SUPPLEMENTAL CONCEPTUAL SITE MODEL (CSM) INVESTIGATION WORK PLAN

ELG UTICA ALLOYS
SITE NO. 633047

Prepared For:
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Utica, New York

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ACRONYMS AND ABBREVIATIONS

bgs	below ground surface
cc	cubic centimeter
cis-1,2-DCE	cis-1,2-dichloroethene
COC	contaminant of concern
CSM	Conceptual Site Model
1,2-DCE	1,2-dichloroethene
DER	Division of Environmental Remediation
DO	dissolved oxygen
ELG UA	ELG Utica Alloys Inc.
ft	feet
f_{oc}	fraction organic carbon
FFS	Focused Feasibility Study
gpm	gallons per minute
HASP	Health and Safety Plan
HVAC	heating, ventilation, and air conditioning
IDW	investigative derived waste
IRM	Interim Remedial Measure
ISCO	in-situ chemical oxidation
lpm	liter per minute
LWBZ	lower water-bearing zone
MDL	method detection limit
MS/MSD	matrix spike/matrix spike duplicate
NELAP	National Environmental Laboratory Accreditation Program
NGVD	National Geodetic Vertical Datum
NTU	Nephelometric Turbidity Units
NYCRR	New York Code of Rules and Regulations
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
OB&G	O'Brien & Gere
OHSWA	Oneida-Herkimer Solid Waste Authority

ORP	oxidation reduction potential
OSHA	Occupational Safety and Health Administration
PCB	Polychlorinated biphenyl
ppm	parts per million
PVC	polyvinyl chloride
QA/QC	Quality Control/Quality Assurance
RL	reporting limit
RSCO	Recommended Soil Cleanup Objective
SVOC	semi-volatile volatile organic compound
S&W	Stearns & Wheler
TCE	trichloroethene
TOC	total organic carbon
VOC	volatile organic compound
USCS	Unified Soils Classification System
USEPA	United States Environmental Protection Division
USGS	United States Geological Survey
UST	underground storage tank
UWBZ	upper water-bearing zone
µg/L	micrograms per liter
$\mu g/m^3$	micrograms per cubic meter
VC	vinyl chloride

1.0 INTRODUCTION

This Supplemental Conceptual Site Model (CSM) Investigation Work Plan (Work Plan) for the ELG Utica Alloys, Inc. (ELG UA) site located in Utica, New York (herein referred to as the Site) is being submitted in response to the New York State Department of Environmental Conservation (NYSDEC) request in their letter dated October 21, 2011. As part of the Draft Focused Feasibility Study (FFS), a preliminary CSM was developed for the Site, which reflects ELG UA's current understanding of the general physical, geological, hydrogeological, and chemical conditions and behavior at the Site. The preliminary CSM is based on the review of historical Site documents and United States Geological Survey (USGS) regional data. The primary data gaps in the CSM as identified in the Draft FFS Report prepared by EHS Support, Inc. for ELG UA and dated August 31, 2011 (EHS, 2011b) are discussed in **Section 3** of this report.

1.1 Applicable Regulations

This Work Plan has been prepared in accordance with the substantive portions of Title 6 of the New York Code of Rules and Regulations (NYCRR) Part 375 for site characterization and remedial investigation, the NYSDEC Soil Cleanup Guidance (CP-51) dated October 21, 2010, and the Division of Environmental Remediation (DER), *Technical Guidance for Site Investigation and Remediation* (DER-10) dated May 2010 (DER, 2010).

1.2 Report Organization

This Work Plan is comprised of seven sections and the organization and content of the report are as follows:

- Section 1: Introduction and Scope – This section describes the purpose of this Work Plan.
- Section 2: Site Description and History – This section describes the Site features, location, and surrounding area and summarizes the previous Site and remedial investigations performed at the Site.
- Section 3: Scope of Work – This section describes the recommended scope of work based on the data gaps identified during development of the preliminary CSM.
- Section 4: Quality Assurance/Quality Control – This section details specific procedures that will be implemented and maintained to control and assure data quality for supplemental CSM investigations.
- Section 5: Management – This section describes health and safety procedures, management of investigative derived waste (IDW), and project documentation management procedures to ensure overall project safety and quality.
- Section 6: Proposed Schedule of Activities
- Section 7: References

2.0 SITE DESCRIPTION AND HISTORY

2.1 Site Description

The Site is located at the corner of Wurz Avenue and Leland Avenue in an industrialized area of the City of Utica, New York as shown on **Figure 2-1**. The ELG Utica Alloys facility recycles specialty metal turnings generated off-site by machining operations typically connected with the production of aerospace parts and equipment. The Site is approximately 1.5 acres in size, with a large building (approximately 38,000 square feet) that contains offices, laboratories and recycling machinery. The remainder of the property is used for outside storage of bundled metal turnings pending processing. The Site layout is provided on **Figure 2-2**.

The Site is bordered to the south by the Leland Avenue extension leading to the county sewer plant and Oneida-Herkimer Solid Waste Authority (OHSWA), and then a railroad switching yard that runs east-west. The City of Utica Fire Department Training Facility, an industrial property (Universal Waste), a gravel road, and the Mohawk River are to the north of the Site and a bulk petroleum tank farm (terminal) is to the northwest. According to the *Preliminary Site Assessment* (Stearns & Wheler [S&W], 2000b), the petroleum bulk facility was abandoned in 1972. The City of Utica Transit Authority, Leland and Wurz Avenues, a parking lot, and vacant land (United Contractors) are located to the west. Wooded vacant land is located to the east of the Site.

2.2 Site History

Historical documentation of materials used and occasionally spilled at the Site is provided in the *Waste Management Study Report* prepared by Clayton Environmental Consultants (Clayton Environmental) (1984). The following is a brief summary of the findings of that study.

It is reported that prior to being used for metals processing; the Site may have been used as a brickyard (Clayton Environmental, 1984). There are no records indicating that the Site was ever used for hazardous waste disposal. Previous reports have suggested that some of the polychlorinated biphenyl (PCB), trichloroethene (TCE), and other contaminants may have been conveyed to the Site from upgradient sources through the public sewer system during seasonal flooding occurrences (W.F. Cosulich Associates, 1993).

Historically, TCE has been used by the facility to degrease metal turnings. Sludge generated from this process was placed in drums and stored in an area near the southwest corner of the property. This procedure may have resulted in spills of the material to the ground in this area (Clayton Environmental, 1984).

2.3 Previous Investigations and Remedial Measures

The following table **(Table 2-1)** presents a chronological summary of the investigations conducted at the Site to date, along with the historical documents associated with each investigation.

Table 2-1: Summary of Previous Investigations and Interim Remedial Measures

Date	Task	Report
1993	A voluntary assessment of surface and subsurface contamination potential was conducted, on behalf of Utica Alloys, which included the following: • Identification of potential pathways for contaminant migration, including surface water, groundwater, storm and sanitary sewers and associated bedding materials • Identification of reported contaminant releases in the area • Identification of possible existing contaminant sources • Evaluation of the potential for contaminants to migrate onto the Site The report concluded that there was a possibility for transport of contaminants to the Site from off-site sources via surface water, groundwater, and sewer systems.	*Surface and Subsurface Contamination Potential* (W.F. Cosulich Associates, 1993)
1996	In accordance with the Consent Order between NYSDEC and Utica Alloys (Index No. A6-0326-95-03) dated September 27, 1995, an investigation was performed to evaluate the potential for hazardous waste contamination on-site from facility operations. Findings included the following: • A number of volatile organic compounds (VOCs), including TCE, 1,2-dichloroethene (1,2-DCE), and vinyl chloride (VC), were detected in on-Site groundwater samples. • Soil samples from the storage tank area (**Figure 2-2**) indicated hundreds to thousands of parts per million (ppm) of TCE in near-surface soils. • PCBs in storage tank area soil samples were at concentrations below cleanup guidelines.	*Supplemental Investigation Report* (W.F. Cosulich Associates, 1996)

Date	Task	Report
	• PCBs exceeded NYSDEC soil cleanup guidelines at both the turnings drum and turnings pile storage areas (**Figure 2-2)**. Because the maximum depth of soil samples collected for PCB analysis did not exceed 1.5 feet below ground surface (ft bgs), the vertical extent of PCB impact is uncertain.	
1998	A soil and groundwater investigation was performed to assess and delineate petroleum impacts from a former 4,000-gallon steel diesel underground storage tank (UST) related to Spill Number 94-03364 (**Figure 2-2**). Findings included the following: • One of four soil samples from the former tank pit had a number of exceedances of guidance values for volatile organic compounds (VOCs) and semi-volatile volatile organic compounds (SVOCs). • The groundwater standard of 0.07 micrograms per liter (µg/L) for benzene was exceeded in groundwater samples from wells MW-1 and MW-2.	*Report on UST Investigation* (S&W, 1998)
1999 and 2005	A Remedial Investigation and Interim Remedial Measures (IRM) Alternative Analysis program was initiated in 1999 by S&W. These activities were conducted in accordance with the NYSDEC Consent Order, dated September 27, 1995, following discovery of VOCs and PCBs at the Site. A supplemental remedial investigation was completed in 2005 to further characterize Site conditions. Findings included the following: • PCBs in shallow soil exceeding the Recommended Soil Cleanup Objectives (RSCOs) were detected in several areas in the outside storage area of the Site (PCB Areas, **Figure 2-3**). • TCE in soils exceeding RSCOs was detected in the vicinity of the former TCE tank on the west side of the building (TCE Areas, **Figure 2-4**). • TCE was detected in the groundwater at	*Remedial Investigation and Interim Remedial Measures Alternatives Analysis* (S&W, 2000a). *Supplemental Remedial Investigation* (S&W, 2005)

Date	Task	Report
	concentrations above the Class GA Ground Water Standard of 5 µg/L, in the vicinity and immediately downgradient (north) of the former TCE tank and TCE Areas (**Figure 2-5)**.	
2007	A total of 83.2 tons of soil were excavated and removed from seven PCB Areas (**Figure 2-3)**. A total of 527.5 tons of soil were excavated and removed from three TCE Areas. In addition, a total of 6,951 gallons of water were pumped from one of the TCE Area excavations and transferred off-site for disposal.	*Interim Remedial Measures Report* (OB&G [O'Brien & Gere], 2010).
2008	The findings of the Sub-slab and Indoor Air Evaluation resulted in the following conclusion: • Based on the data collected in March 2008 and the NYSDOH vapor intrusion guidance document, the sub-slab and indoor air concentrations identified for TCE and cis-1,2-dichloroethene are at concentrations where mitigation is recommended. • However, based on the data collected to date, a vapor intrusion mitigation system would not be necessary to meet the OSHA limits. • UA intends to move the office and office staff to a new location in Herkimer New York in July 2012; eliminating the indoor air exposure pathway.	July 21, 2008 letter to NYSDEC (OB&G, 2008b) Sub-slab and Indoor Air Sampling Results
December 2007, April 2008, and October 2008	The objectives of the groundwater sampling portion of the IRM consisted of the following: • Evaluate changes in groundwater quality following removal of impacted soil from the source area as documented in the *Soil Removal Report* (OB&G, 2008a). • Evaluate if the existing monitoring network was sufficient to monitor the groundwater plume. • The report concluded that the excavation of TCE-containing soil during the IRM has contributed to the reduction in concentration of TCE in groundwater. The	*Post-IRM Ground Water Monitoring Program Report* (OB&G, 2009)

