Groundwater Investigation Work Plan

Chicago Pneumatics Tool Company
2200 Bleecker Street
Frankfort, New York

NYSDEC Site Number: 622003

CHA Project Number: 073631.000

Prepared for:
Chicago Pneumatic Tool Company
1815 Clubhouse Road
Rock Hill, South Carolina 29730

Prepared by:

CHA

300 South State Street, Suite 600
Syracuse, New York 13202
Phone: (315) 471-3920

September 2024

V:\Projects\ANY\K6\073631.000\08_Reports\Investigation Work Plan\FINAL\2024-09-26_Groundwater Investigation Work Plan_r3.docx

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS & ABBREVIATIONS

AOC	Area of Concern
BBL	Blasland, Bouck & Lee, Inc
CAMP	Community Air Monitoring Plan
CHA	CHA Consulting, Inc.
COC	Chain of Custody
CP	Chicago Pneumatic Tool Company
CVOC	Chlorinated Volatile Organic Compound
DCE	cis-1,2-dichloroethene
ELAP	Environmental Laboratory Approval Program
EPA	Environmental Protection Agency
GC/MS	Gas Chromatography/Mass Spectrometry
HASP	Health and Safety Plan
IRM	Interim Remedial Measure
LCS	Laboratory Control Sample
MDL	Method Detection Limit
MS/MSD	Matrix Spike/Matrix Spike Duplicate
NYSDEC	New York State Department of Environmental Conservation
PCB	Polychlorinated Biphenyl
PID	Photoionization Detector
QA/QC	Quality Assurance/Quality Control
RI	Remedial Investigation
RL	Reporting Limit
ROD	Record of Decision
RPD	Relative Percent Difference
SOP	Standard Operating Procedure
SPDES	State Pollutant Discharge Elimination System
SVOC	Semi-Volatile Organic Compounds
TAL	Target Analyte List
TCE	Trichloroethene
TCL	Target Compound List
TCLP	Toxicity Characteristic Leaching Potential
TOGS	Technical and Operational Guidance Series
TSCA	Toxic Substances Control Act
VOC	Volatile Organic Compound

CERTIFICATION STATEMENT

I, Samantha Miller, P.E., certify that I am currently a Qualified Environmental Professional as defined in 6 NYCRR Part 375 and that this Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the DER Technical Guidance for Site Investigation and Remediation (DER-10).

Samantha Miller, P.E.
Senior Engineer

1.0 INTRODUCTION

On behalf of Chicago Pneumatic Tool Company (CP), CHA Consulting, Inc. (CHA) has prepared this Groundwater Investigation Work Plan to delineate the current groundwater impacts from chlorinated volatile organic compound (CVOC) contamination. The Chicago Pneumatic Tool Company facility is located at 2200 Bleecker Street in the Town of Frankfort, Herkimer County, New York (Site). See Figure 1 for the general vicinity of the Site. CVOC contamination is currently managed with northern and southern groundwater collection trenches that gravity feed two pumping manholes. The pumping manholes transmit groundwater to the low-profile air stripper located in the southeast corner of the building for treatment and discharge. See Figure 2 for the facility layout of the groundwater collection and treatment system.

Generally, the purpose of the groundwater collection and treatment system is to prevent off-site migration of contaminated shallow groundwater. The air stripper system was initially installed in 1995 as an interim remedial measure (IRM) and the collection trenches were improved in 1999 during the remedial action. Due to the age of the system, many components have degraded in performance and the system is intermittently not functioning as intended. Troubleshooting and repairs or replacement to pumps, floats, and electrical components within the two pumping manholes and the groundwater treatment building have lengthened the life of the system, but repairs have been less successful over the last several years at maintaining appropriate function. The purpose of the Groundwater Investigation Work Plan is to determine the current extent of groundwater contamination for the evaluation of alternatives to the pump and treat system currently in operation.

The Site is currently classified as a Class 4 Inactive Hazardous Waste Disposal Facility regulated under the New York State Department of Environmental Conservation (NYSDEC) as Site Number 622003. Under the direction of NYSDEC, eight areas of concern (AOCs) were investigated, delineated, and remediated during the 1990s and early 2000s. A brief history of the Site is detailed in Section 2 including all AOCs, but particular attention is given to the impacts to groundwater and the AOCs that initiated the need for the air stripper installed as an IRM.

1.1 SITE HYDROGEOLOGY

Two distinct hydrogeologic units are present at the Site and consist of unconsolidated overburden materials and weathered shale bedrock. The two units are separated by a till unit that was not observed to be water bearing and appeared to act as a semi-confining unit limiting the vertical migration of groundwater between the two water bearing units.

