	0.35 J	1.3 U	0.87 U

Office Area Indoor Air

Date	5/7/2012	2/25/2013	3/12/2014
Acetone	19	8.2	16
Benzene	0.41 J	1.3	0.65
Carbon Tetrachloride	0.36 J	0.56	0.38
Chloroform	4	2.6	6.1
Chloromethane	1.3	1	1 U
Cyclohexane	0.21 J	NA	0.69 U
Dichlorodifluoromethane	2.5	NA	2.5 U
Freon TF	0.61 J	0.56	1.5 U
Methyl Ethyl Ketone (2-Butanone)	2.6	0.92 U	2.5
Methylene Chloride	4.6 B	1.8	1.9
n-Heptane	0.64 J	NA	1.4
n-Hexane	0.65 J	NA	1.7
Tetrachloroethene (PCE)	1.8	0.11 U	1.4 U
Tetrahydrofuran	0.22 J	NA	15 U
Toluene	1.1	1.9	0.99
Trichloroethene (TCE)	0.4 J	0.24	0.45
Trichlorofluoromethane (CFC-11)	1.4	1.4	1.3

Office Area Sub-Slab Soil Vapor

Date	5/7/2012	2/25/2013	3/12/2014
1,2,4-Trimethylbenzene	2.6	NA	0.98 U
1,3,5-Trimethylbenzene	1.7	NA	0.98 U
4-Ethyltoluene	0.46 J	NA	0.98 U
Acetone	66	14	21
Benzene	7.2	6.7	5.2
Carbon Disulfide	2	4.3	1.6 U
Carbon Tetrachloride	0.42 J	0.51	0.4
Chloroform	1	1.4 U	1.3
Chloromethane	0.65 J	1.1 U	1 U
cis-1,2-Dichloroethene	2.3	1.1 U	3
Cyclohexane	6.1	NA	2.2
Dichlorodifluoromethane	2.3 J	NA	2.5 U
Ethylbenzene	0.92	8.8	1.1
Freon TF	0.69 J	0.58	5.3
Methyl Butyl Ketone (2-Hexanone)	0.93 J	1.1 U	2 U
Methyl Ethyl Ketone (2-Butanone)	5.9	3	4.2
Methylene Chloride	1.6 J B	1	1.7 U
n-Heptane	28	NA	6.4
n-Hexane	26	NA	5.1
Styrene	1	2.4 U	0.85 U
Tetrachloroethene (PCE)	1.1 J	0.64	1.4 U
Tetrahydrofuran	1.1 J	NA	15 U
Toluene	6.3	39	7.3
trans-1,2-DCE	0.4 J	1.1 U	0.79 U
Trichloroethene (TCE)	140	170 D	110
Trichlorofluoromethane (CFC-11)	4	2.8	1.9
Xylene (m,p)	6.1	37	4.3
Xylene (o)	2.1	9.6	1.5

LEGEND:

- APPROXIMATE PROPERTY LINE
- LACUSTRINE MONITORING WELL LOCATION
- LACUSTRINE MONITORING WELL LOCATION (ABANDONED AUGUST 2009)
- SOIL VAPOR SAMPLE LOCATION (APRIL 2010)
- SOIL VAPOR SAMPLE LOCATION (SEPTEMBER 2010)
- VAPOR INTRUSION INVESTIGATION LOCATION

NOTES:

1. CURRENT FEATURES (DRIVEWAY, PARKING LOT, AND BUILDING LOCATION) FROM A DRAWING BY CAMINA, WOOD, & MORRIS, PC., TITLED "OVERALL SITE PLAN", DATED 3/09, @ A SCALE OF 1"=50.
2. ALL LOCATIONS ARE APPROXIMATE.
3. FORMER ROEHLEN ENGRAVING BUILDING DEMOLISHED IN APRIL/MAY 2008.
4. CURRENT DRIVEWAY/PARKING LOT INSTALLED NOVEMBER 2009.
5. ONE-STORY RESTAURANT CONSTRUCTION COMPLETED JANUARY 2010.
6. ALL CONCENTRATIONS ARE PRESENTED IN MICROGRAMS PER CUBIC METER (ug/m3).
7. SHADED CELLS EXCEED UNITED STATES ENVIRONMENTAL PROTECTION AGENCY BUILDING ASSESSMENT AND SURVEY EVALUATION BACKGROUND VALUE.
8. J = ANALYTE DETECTED AT OR BELOW THE QUANTITATION LIMITS.
9. U = NOT DETECTED AT THE REPORTING LIMIT.
10. B = COMPOUND WAS FOUND IN THE BLANK AND SAMPLE.
11. D = CONCENTRATION IS THE RESULT OF A DILUTION.
12. NA = NOT ANALYZED.

0 60' 120'

GRAPHIC SCALE

STANDEX INTERNATIONAL CORPORATION
FORMER ROEHLEN ENGRAVING SITE
HENRIETTA, NEW YORK
REVISED SFE REPORT

VAPOR INTRUSION CONCENTRATIONS

ARCADIS Design & Consultancy for natural and built assets

FIGURE **9**