Date	Task	Report
	ratio of TCE to breakdown products (cis-1,2-DCE and VC) at the edges of the TCE-impacted soil removal area suggests that degradation is occurring in these areas. However, concentrations of VOCs in groundwater in this area are still above groundwater criteria.	
2010	Based on a February 14, 2010 request by the NYSDEC, a supplemental investigation was performed to supplement historical assessment data and delineate petroleum impacts from a former 4,000-gallon steel diesel UST and close out Spill Number 94-03364. The results of the investigation coupled with the historical investigation data (S&W, 1998), indicated the following: • The petroleum impacts from the former diesel UST are localized and confined to the immediate vicinity of the former UST. This is supported by the absence of groundwater detections of VOCs and the very low concentrations of SVOCs, detected between reporting limits (RLs) and method detection limits (MDLs), downgradient of the former tank pit. In general, the compounds detected in soils from the most recent investigation are insoluble and not mobile in groundwater. This is supported by the limited petroleum impacts detected downgradient of the source. The NYSDEC has not responded to this report to date.	*Site Characterization Report* (EHS Support, 2011a)
2011	A preliminary FFS was performed which identified the following key data gaps: • Lithology and thickness of upper water-bearing zone (UWBZ) • Structural surface of confining unit (depth of the confining unit) • Lack of water level control points to determine UWBZ groundwater flow direction • Aquifer hydraulic properties of the UWBZ • Physical properties of the confining unit	*Draft Focused Feasibility Study Report* (EHS Support, 2011b)

Date	Task	Report
	• Water quality conditions in the conceptualized downgradient region of the UWBZ (horizontal and vertical) • Biogeochemical characterization	

Physical, hydrogeological, and analytical data from the above-referenced investigations and actions were used to develop the preliminary CSM presented in the Draft FFS Report (EHS Support, 2011b), and the proposed supplemental CSM investigation scope of work presented in **Section 3** of this Work Plan.

3.0 SCOPE OF WORK

The recommended scope of work presented in this section is based on the data gaps identified during development of the preliminary CSM. The primary data gaps identified in the CSM are as follows:

- Lithology and thickness of upper water-bearing zone (UWBZ)
- Structural surface of confining unit (depth of the confining unit)
- Lack of water level control points to determine UWBZ groundwater flow direction
- Aquifer hydraulic properties of the UWBZ
- Physical properties of the confining unit
- Water quality conditions in the conceptualized downgradient region of the UWBZ (horizontal and vertical)
- Biogeochemical characterization

These data gaps need to be addressed before the CSM can be completed and remedial alternatives can be evaluated. To address these data gaps, it is recommended that up to eight (8) new or replacement monitoring wells and two (2) surface water gaging sites be installed to:

- Complete the identification of groundwater migration pathways for VOCs in the UWBZ
- Complete the characterization of VOC groundwater impacts in the UWBZ
- Gain insight into aquifer properties of the UWBZ and confining unit that directly affect quantitative evaluations of remedial alternatives

The proposed activities to be completed in accordance with this Work Plan include, but are not limited to, lithology characterization, vertical profiling of the VOCs in groundwater at the proposed monitoring well locations (**Figure 3-1),** installation of groundwater monitoring wells, installation of river staff gages, collection and analysis of groundwater samples, measurement of groundwater and river levels, performance of in situ hydraulic conductivity tests, and reporting.

3.1 Utility Location

Drilling locations will be marked for approval by the property owner, and underground utility clearance will be conducted in accordance with New York regulations. A private underground utility locating contractor will also be contracted to complete a Ground Penetrating Radar survey at each of the proposed boring locations. Property underground utility maps will be consulted when available to assist in utility location.

3.2 Lithology Characterization

Based on regional geologic conditions (Casey and Reynolds, 1988), the stratified-drift aquifer consists of three hydrostratigraphic units as shown in **Figure 3-6** and described below:

- UWBZ
    - Consists of the alluvium sediments.
    - Water-bearing zone is unconfined and depth to water occurs approximately 5 ft bgs.
    - Saturated thickness is approximately 30 feet.
- Confining Unit
    - Consists of the lacustrine and till sediments.
    - Approximate thickness of 145 ft.
- Lower Water-bearing Zone (LWBZ)
    - Consists of the outwash sand and gravel sediments with approximate thickness of 70 ft.
    - Water-bearing zone is confined by the overlying lacustrine and till sediments.

In order to better characterize the lithology and thicknesses of the UWBZ, Confining Unit and LWBZ at the Site, one continuous boring is proposed to the top of the bedrock unit, which occurs at approximately 240 ft bgs.

3.2.1 Location of Boring

It is recommended that the proposed boring be located in an area unaffected by historical contaminants of concern (COCs). The proposed location of the continuous boring is shown on **Figure 3-1** and is identified as UA-1. This location is near existing monitoring well MW-9 and was selected because it is located upgradient of the Site and historical sampling records show that groundwater in the vicinity is relatively unaffected.

3.2.2 Installation of Boring

One continuous boring (UA-1) will be advanced to the top of the bedrock unit (bottom of the LWBZ) using sonic drilling technology. Each core sample will be screened with a photoionization detector for the presence of VOCs and characterized for impacts via visual and/or olfactory observations. The grain size of the soil sample will be visually identified in the field and described in accordance with the Unified Soils Classification System (USCS). All non-dedicated drilling tools and equipment will be decontaminated between boring locations using potable tap water and a phosphate-free detergent (e.g., Alconox). The continuous boring will be abandoned using a tremie pipe and grouted from the bottom to land surface with general purpose, non-shrinking (Type I) neat Portland cement.

3.2.3 Geotechnical Testing and Analyses

To facilitate estimation of aquifer hydraulics and contaminant transport characteristics for development of a response action, geotechnical and geochemical testing will be performed on cores from the UWBZ, the Confining Layer, and the LWBZ. Some of these tests require collection of undisturbed core samples during the drilling. Four undisturbed soil samples will be collected, one each from the UWBZ, the LWBZ, the low-permeability zone of the Confining Unit, and the high-permeability zone of the Confining Unit (**Figure 3-2**) and analyzed for grain-size distribution, fraction organic carbon (f_{oc}), effective porosity, moisture content, and permeability.

3.3 Vertical Profiling of COCs in Groundwater

It is important to note that the Site monitoring wells are screened in the upper portion of the UWBZ with depths ranging between 10 ft to 15 ft bgs. Considering the stratified-drift aquifer in the Site area can potentially be at least 150 feet thick, the shallow well depths pose a data gap in understanding the deeper aquifer setting below water table conditions (lower portion of the UWBZ and LWBZ). Therefore, discrete groundwater samples will be collected and analyzed for VOCs at each of the proposed replacement and new monitoring well locations (**Figure 3-1**), in order to determine the vertical extent of VOCs in groundwater and optimize the placement of each well screen.

3.3.1 Monitoring Well Locations

The rationale for the placement of the proposed new and replacement monitoring wells is as follows:

- *Monitoring well MW-3R*: This is a replacement well for former well MW-3 that no longer exists. Based on the sampling evidence, the former well MW-3 was observed to have relatively high concentrations of TCE (60,000 µg/L on May 25, 2005).

  It is recommended that well MW-3R be installed first since this area generally coincides with the historical sources. It is anticipated that the well depth will be less than 50 ft bgs.

- *Monitoring wells MW-1R, MW-2R and MW-5R*: These are replacement wells for former wells that no longer exist. Based on the sampling evidence, these wells were observed with TCE and/or vinyl chloride (VC) above groundwater standards in their sampling history and represent plume boundary conditions.

- *Monitoring wells MW-12, MW-13 and MW-14*: These monitoring wells will be used to evaluate water quality conditions as well as groundwater elevations in what is suspected to be a downgradient direction from the existing monitoring wells (but within the ELG UA Site boundary). The well locations are approximate but serve to track potential migration from historically affected monitoring wells MW-3, MW-4, MW-5, MW-7 and MW-11 (60,000 µg/L at MW-3 in 2005; 325 µg/L at MW-4 in 2009; 6,500 µg/L at MW-5 in 2000; 1,570 µg/L at MW-7 in 2009; and 159 µg/L at MW-11 in 2009). These wells will also assist in confirming the groundwater flow direction.

3.3.2 Discrete Groundwater Sample Collection

Discrete groundwater samples will be collected at least every 10 ft at each proposed monitoring well location boring until VOCs are not detected in the discrete groundwater samples. Groundwater samples will be collected using either a submersible pump or a WaTerra pump inserted in a 5-ft stainless steel 0.010-inch (in) slotted screen. One set of field parameters (pH, temperature, turbidity, dissolved oxygen (DO), oxidation reduction potential (ORP), and specific conductivity) will be collected per groundwater sample.

The total depth of each soil boring will be determined based on COC concentrations in groundwater samples that will be analyzed using an on-site mobile laboratory. Each soil boring is not expected to exceed a depth of 50 ft bgs). Continuous cores will be collected in order to obtain additional lithologic data. This lithologic data will be used to supplement the lithologic data collected from boring location UA-1 and to update the CSM for the Site.

3.3.3 On-site Analyses

The discrete groundwater samples will be submitted to an on-site mobile laboratory to analyze for VOCs by United States Environmental Protection Agency (USEPA) Method 8260B. The VOC vertical delineation will be considered complete when the concentrations of two consecutive groundwater samples are less than the following groundwater quality standards pursuant to 6 NYCRR 703 for each of the following VOCs:

- TCE = 5 µg/L
- cis-1,2-DCE = 5 µg/L
- 1,1-dichloroethene (DCE) = 5 µg/L
- VC = 2 µg/L

3.3.4 Certified Laboratory - Confirmation Analyses

In accordance with NYSDEC DER-10, *Technical Guidance for Site Investigation and Remediation* (NYSDEC, 2010), a duplicate sample of 10% of the groundwater samples collected for on-site analyses by the mobile laboratory will be submitted to a New York State Department of Health (NYSDOH) approved fixed laboratory for analyses of VOCs by USEPA Method 8260.

3.4 Monitoring Well Installation

At a minimum, four replacement monitoring wells and three new monitoring wells are proposed to better define groundwater flow direction beneath the Site and to delineate TCE (and its breakdown products) in groundwater.

Upon review of the vertical profiling groundwater analytical data, the monitoring wells will be installed to the appropriate depth. Each monitoring well will be constructed of 2-inch diameter flush-joint Schedule 40 polyvinyl chloride (PVC) and completed with 10 ft of 0.010-inch machine slotted PVC screen. A silica sand filter pack (size #0) will be installed from the base of the well to a maximum of 2 ft above the top of the screen. A bentonite chip seal will then be installed and allowed to hydrate sufficiently to mitigate the potential for downhole grout contamination. Cement/bentonite grout will be installed to approximately 1 ft bgs. The newly installed monitoring wells will be completed with keyed-alike locks, a lockable J-plug, and an 8-inch diameter steel flush-mounted manhole within an approximate 2-ft by 2-ft by 1-ft square concrete pad.

Upon completion, but not within 24 hours, each newly installed monitoring well will be developed in accordance with NYSDEC protocols to remove fine-grained materials that may have entered the well screen during installation.