The Supplemental Remedial Investigation Report/Feasibility Study, which was prepared by Blasland, Bouck & Lee, Inc (BBL) and finalized in December 1995, and the Record of Decision (ROD) dated March 1996, indicate that the Site is located on the south side of the Mohawk Valley and subsurface geology is generally characterized by unconsolidated overburden, till, and black weathered shale bedrock of the Upper Ordivician period. The unconsolidated overburden is approximately three feet deep in the southern portion of the site and 11.5 feet deep in the northern portion and underlain by a till unit present across the site and ranging in thickness from 11.5 to 24 feet. Portions of the overburden material had been reworked to varying depths and is classified as fill material. Additionally, the aforementioned foundry sand landfill located to the west of the building was covered with approximately one foot of asphalt but the foundry sand extends to a depth of approximately six feet below ground surface.

The effects of glaciation are evident in the Mohawk Valley in the formation of lodgement till, a cohesive material typically classified as boulder clays that were deposited directly from the moving ice beneath the moving glacier. Additionally, the Mohawk Valley was a meltwater channel during deglaciation and glaciofluvial sands and gravels or glaciolacustrine silts and clays were deposited. Groundwater flow in the overburden is generally from the south to the north-northeast at a measured velocity of 1.1 feet per day.

Black weathered bedrock underlying the till unit is gently sloped to the northeast toward the Mohawk Valley floor and the Mohawk River and measured groundwater velocity was 0.6 feet per day.

1.2 PROJECT TEAM

This groundwater investigation will require the expressed approval and cooperation from all parties involved. It is our understanding that the Site has agreements in place with both, additional responsible parties and the property owner/manager. Prior to mobilization, notification of this work will be provided to and required from all parties.

Table 1. Project Team

Name	Contact Information
Brianna Scharf NYSDEC Project Manager	(518) 402-5987 Brianna.scharf@dec.ny.gov
Sarah Saucier, P.E. NYSDEC Remedial Section C Chief	(518) 402-9675 Sarah.Saucier@dec.ny.gov
Mark Sergott NYSDOH	mark.sergott@health.ny.gov
Melissa Doroski NYSDOH	melissa.doroski@health.ny.gov
Jonathan Bone TRC Project Manager	(315) 436-0853 (Cell) jbone@trccompanies.com
Virashnie Maharaj CP North America Chicago Pneumatic Tool Co. Business Control	(803) 817-7000 Virashnie.maharaj@cp.com
Samantha Miller, P.E. CHA Consulting, Inc. Project Manager	(315) 257-7154 (office) smiller@chasolutions.com
Karyn Ehmann CHA Consulting, Inc. Field Team Leader	(315) 257-7250 (office) kehmann@chasolutions.com
Tim Daniluk ERM Consultant for Vontier	(315) 233-3043 Tim.daniluk@erm.com

2.0 HISTORICAL REVIEW

2.1 DISPOSAL HISTORY AND EARLY REMEDIATION

CP began operations at the Site in 1948, during which time three unlined lagoons connected in series and located on the south side of the Site were used to dispose of waste coolant oils from plant operations. The first lagoon in series was occasionally skimmed to re-use the oil in the on-site boiler or disposed of off-site. In 1978, CP received approval from the NYSDEC to empty, excavate and backfill the waste oil lagoons. This work was conducted in 1979. The excavated material was disposed of off-site and backfilled with imported fill material. A new clay-lined lagoon was constructed at that time to collect Site runoff and skim residual oils.

From 1949 to 1979, CP operated a foundry sand landfill. Foundry sand contaminated with phenol formaldehyde binder was disposed of to the west side of the facility. It was reported approximately 144 tons of foundry sand was disposed of yearly. Oil-stained soils, scrap metal, drums, and other debris were disposed of in a landfill area to the south of the building. Additionally, a chip chute area was operational until 1991 when it was dismantled. Metal chips from the manufacturing process were stored along the south side of the manufacturing facility and transferred to vehicles for off-site recycling. Spent cutting oil and solvents migrated from the chip chute area to the ground and drainage ditch along the south side of the building.

2.2 PRELIMINARY INVESTIGATIONS AND ORDER ON CONSENT

Investigations began in 1985 with a NYSDEC Phase I Investigation conducted by RECRA Research, Inc., and in 1986, an Environmental Protection Agency (EPA) inspection was conducted by NUS Corporation. The disposal areas discussed in Section 1.1.3 were identified as part of these efforts. From 1988 through 1991, BBL conducted several investigations that, in conjunction with a file review and site visit, informed a Preliminary Site Assessment completed in 1990 by E.C. Jordan Company under contract to the NYSDEC. At that time and based on the Preliminary Site Assessment, the Site was classified as a Class 2 Inactive Hazardous Waste Disposal Site where a Class 2 site is defined as a site where significant threat to public health or environment exists, and action is required to address the threat.