3.5 Surface Water Gage Installation

Two (2) surface water gages, SG-1 and SG-2, will be installed at locations shown on **Figure 3-1.** The purpose of the river gaging sites is to provide surface water characteristics that verify groundwater recharge or discharge conditions near the Mohawk River control structure. Insights to surface water elevation and streambed elevation will assist in completing the groundwater flow conceptualization.

Enameled iron gages, such as the one shown, are preferred over other type gages (such as painted gages) since they resist rust, corrosion or discoloration and will last almost indefinitely with proper installation and maintenance. Any algae, organic/marine growth or other dirt buildup on the gage is easily washed off.

The surface water gage will be mounted on a redwood, cypress, cedar or synthetic board of suitable width and then the board will be attached to the concrete wall along the river bank upstream and downstream of the river control structure.

If the owner can be identified and permission obtained, the surface water gages will be mounted directly on the river control structure: one on the upstream side and one on the downstream side.

3.6 Location and Top-of-Casing Survey

Upon completion of the soil boring and monitoring wells, their locations and elevations will be surveyed by a New York licensed land surveyor. The survey will include location coordinates, ground surface elevation, and top-of-casing elevation of each monitoring well referenced to NYS Plane Coordinates and National Geodetic Vertical Datum (NGVD).

3.7 Water Level Measurements

Water level measurements will be obtained from all new and existing monitoring wells to measure the depth to, and develop the potentiometric surface of the UWBZ. Each monitoring well will be opened and given the opportunity to equilibrate with outside air pressure. A water level meter will then be used to measure the depth to water from the top-of-casing to the nearest 0.01 ft.

3.8 Groundwater Sampling and Analysis

Groundwater samples will be collected at least 24 hours after well development from each existing and newly installed Site monitoring well. Upon arrival at each monitoring well, field personnel will visually inspect the monitoring wells for defects and/or vandalism. Following location and inspection of each monitoring well, the static water level and total depth will be recorded and one standing well volume will be calculated. Wells will be purged and sampled using a peristaltic pump and dedicated pump tubing following low-flow (minimal drawdown) purge (typically less than 0.1 liter per minute [lpm]) sampling procedures. Field measurements for pH, specific conductance, temperature, turbidity, dissolved oxygen (DO), oxidation reduction potential (ORP), and water level, as well as visual and olfactory field observations, will be periodically recorded and monitored for stabilization. Purging will be considered complete when pH, specific conductivity, temperature, DO and ORP stabilize and when turbidity measurements fall below 50 Nephelometric Turbidity Units (NTU), or become stable above 50 NTU. Stability is defined as variation between field measurements of 10 percent or less and no overall upward or downward trend in water level measurements.

Following purging completion, groundwater samples will be collected from the monitoring well and placed in pre-cleaned, pre-preserved laboratory provided bottles, cooled to 4 degrees Celsius (℃) in the field, and transported under chain-of-custody to the laboratory for analysis.

All groundwater samples will be analyzed for VOCs by USEPA Method 8260. In addition, selected groundwater samples will be analyzed for the following geochemical parameters:

- Aqueous-Phase Native Electron Acceptors
  - Oxygen
  - Nitrate and Nitrite
  - Sulfate and Sulfide
  - Total Iron, Ferrous Iron, and Ferric Iron
  - Total Manganese and Dissolved Manganese
  - Phosphate
- Dissolved Gases
  - Oxygen
  - Carbon Dioxide
  - Carbon Monoxide
  - Nitrogen
- Light Hydrocarbons
  - Methane, Ethane, and Ethene
- Other
  - DO
  - pH
  - ORP
  - Total organic carbon (TOC)
  - Alkalinity
  - Chloride

- Microbial community structure

The groundwater sampling and analysis plan is summarized in **Table 3-1.**

3.9 In Situ Hydraulic Conductivity Testing

Following monitoring well development, a single-well constant-rate aquifer test (constant rate) will be conducted on three monitoring wells (MW-8R, MW-12 and MW-14) at the Site to assess aquifer transmissivity, aquifer hydraulic conductivity, and specific yield (unconfined) or storage coefficient (confined). Monitoring wells MW-12 and MW-14 are new wells to be installed.

The single-well test will be performed by stressing the aquifer via a short duration pump test (30 minutes to 1 hour). The test will monitor for both the groundwater drawdown and recovery phases.

The test will be performed as follows:

- Measure and record the static groundwater level in the well prior to installing the test equipment in the well.
- Install a datalogger transducer (In Situ miniTroll or equivalent) in the well and position the transducer approximately 1 ft above the pump.
- Install a submersible pump (Whale pump or equivalent) at the bottom of the well.
- Once the transducer and pump are secured so that they will not move or shift in the well (slippage into the well), the water level in the well will be allowed to equilibrate back to static condition prior to conducting the test. Confirm the groundwater has returned to static condition by manual measurement of the groundwater elevation and comparing with the static water level measured prior to equipment installation. Record the new static groundwater level. *Note:* Install a backflow prevention device at the top of the pump discharge port (if the well diameter allows for the device to be placed in the well) and immediately downstream from the discharge flow control value. Locate the flow control valve near the wellhead. The purpose of the two backflow prevention devices is to stop the discharged water that is contained in the discharge hose from going back into the well. The introduction of the water back into the well during monitoring of the recovery phase would provide erroneous test results.
- Pump the well at a rate sufficient to create a measurable drawdown of the water table within the well (1 to 5 ft). Once a drawdown is achieved, maintain a constant extraction rate throughout the duration of the test. The flow rate should be determined and held constant within the first 10 minutes of the test. *Note:* The anticipated extraction rate needs to be considered prior to conducting the test to properly plan for the management of the extracted water (investigative derived waste – IDW). It is preliminarily anticipated that the pumping rate will be at least 1 gallon per minute (gpm). For example, if the pumping rate is 1 gpm, then one 55-gallon drum will be required to contain the fluids.
- Groundwater drawdown and recovery levels will be recorded by an electronic device (miniTroll with data logger) and verified with manual measurements. Perform manual measurements at a high frequency during the beginning phase of the test and low frequency during the middle and late phases of the test.

- The groundwater level drawdown and recovery phase data measured in the pumped well will be analyzed with AQTESOLV analytical software package using the appropriate method of analyses.
- The transducer and submersible pump will be decontaminated prior to and after use in each well.

3.10 Indoor Air Sampling and Analysis

Indoor air and sub-slab vapor samples will be collected at the Site during the next heating season (November 15th to March 31st) to meet the following objectives:

- Assess the current potential for intrusion of vapors from the soil and groundwater on the western side of the building into the indoor air
- Evaluate fluctuation in concentrations due to the following:
  - Different weather conditions (e.g., seasonal effects)
  - Changes in building conditions (e.g., various operating conditions of the building's heating, ventilation, and air conditioning [HVAC] system)
  - Changes in source strength
- Compare these results to the results from 2008 (OB&G, 2008b). As in 2008, the sampling activities were focused on the office area of the building as there is potential for TCE and other solvents to be associated with the material handled in the production areas. The sampling will be completed in general conformance with the NYSDOH document *Guidance for Evaluating Soil Vapor Intrusion in the State of New York* (NYSDOH, 2006).

3.10.1 Sample Locations

Two sets of sub-slab and indoor air samples will be collected from the office area of the facility as shown on **Figure 3-3**. The sub-slab samples will be designated as SS and the indoor air samples will be designated as IA. Samples SS-1 and IA-1 will be collected from the grinding room located off the main office area. Samples SS-2 and IA-2 will be collected from the locker room located on the west side of the office area. These sample locations are consistent with the locations of the samples collected in 2008 (OB&G, 2008b). An ambient air sample, AA-1, will also be collected from an area located upwind of the office area of the building.

3.10.2 Indoor Air Sampling Procedures

As outlined in the NYSDOH guidance document (2006), indoor air samples will be collected into individually certified, clean, 6-liter, pre-evacuated Summa® canisters with inlets positioned at approximately 4 to 5 ft above the floor to be consistent with the breathing zone. Details of the sample collection will be recorded on the field forms provided in **Appendix A.** A building survey and chemical inventory will be conducted during the sampling and documented on the field forms provided in **Appendix A**. The purpose of the survey and inventory will be to collect information pertaining to potential sources of VOCs within the building.

The sampling rate will be set to draw the air sample over an approximate 8-hour period. The sampling rate will be maintained by laboratory-supplied, constant-differential, low-volume flow controllers. Vacuum readings of the canisters will be obtained and documented prior to sample collection and upon completion of sampling. Sample identification, vacuum readings, flow controller identification numbers, and other relevant information will be recorded on sampling forms.

3.10.3 Sub-slab Vapor Sampling Procedures

Sub-slab samples will be collected by drilling an approximate ¾-inch diameter hole through the concrete floor (about 8 inches thick) using a hand-held drill. Approximately 14 inches of soil will then be drilled from beneath the slab. Consistent with the NYSDOH guidance document (2006), the following procedures for sub-slab sample collection will be followed:

- A section of 14-inch Teflon or polyethylene tubing will be inserted through a hole drilled through the slab. The tubing inlet will be installed approximately 14 inches below the slab. The annular space between the hole and tubing will be sealed using 100% beeswax or similar non-VOC containing material.
- The tubing will be purged using a polyethylene, 60 cubic centimeter (cc) syringe. One to three tubing volumes will be purged prior to sample collection at a rate no greater than 0.2 liters per minute (lpm). The tubing will then be connected to a sample canister.
- A sample of sub-slab soil vapor will be collected over an approximate 8-hour period, utilizing batch certified, clean, 6-liter, pre-evacuated canisters. The required sampling rate will be maintained by laboratory-supplied constant-differential low-volume flow controllers. Vacuum readings of the canisters will be obtained and documented prior to sample collection and upon completion of sampling. Sample identifications, vacuum readings, flow controller identification numbers, and other relevant information will be recorded on field forms.

3.10.4 Ambient Air Sampling Procedure

Concurrent with the sub-slab and indoor air samples, one outdoor, field-located air sample will be collected from a ground level location upwind of the office area of the building. This ambient air sample will be collected in the same manner as the indoor air samples. Sample identification, vacuum readings, flow controller identification numbers, and other relevant information will be recorded on field forms.

3.10.5 Sample Analysis

Samples (canisters) will be delivered to a laboratory that is certified by the National Environmental Laboratory Approval Program (NELAP) and certified by NYSDOH for USEPA Method TO-15 under routine chain-of-custody protocols. The samples will be analyzed for compounds identified in **Table 3-2**. **Table 3-2** also provides the reporting limits of undiluted samples using a low-level version of Method TO-15 needed to achieve low reporting limits for trichloroethene of less than 0.25 micrograms per cubic meter ($\mu g/m^3$) for the indoor air and ambient air samples. The actual reporting limits may be higher than those identified in **Table 3-2** depending on the amount of dilution needed for the analysis and calibration.

3.11 Reporting

The results of the supplemental CSM investigations proposed herein will be submitted to NYSDEC in a Supplemental CSM Investigation Report. The report will include, at minimum, the following:

- Description of field activities
- Summary of lithology
- Figures showing monitoring well and surface gauging locations, potentiometric surface and groundwater analytical data
- Tables summarizing well construction data, groundwater levels, groundwater quality, and indoor air quality
- Boring logs and well construction diagrams
- Conclusions and recommendations

4.0 PROJECT QUALITY ASSURANCE/QUALITY CONTROL

The following sections detail specific procedures that will be implemented and maintained to control and assure data quality for the supplemental CSM investigations described in the previous sections.

4.1 Project Management Related QA/QC

The following sections describe health and safety, IDW management, and project documentation procedures to ensure overall project safety and quality.

4.1.1 Health and Safety

Field activities will be conducted in accordance with the Site-specific Health and Safety Plan (HASP). A review of the proposed field investigation activities will be completed prior to the start of field sampling activities. Based on this review, a HASP Addendum will be prepared to include any activities that are not adequately addressed in the current HASP. Field activities will be conducted in accordance with the HASP and any addenda that are approved for the Site at the time of sampling.

4.1.2 IDW Management

All IDW, including but not limited to, well development water, soil cuttings, sample purge water, and decontamination water will be containerized, characterized, and properly disposed of off-site.

4.1.3 Project Documentation

All information pertinent to the investigation will be recorded in a bound field logbook and/or field data sheets. Entries will include the following, as applicable:

- Project name and number
- Sampler's and field personnel names
- Date and time of sample collection
- Observations at the sampling site such as weather conditions
- Sample number, location, and depth
- Sampling method
- Analyses requested
- Sampling media
- Sample type (grab or composite)
- Sample physical characteristics

- Summary of daily tasks and information concerning sampling changes and scheduling modifications dictated by field conditions

Field investigation situations vary widely. No general rules can include every type of information that must be entered in a logbook or data sheet for a particular site.

Laboratory and field data sheets will be included as an appendix to the Supplemental CSM Investigation Report. Site-specific recording will include sufficient information so that the sampling activity can be reconstructed without relying on the memory of field personnel. At the completion of the field activities, the logbooks will be maintained in the central project file.

4.2 Field Sampling Related QA/QC

Quality Assurance/Quality Control (QA/QC) procedures for the field sampling program will include the collection of QA/QC samples and proper processing and handling of samples. The following sections describe those procedures and the QA/QC procedures for analytical data.

4.2.1 Sample Identification, Handling, and Chain of Custody

Samples will be identified, handled, and recorded as described below. Each sample container will have a sample label affixed to the outside, and documentation will be completed in waterproof ink. Each label will be marked using waterproof ink with the following information:

- Project name
- Sample identification number
- Date and time of collection
- Initials of sampling technician
- Requested analysis
- Method of preservation

Sample containers will be packed in bubble wrap to minimize breakage and placed in plastic coolers. Ice will be placed around sample containers, and additional cushioning material will be added to the cooler, if necessary. A temperature blank will be included in each cooler. Paperwork will be placed in a sealable plastic bag and placed on top of the sample containers or taped to the inside lid of the cooler. The cooler will be sealed, and signed custody seals will be affixed to two sides of the cooler. Laboratory address labels will be placed on top of the cooler.

Sample coolers will be packaged and shipped as environmental samples in accordance with applicable federal and state regulations. Standard procedures applicable to the shipment of environmental samples to the analytical laboratory are outlined below.

- Environmental samples collected will be transported to the laboratory by field personnel, shipped via Federal Express or equivalent overnight service, or picked up by a laboratory courier. Shipments will be scheduled to meet holding time requirements.
- The laboratory will be notified prior to receipt of samples. If the number, type, or date of shipments changes due to Site constraints or program changes, the laboratory will be informed in advance to allow adequate time to prepare.

The transfer of custody of field-collected samples will follow an established sample chain-of-custody program. The primary purpose of chain-of-custody procedures is to ensure that sample traceability is maintained from collection through shipping, storage, and analysis, to data reporting and disposal.

Tracing sample possession will be accomplished by using the chain-of-custody record. A chain-of-custody entry will be recorded for every sample, and a chain-of-custody record will accompany every sample shipment to the laboratory. At a minimum, the chain-of-custody record will contain the following information for each sample:

- Project name and number
- Sample number and identification of sampling point
- Sample media
- Date and time of collection
- Sample type
- Number, type, and volume of sample container(s)
- Sample preservative
- Analysis requested
- Name, address, and phone number of laboratory or laboratory contact
- Signature, dates, and times of persons in possession
- Any necessary remarks or special instructions

Once the chain-of-custody is complete and the samples are prepared for shipment, the chain-of-custody will be placed inside the shipping container, and the container will be sealed. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safekeeping. A copy of each chain-of-custody form will be retained by the sampling team for the project file. Bills of lading will also be retained as part of the chain-of-custody record.

4.2.2 Analytical QA/QC Samples

Field QA/QC samples are designed to help identify and minimize potential sources of sample contamination due to field procedures and to evaluate potential error introduced by sample collection and handling. Three (3) types of QA/QC samples will be collected as part of the proposed supplemental CSM investigations:

- Field (rinsate) blank samples: A field blank sample is intended to indicate potential contamination from sampling equipment. A field blank sample will be collected by rinsing laboratory-supplied, organic-free, deionized water over decontaminated sampling apparatus into a laboratory-supplied sample bottle. The field blank sample is assigned a distinct identification number and will be handled, transported, and analyzed in the same manner as the samples collected that day. Field blanks will be collected at a rate of one per day per sample matrix. A field blank does not need to be collected when dedicated or disposable sampling equipment is used.

- Duplicate samples: Blind field duplicate samples will be collected to evaluate the consistency of field techniques and laboratory analysis. Duplicate samples will be obtained by simultaneously filling aliquots of homogenized sample media into two sets of bottle ware: 1) the investigative set and 2) the duplicate set. The duplicate sample will be handled in the same manner as the primary sample, assigned distinct sample identification, and submitted to the laboratory with its primary sample. Duplicate samples will be collected at a rate of five (5) percent of the total samples collected for each matrix. Field duplicates will not be collected for geochemical analyses. Locations selected for the collection of duplicates will be based on professional judgment of the field team leader.
- Trip blank: A trip blank will be included in each cooler containing samples to be analyzed for VOCs. Analysis of trip blanks shows whether a sample bottle was contaminated during shipment from the manufacturer, while in bottle storage, in shipment to the laboratory, or during analysis at the lab. Trip blank will consist of an aliquot of distilled water sealed in a sample bottle and prepared by the laboratory prior to shipping the sample bottles to EHS Support.
- Matrix spike/matrix spike duplicate (MS/MSD) samples: MS/MSD samples are prepared at the laboratory by dividing a control sample into two aliquots, then spiking each with identical concentrations of specific analytes. The spiked samples are then analyzed separately, and the results are compared to evaluate the effects of the sample matrix on the analytical accuracy and precision. At sampling locations where MS/MSD samples are to be collected, a sufficient volume of sampling material, as required by the laboratory, will be collected. MS/MSD samples will be labeled and shipped to the laboratory along with the primary sample from which it was collected. MS/MSD samples will be collected at a rate of five (5) percent of the total number of samples in each matrix.
- Temperature blank: A temperature blank will be included in each cooler shipped in wet ice. A temperature blank is a vial of water shipped with samples and is used by the laboratory to measure the temperature of the cooler upon receipt at the laboratory. The temperature blank is not analyzed.

5.0 PROPOSED SCHEDULE OF ACTIVITIES

Pending final NYSDEC approval of the Supplemental CSM Investigation Work Plan, **Figure 6-1** presents the proposed project schedule.

6.0 REFERENCES

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7.0 STATEMENT OF LIMITATIONS

This report is intended for the sole use of ELG Utica Alloys, Inc. The scope of services performed during this investigation may not be appropriate to satisfy the needs of other users, and any use or re-use of this document or of the findings, conclusions, or recommendations presented herein is at the sole risk of said user.

Background information, design bases, and other data have been furnished to EHS Support, Inc. by ELG Utica Alloys, Inc. and/or third parties, which EHS Support, Inc. has used in preparing this report. EHS Support, Inc. has relied on this information as furnished, and is neither responsible for nor has confirmed the accuracy of this information.

Opinions presented herein apply to the existing and reasonably foreseeable Site conditions at the time of our assessment. They cannot apply to Site changes of which EHS Support, Inc. is unaware and has not had the opportunity to review. Changes in the condition of this property may occur with time due to natural processes or works of man at the Site or on adjacent properties. Changes in applicable standards may also occur as a result of legislation or the broadening of knowledge. Accordingly, the findings of this report may be invalidated, wholly or in part, by changes beyond our control.

TABLES

Table 3-1

Proposed Monitoring Plan
ELG Utica Alloys Site
Utica, NY

SAMPLE ID	WELL DIAMETER (inch)	SCREENED INTERVAL (ft)	WELL DEPTH (ft bls)	VERTICAL PROFILING[1]	LITHOLOGY CHARACTERIZATION	ANALYSES				WATER LEVEL	LOCATION STATUS (EXISTING/PROPOSED)
						Matrix	Geotechnical Testing[2]	8260 TCL LIST	Geochemical Parameters[3]		
MW-1R	2	To be determined		X	X	GW		X		X	Proposed
MW-2R	2	To be determined		X	X	GW		X		X	Proposed
MW-3R	2	To be determined		X	X	GW		X		X	Proposed
MW-4	2					GW		X		X	Existing
MW-5R	2	To be determined		X	X	GW		X		X	Proposed
MW-6	2	3-13	13			GW		X		X	Existing
MW-7	2					GW		X		X	Existing
MW-8R	2	3-13	13			GW		X		X	Existing
MW-9	2					GW		X		X	Existing
MW-10	2	3-13	13			GW		X	Wells for geochemical testing will be selected based on vertical profiling data	X	Existing
MW-11	2	3-13	13			GW		X		X	Existing
MW-B3R	2	2-12	12			GW		X		X	Existing
MW-12	2	To be determined		X	X	GW		X		X	Proposed
MW-13	2	To be determined		X	X	GW		X		X	Proposed
MW-14	2	To be determined		X	X	GW		X		X	Proposed
UA-1 UWBZ	NA	NA	NA	X	X	Soil	X			X	Proposed
UA-1 CU	NA	NA	NA	X	X	Soil	X			X	Proposed
UA-1 LWBZ	NA	NA	NA	X	X	Soil	X			X	Proposed
SG-1	NA	NA	NA			Surface Water				X	Proposed
SG-2	NA	NA	NA			Surface Water				X	Proposed