One of the several assessments in the early 1990s included focus on an 8-inch diameter buried clay pipe discharging to the northern drainage ditch parallel to Bleecker Street. Water sampled from the clay pipe was found to be impacted by cis-1,2-dichloroethene (DCE) and trichloroethene (TCE). Impacted groundwater on the northeast side of the manufacturing facility was potentially attributed to channelized groundwater flow through this existing clay pipe.

An Order on Consent (A6-0279-92-04) was entered between the NYSDEC and Chicago Pneumatic Tool Company in October 1993. The Order on Consent was specifically for the development of a Remedial Investigation Work Plan and Feasibility Study.

2.3 REMEDIAL INVESTIGATION

The initial remedial investigation (RI) was conducted between October 1993 and April 1994 with supplemental RI work conducted in 1995. The results of the RI are summarized in the Record of Decision. Generally, eight AOCs were identified, as described below:

- Separation Ponds
    - Soils within the former separation ponds contained lead, chromium, zinc, copper, TCE, DCE, and vinyl chloride
    - Groundwater samples contained vinyl chloride, DCE, TCE, and lead in the bedrock monitoring wells and polychlorinated biphenyls (PCBs) in the overburden wells.
- Skimmer Pond
    - Sediments in the skimmer pond included contamination of PCBs, chromium, lead, zinc, and copper.
    - Downgradient groundwater sampling of overburden wells showed contamination of DCE, lead, zinc, and chromium.
- Debris & Oily Waste Landfill
    - Included contaminated soils containing lead, chromium, zinc, copper, vinyl chloride, DCE, TCE, and PCBs.
    - Overburden groundwater sample showed vinyl chloride, PCBs, lead, zinc, chromium, and copper.
- Chip Chute Area and On-Site Drainage Ditches
    - Included soil and sediment contamination including lead, chromium, zinc, copper, TCE, DCE, vinyl chloride, and PCBs.
    - Overburden groundwater samples contained TCE.
- Unnamed Creek
    - Sediments contaminated with lead, chromium, zinc, copper, and PCBs
    - Surface water contaminated with DCE, TCE, zinc, and copper
- Off-Site Drainage Ditch north of Bleecker Street
    - Sediments contaminated with lead, copper, and PCBs
    - Surface water contaminated with DCE, TCE, lead, zinc, and copper
- Storm Sewer System

  - Sediments from the storm sewer manholes contained site related contamination including lead, zinc, chromium, copper, and PCBs.
  - Stormwater sampled contained TCE, zinc, and copper.
- Shallow Groundwater Contamination and East Lot
  - Soils contaminated with vinyl chloride, DCE, TCE, chromium, lead, zinc, copper, and PCBs.
  - Groundwater samples from test pits adjacent to MW-5 contaminated with vinyl chloride, PCBs, lead, chromium, zinc, and copper.
  - Groundwater in the northeast corner of the site contaminated with vinyl chloride (12-5,000 ppb), DCE (1-12,000 ppb), and TCE (1-16,000 ppb), lead (1-320 ppb), and zinc (1-1350 ppb).

Figure 3 presents a summary of the AOCs associated with elevated CVOC concentrations; namely the Chip Chute Area and On-Site Drainage Ditches and the Shallow Groundwater Contamination and East Lot. It should be noted soil and sediment impacts were identified in the Chip Chute Area and On-Site Drainage Ditches and only one sample with groundwater impacts of CVOCs was identified. Low level concentrations of DCE and TCE (non-detect to 11 µg/L) were identified in MW-5 or surrounding sampling points. The northeast portion of the building, as identified in Figure 3, is the primary area where CVOC compounds were detected.

2.4 INTERIM REMEDIAL MEASURE

An Interim Remedial Measure (IRM) was installed between January 16, 1995, and February 24, 1995, for the purposes of preventing further migration of contaminated groundwater emanating from the clay pipe. The IRM involved installing an interceptor trench to intercept groundwater discharging from a clay pipe located on the northeast side of the building. The water was pumped to a low-profile air stripper for VOC removal. Treated effluent was discharged to a State Pollutant Discharge Elimination System (SPDES) discharge monitoring point (03A). The IRM also included rerouting the discharge from the oil skimmer pond through the air stripper. As part of the remedial action, described in the following section, the IRM was enhanced for long term pumping and treatment of groundwater collected in trenches to the north and south of the building.

2.5 ORDER ON CONSENT AND REMEDIAL ACTION

A second Order on Consent (B6-0491-96-04) to initiate the Remedial Design and Remedial Actions at the Site was entered between Chicago Pneumatic Tool Company and the NYSDEC on October 2, 1997. The design was developed, and remediation occurred in 1999 and early 2000.