Notes:

ft = Feet
ft bls = Feet below land surface

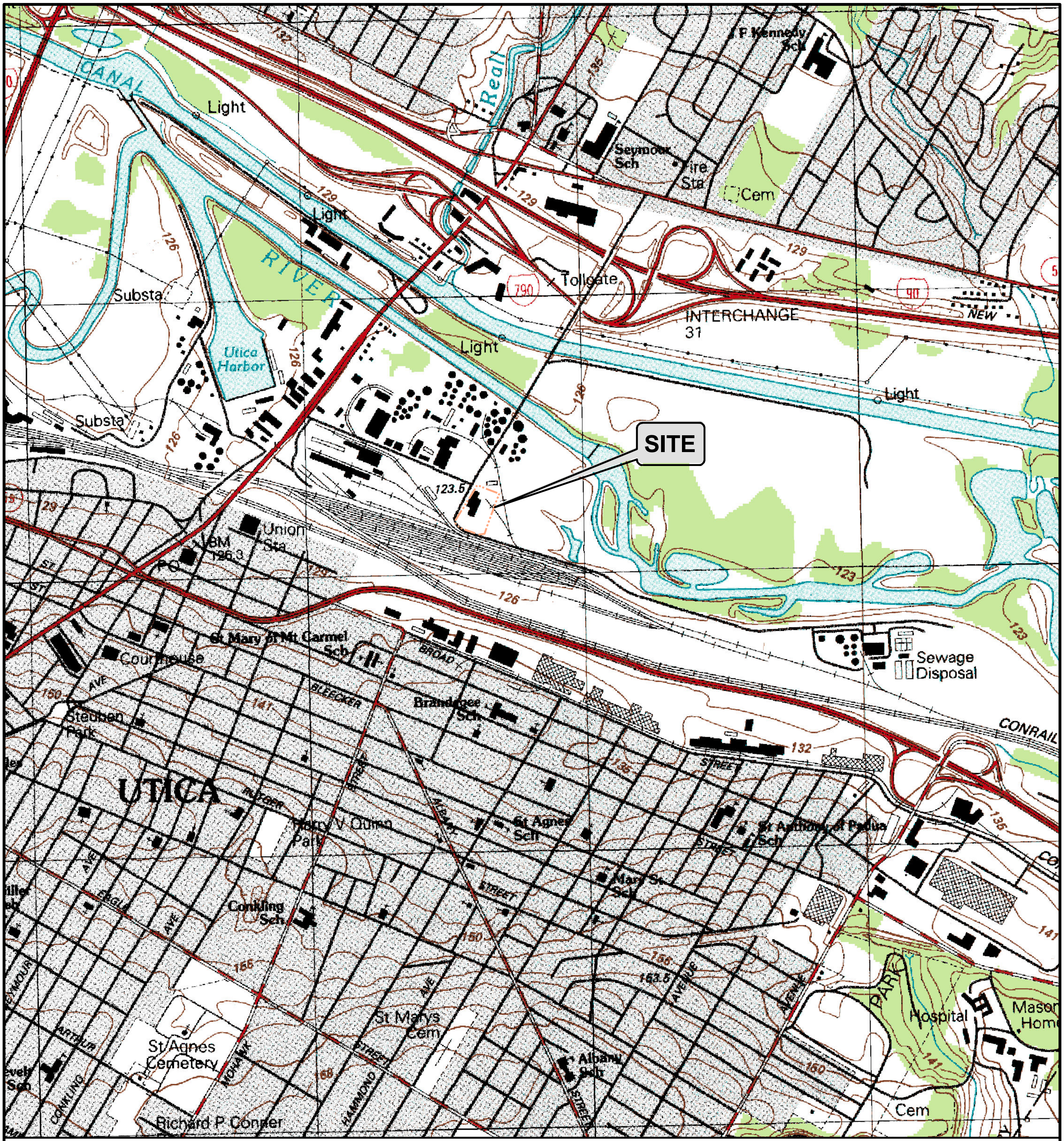
Table 3-2

TO-15 Target Analytes and Reporting Limits
ELG Utica Alloys Site
Utica, NY

Compound	ppbv	M.W.	μg/m³
1,1,1-Trichloroethane	0.01	133.42	0.05
1,1,2,2-Tetrachloroethane	0.01	167.86	0.07
1,1,2-Trichloroethane	0.01	133.42	0.05
1,1-Dichloroethane	0.01	98.97	0.04
1,1-Dichloroethene	0.01	96.95	0.04
1,2-Dibromoethane	0.01	187.88	0.08
1,2-Dichloroethane	0.01	98.96	0.04
1,2-Dichloropropane	0.01	112.99	0.05
1,3,5-Trimethylbenzene	0.01	120.19	0.05
1,3-Butadiene	0.01	60.14	0.02
2,2,4-Trimethylpentane	0.01	132.38	0.05
3-Chloropropene	0.01	76.53	0.03
4-Ethyltoluene	0.01	120.2	0.05
Benzene	0.01	78.11	0.03
Bromodichloromethane	0.01	163.83	0.07
Bromoethene	0.01	106.96	0.04
Bromoform	0.01	252.75	0.10
Bromomethane	0.01	94.95	0.04
Carbon Tetrachloride	0.01	153.84	0.06
Chloroethane	0.01	64.52	0.03
Chloroform	0.01	119.39	0.05
cis-1,2-Dichloroethene	0.01	96.95	0.04
cis-1,3-Dichloropropene	0.01	110.98	0.05
Cyclohexane	0.01	84.16	0.03
Dibromochloromethane	0.01	242.74	0.10
Dichlorodifluoromethane	0.01	120.92	0.05
Dichlorotetrafluoroethane	0.01	170.93	0.07
Ethylbenzene	0.01	106.16	0.04
m,p-Xylene	0.01	106.16	0.04
Methyl tert-Butyl Ether	0.01	88.15	0.04
n-Heptane	0.01	101.2	0.04
n-Hexane	0.01	86.18	0.04
o-Xylene	0.01	106.16	0.04
Tetrachloroethene	0.01	165.85	0.07
Toluene	0.01	92.13	0.04
trans-1,2-Dichloroethene	0.01	96.95	0.04
trans-1,3-Dichloropropene	0.01	110.98	0.05
Trichloroethene	0.01	131.4	0.05
Trichlorofluoromethane	0.01	137.38	0.06
Vinyl Chloride	0.01	62.5	0.03

Notes:
ppbv = parts per billion by volume
M.W. = molecular weight
$\mu g/m^3$ = micrograms per cubic meter

FIGURES



Source: 1983 USGS QUADRANGLE SHEET, QUAD NAME UTICA EAST

2,000 1,000 0 2,000

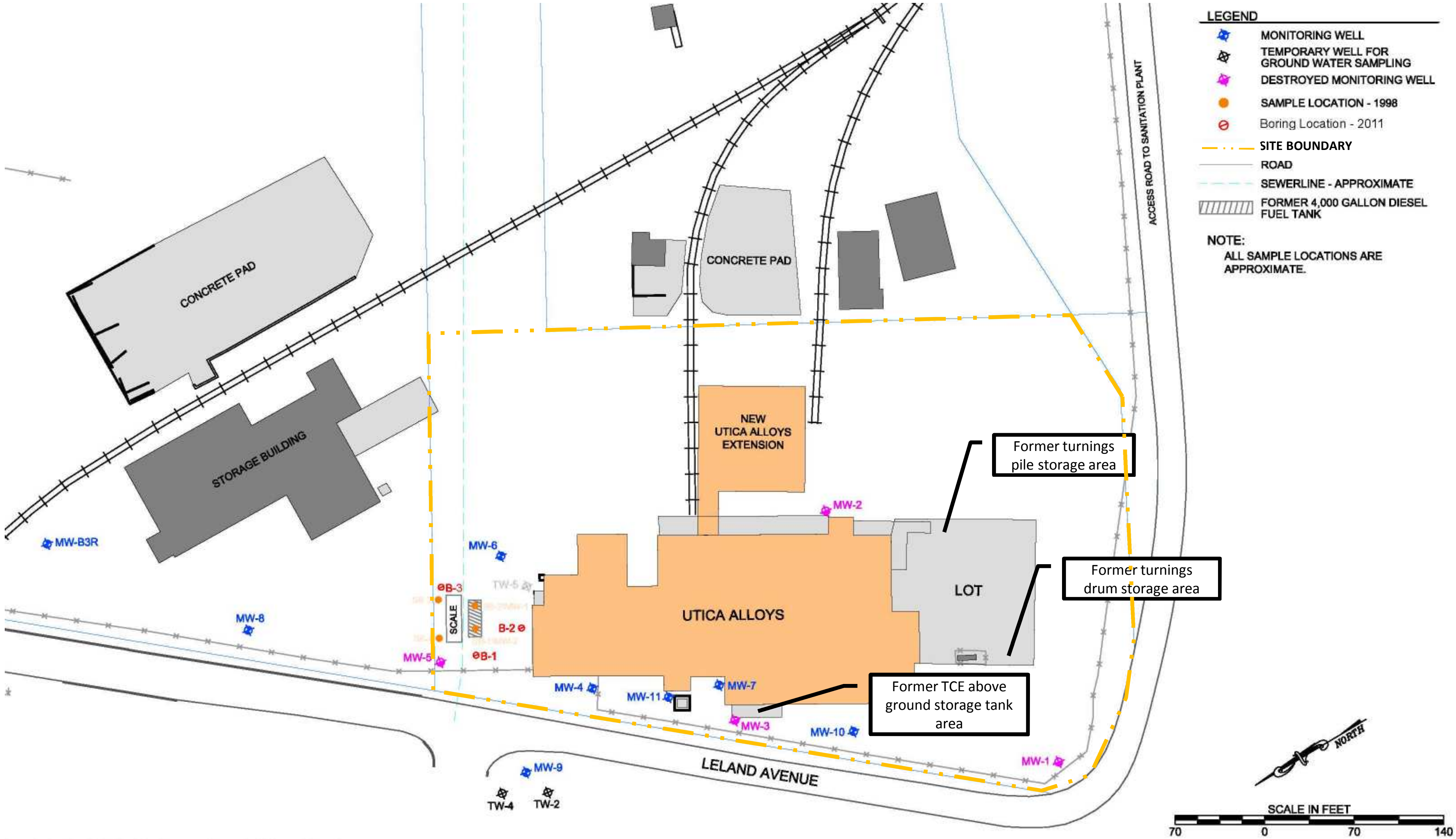
Feet

N

EHS Support *consider it done* www.ehs-support.com

ELG UTICA ALLOYS
UTICA, NEW YORK

FIGURE 2-1
SITE LOCATION



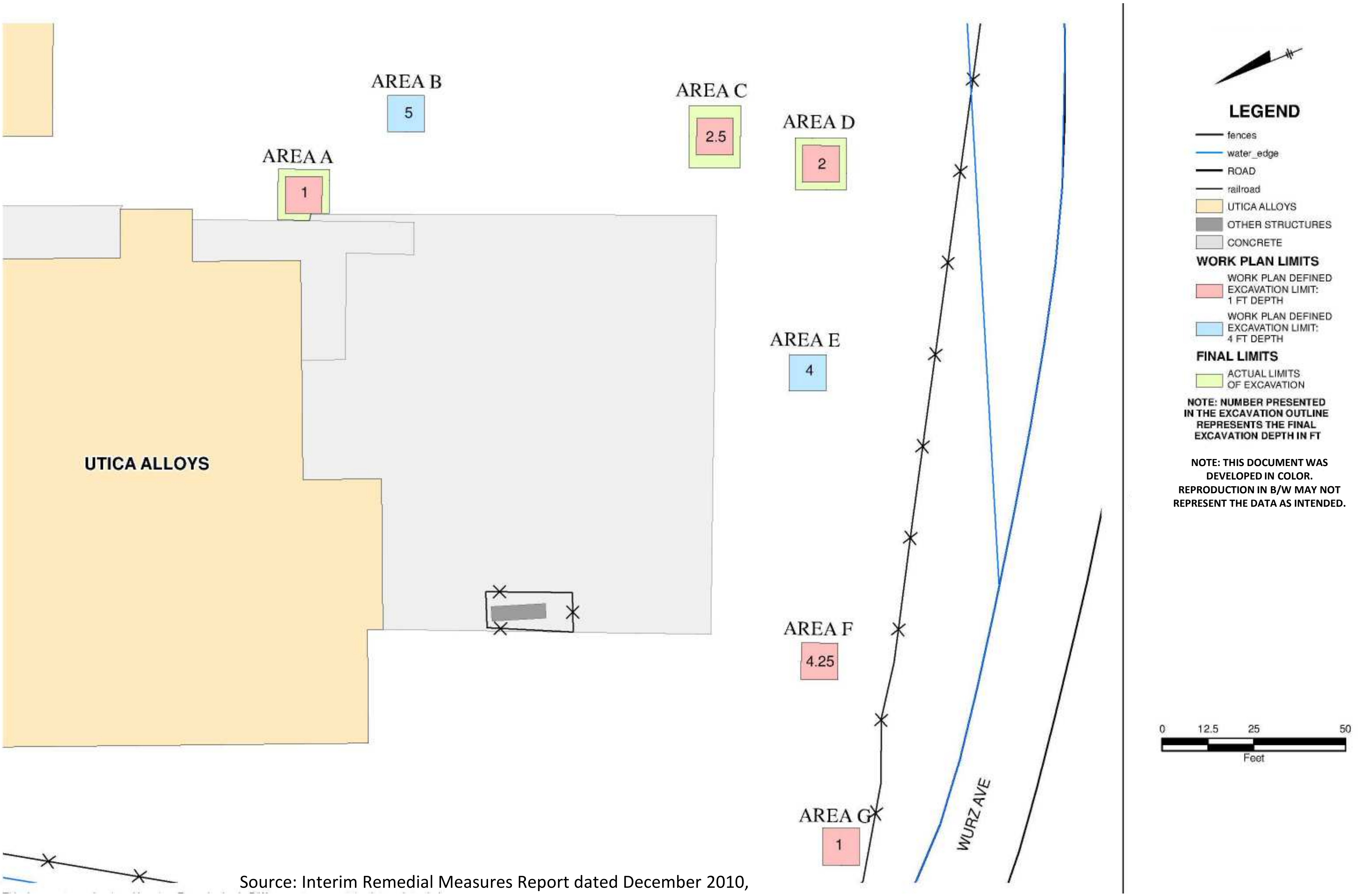
ELG UTICA ALLOYS SITE
UTICA, NY

EHS Support

August, 2011

SITE LAYOUT

FIGURE 2-2

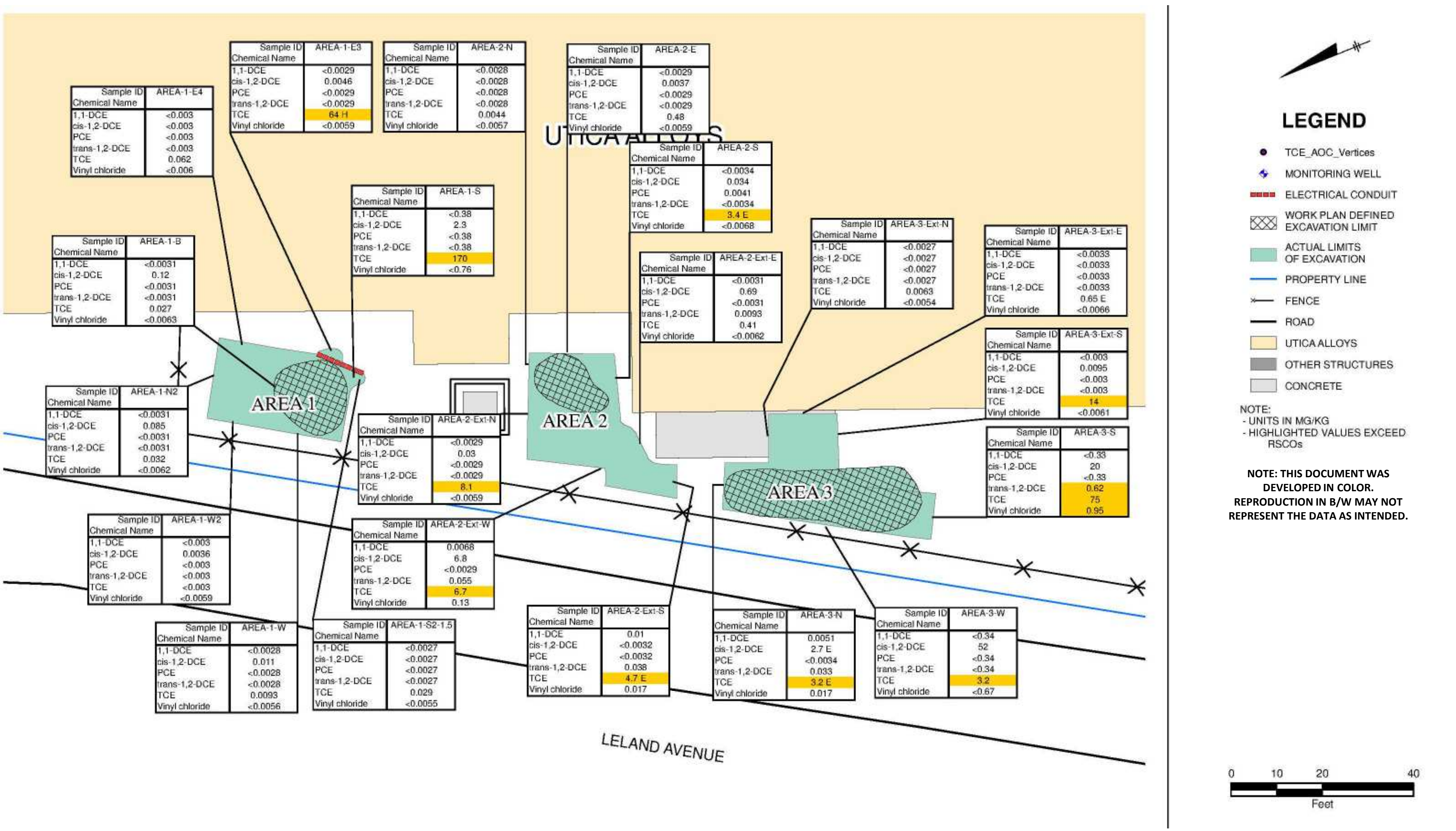


Source: Interim Remedial Measures Report dated December 2010, prepared by O'Brien & Gere

ELG UTICA ALLOYS SITE
UTICA, NY
EHS Support
August, 2011

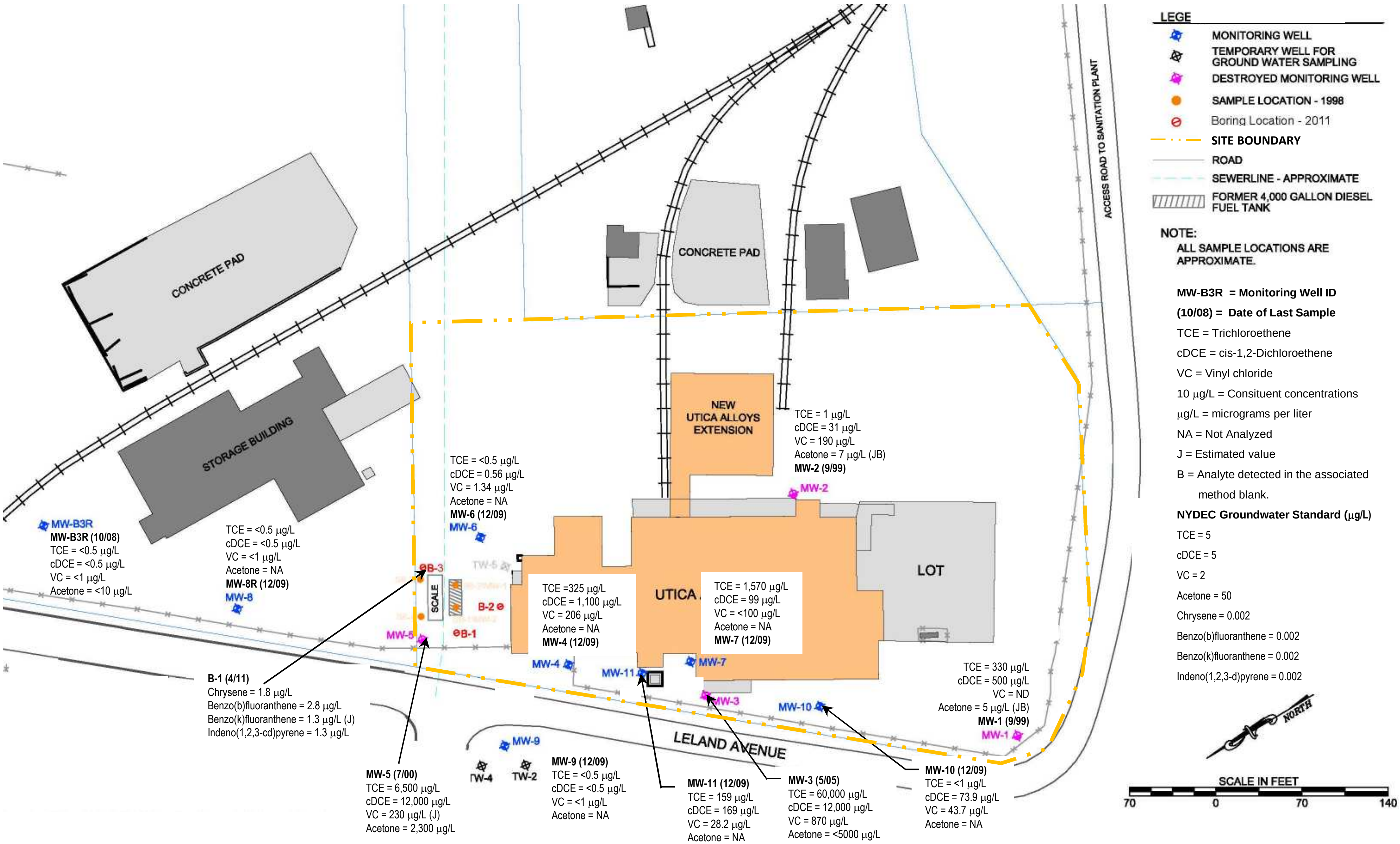
INTERIM REMEDIAL MEASURES PCB SOIL AREA EXCAVATION LIMITS

FIGURE 2-3



Source: Interim Remedial Measures Report dated December 2010, prepared by O'Brien & Gere

ELG UTICA ALLOYS SITE UTICA, NY	INTERIM REMEDIAL MEASURES TCE SOIL AREA EXCAVATION LIMITS	FIGURE 2-4
EHS Support — August, 2011		



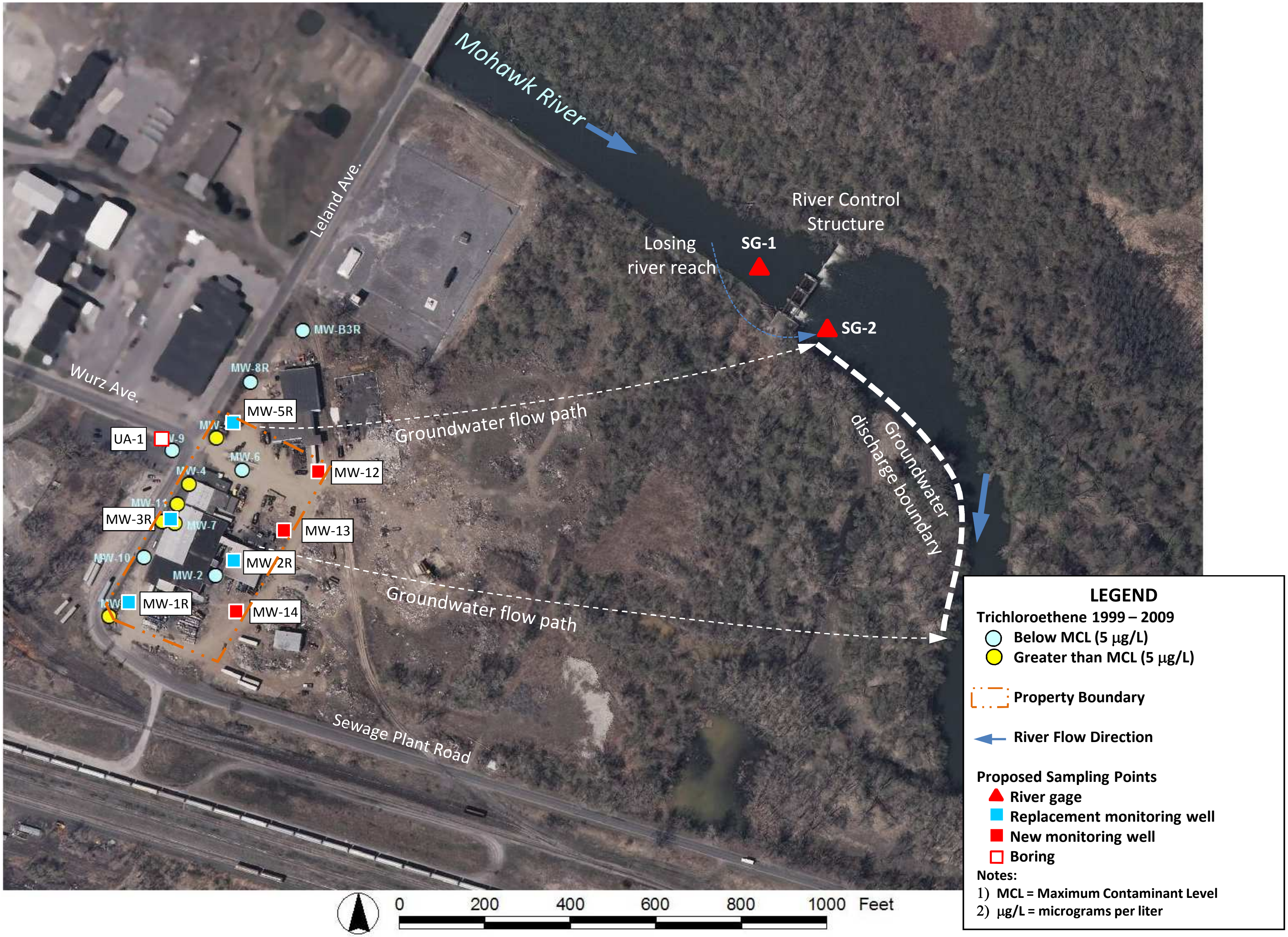
ELG UTICA ALLOYS SITE
UTICA, NY

EHS Support

August, 2011

HISTORICAL GROUNDWATER QUALITY

FIGURE 2-5



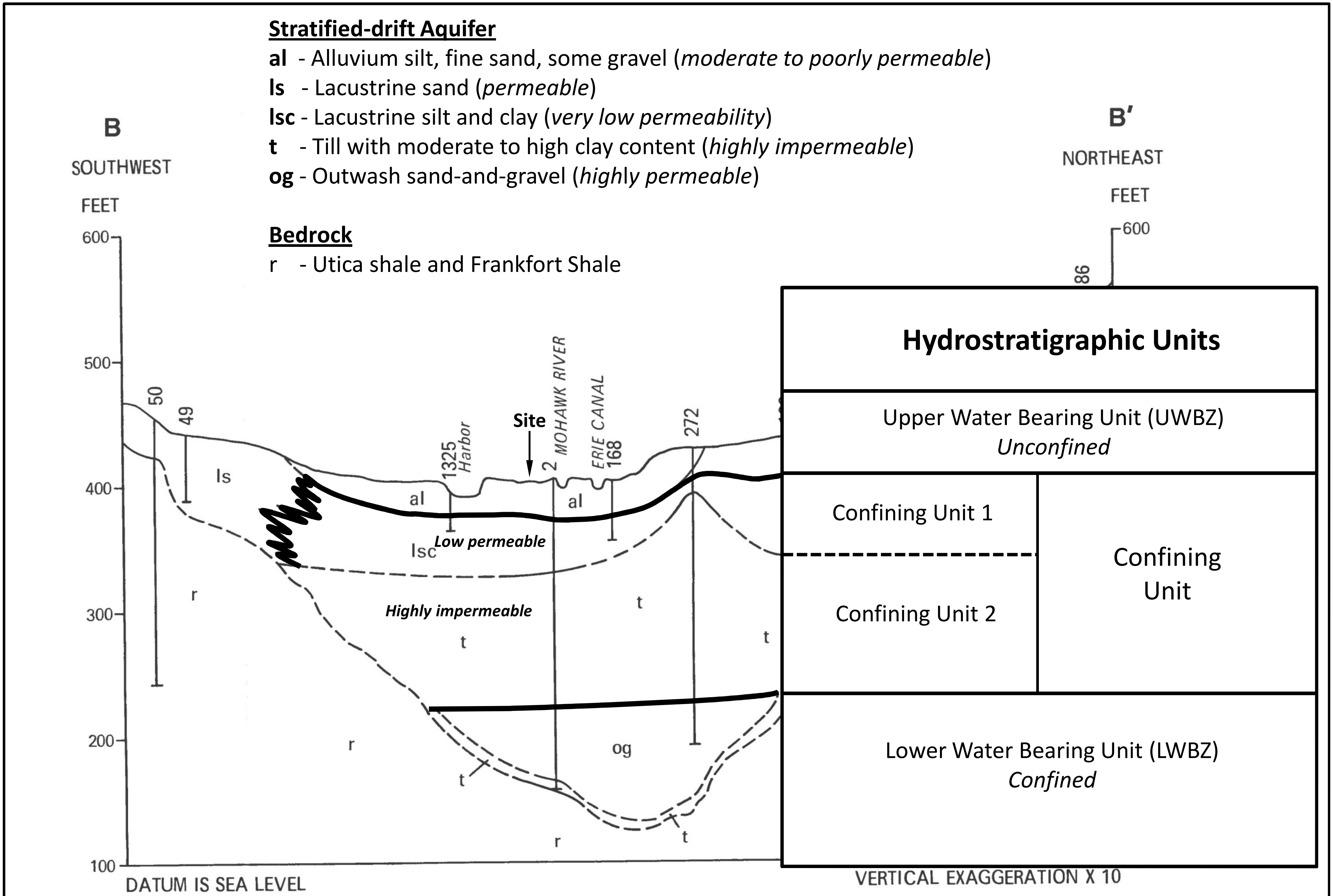
ELG UTICA ALLOYS SITE
UTICA, NY

EHS Support

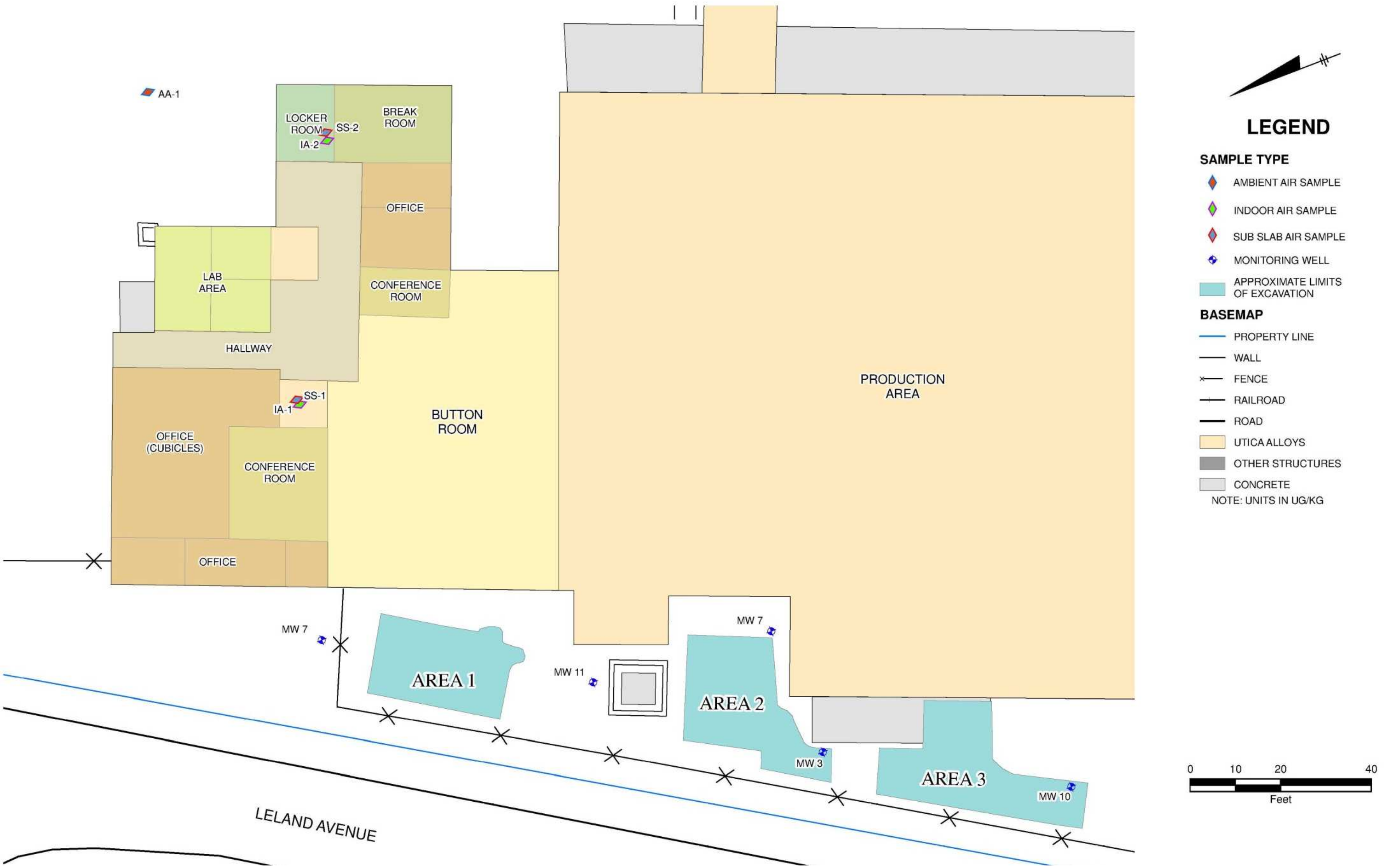
August, 2011

PROPOSED MONITORING WELL LOCATIONS AND SURFACE WATER GAGING SITES

FIGURE 3-1



ELG UTICA ALLOYS SITE UTICA, NY EHS Support August, 2011	CONCEPTUAL HYDROGEOLOGIC FRAMEWORK	FIGURE 3-2



ELG UTICA ALLOYS SITE
UTICA, NY

EHS Support

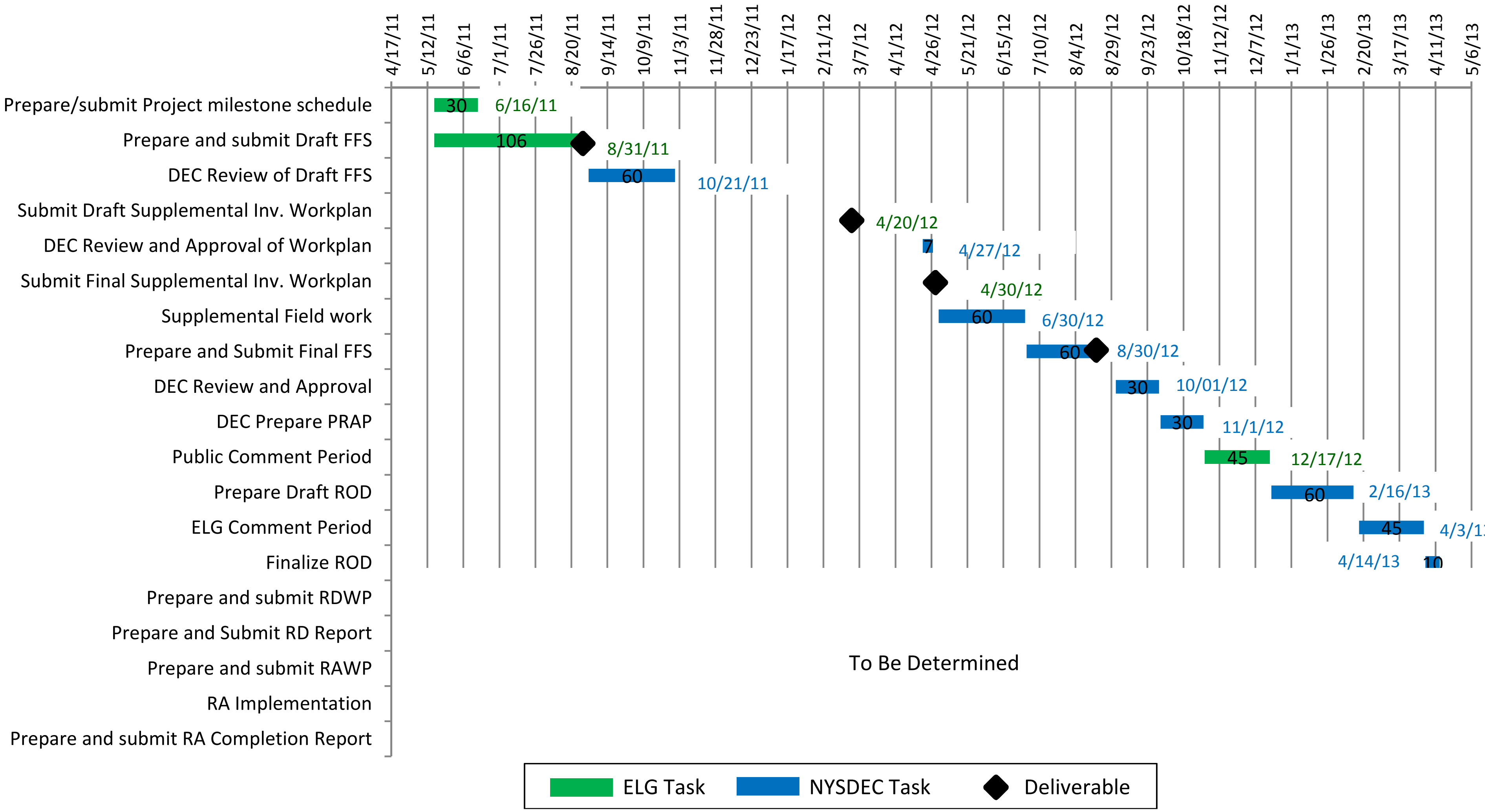
August, 2011

INDOOR AIR SAMPLE LOCATIONS

FIGURE 3-3

Figure 6-1

Proposed Project Schedule
ELG Utica Alloys Site
Utica, NY



EHS Support consider it done

2/28/12

APPENDIX A

Field Forms

Date:
Collector:
Affiliation:

Indoor Air Quality
Building Survey

Access Contact ____________________ Address ____________________
Phone ____________________
Best time to contact ____________________

Owner [ ] Renter [ ] Other [ ] Access Agreement Signed ______

Date built ______ Building type:
Yrs of residence ______ Residential [ ] School [ ] Industrial [ ]
No. of occupants ______ Commercial [ ] Church [ ] Other

Check all that apply:

Ranch [ ] Raised Ranch [ ] 2-Family [ ] Apartments [ ]
Cape [ ] Colonial [ ] Duplex [ ] Condominium [ ]
3-Family [ ] Mobile Home [ ] Other ______

Above grade building construction:

Wood frame [ ] Poured concrete [ ] Stone [ ]
Brick [ ] Concrete block [ ] Other ______

Foundation construction:

Fieldstone [ ] Solid top concrete block [ ] Slab on grade [ ]
Poured concrete [ ] Open top concrete block [ ] Other ______

Is the owner aware of any additions make to the original design of the structure: (please specify)

____
____

Utilities

Sewer: | Water: | | Hot water heater type:
Public [ ] | Public [ ] | Spring [ ] | Gas [ ] Electric [ ]
Private [ ] | Private [ ] | Well [ ] | Oil [ ] Other ______
Other ______ | Other ______

Heating, ventilation, and air conditioning systems

Primary heat type:
Hot air [ ]
Hot water [ ]
Steam radiator [ ]
Electric [ ]
Solar [ ]
Other ______

Fuel type (heat):
Natural gas [ ]
Fuel oil [ ]
Electric [ ]
Wood [ ]
Other ______

Secondary heat type:
Kerosene [ ]
Wood stove [ ]
Electric [ ]
Propane [ ]
Other ______

Ventilation types:
Attic fan [ ]
Kitchen hood [ ]
Bathroom fan [ ]
Other ______

Ceiling fan [ ]
Air filtration [ ]
Induced fireplace [ ]
Other ______

Air conditioning:
Window units [ ]
Furnace unit [ ]
Electric [ ]
Other ______

EHS Support consider it done

Date:
Collector:
Affiliation:

Indoor Air Quality
Building Survey

Basement type:

None	☐	Half	☐	Vented crawlspace	☐	Other	____
Full	☐	Slab on grade	☐	Unvented crawlspace	☐		

If slab on grade, is there a garage with occupied space above?

Basement depth below grade (ft)

Front ____ Rear ____ Side 1 ____ Side 2 ____

Basement characteristics

General:		Floor:		Walls:			
No. of rooms	☐	Earth	☐	Finished	☐	Paneling	☐
Bathroom	☐	Concrete	☐	Unfinished	☐	Tile	☐
Basement use	☐	Tile	☐	Painted	☐	Insulated	☐
		Carpet	☐	Sheetrock	☐	Uninsulated	☐
		Other	____	Other	____		

Check if present:

Fireplace	☐	Elevator	☐	French drain	☐
Sump pump	☐	Ash cleanout	☐	Floor cracks	☐
Floor drains	☐	Water damage	☐	Wall cracks	☐
Interior walls	☐	Jacuzzi/hot tub	☐	Other	____

Does the basement have a moisture problem? ____
Does the basement ever flood? (specify frequency) ____
Does the basement have a radon system installed? ____
Has there been recent purchases of furnishings (carpet, rugs, linoleum, tile, or furniture) or remodeling (new construction, roofing, or floor stripping)? (please specify) ____

Chemical usage, exposure and storage

Identify occupant hobbies:

Painting	☐	Electronics	☐	Model Making	☐
Stained glass	☐	Woodworking	☐	Auto repair	☐
Jewelry making	☐	Furniture refinishing	☐	Other	____

Where in the structure are these hobbies conducted? ____
Does the occupant's job require chemical exposure? ____
If so, where are the occupants clothes cleaned? ____

Has the structure been fumigated in the last year? ____
If so, is fumigation regularly performed? (how often) ____
Are pesticides frequently applied to lawn or garden? ____
If so, are they stored on the property? ____

Date:
Collector:
Affiliation:

Indoor Air Quality
Building Survey

Identify chemicals stored in the basement/1st floor living space, or garage if structure is slab on grade (include fuels, solvents, cleaners, etc.). Use separate inventory sheet for each area surveyed.

Brand	Product	Amount Stored

Comments

Is there any other information about the structural features of this building, the habits of its occupants or potential sources for chemical contaminants to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building?

Date:
Collector:
Affiliation:

Indoor Air Quality
Building Survey

Identify chemicals stored in the basement/1st floor living space, or garage if structure is slab on grade (include fuels, solvents, cleaners, etc.). Use separate inventory sheet for each area surveyed.

Brand	Product	Amount Stored

Comments

Is there any other information about the structural features of this building, the habits of its occupants or potential sources for chemical contaminants to the indoor air that may be of importance in facilitating the evaluation of the indoor air quality of the building?

Multiple Vapor Intrusion Sampling Form

Project # ____________________ Date ____________________

Project Name ____________________ Collector ____________________

Structure Location ____________________ Sample Locations ____________________

PID/FID meter ID ____________________

Sample Duration (intended) ____________________

Indoor Air Sample		Sub-structure Sample		Circle Sample Type: Indoor Air SS-DUP Ambient IA-DUP	
Sample ID		Sample ID		Sample ID	
Canister ID		Canister ID		Canister ID	
Flow Controller ID		Flow Controller ID		Flow Controller ID	
Date/Time start		Date/Time start		Date/Time start	
Date/Time end		Date/Time end		Date/Time end	
Gauge prior to start		Gauge prior to start		Gauge prior to start	
Start vacuum, units		Start vacuum, units		Start vacuum, units	
End vacuum, units		End vacuum, units		End vacuum, units	
Complete all that apply:		Complete all that apply:		Complete all that apply:	
Air temperature (^{o}F)		Air temperature (^{o}F)		Air temperature (^{o}F)	
PID/FID reading, units		PID/FID reading, units		PID/FID reading, units	
Length of tubing used, units		Length of tubing used, units		Length of tubing used, units	
Tubing purged?		Tubing purged?		Tubing purged?	
For indoor location:		For indoor location:		For outdoor location:	
Noticeable odor?		Noticeable odor?		Noticeable odor?	
Intake height above floor (in)		Floor slab thickness (in)		Distance to road (ft)	
Floor surface type		Intake depth below floor (in)		Direction to closest building (degrees)	
Room		Floor surface type		Distance to closest building (ft)	
Story/level		Room		Intake height above ground level (in)	
		Story/level			

Building Survey and Chemical Inventory Form Completed? ____________________

Photographs Taken? ____________________

Comments: ____________________

Analytical method required: ____________________

Laboratory used ____________________

EHS Support *consider it done*