Components of the remedy included:

- Excavation of soils and sediments contaminated above cleanup goals from all AOCs including: Former Oil/Water Separation Ponds, Skimmer Pond, Debris/Oily Waste Landfill, Former Chip Chute and On-Site Drainage Ditches, Unnamed Creek, Off-Site Drainage Ditch, and Storm Sewers. Where appropriate, excavated areas were backfilled with clean material and regraded. Once excavated, soils contaminated with 10 ppm total VOCs or greater were treated using ex-situ soil berms and soil vapor extraction treatment prior to on-site disposal in a lined containment cell.

- Soil containing 50 ppm or greater total PCBs were transported off site to a Toxic Substances Control Act (TSCA) permitted hazardous waste disposal facility.

- Remaining soils, including treated residuals, were consolidated on-site in a lined containment cell constructed with a leachate collection system, and capped.

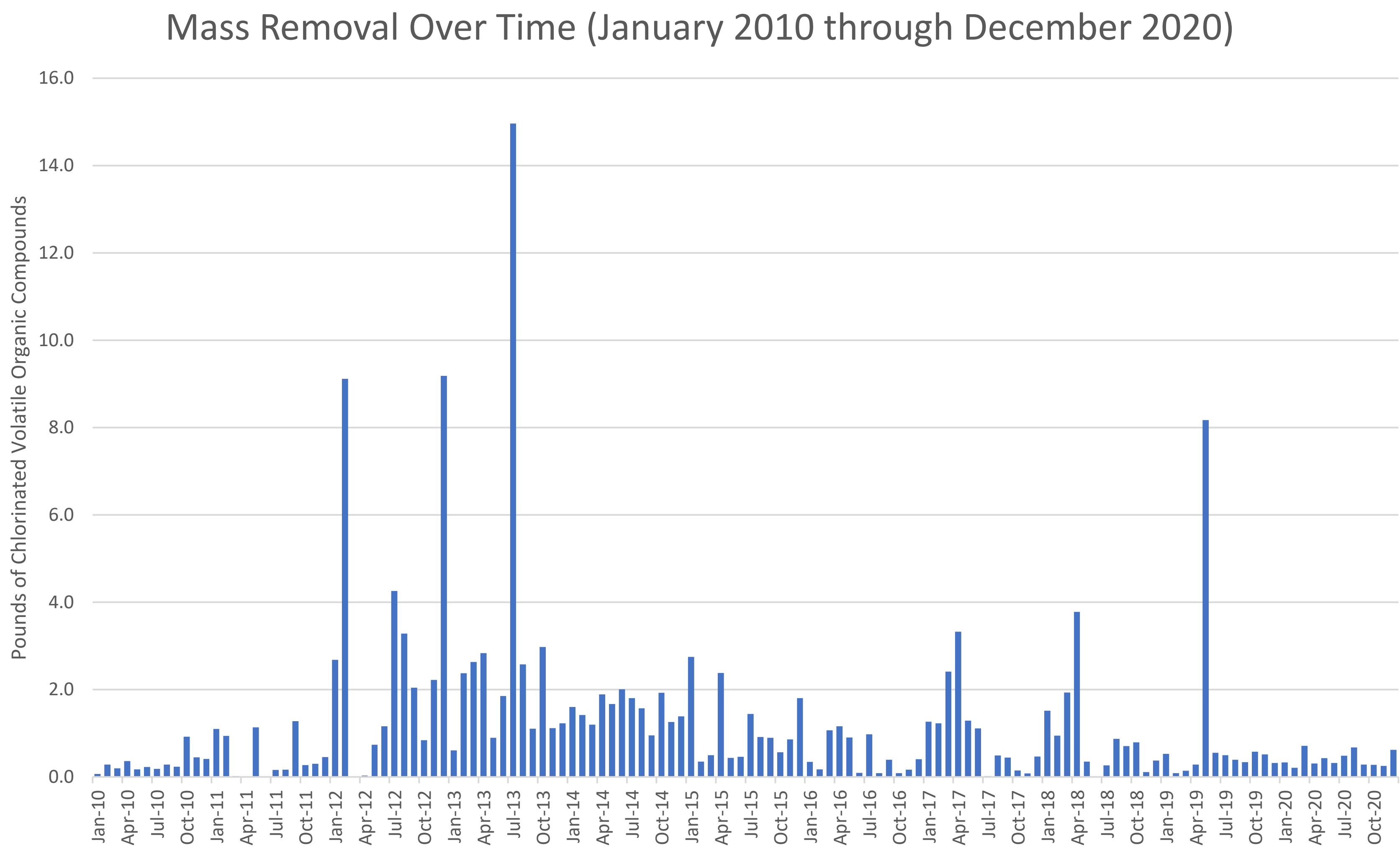
- Shallow groundwater collection systems were installed along the north boundary of the site (northern collection trench) and also to the south of the manufacturing building (southern collection trench), down gradient of the Oily Waste/Debris Landfill and Oil/Water Separation Ponds. The groundwater is treated on-site using an upgraded version of the existing groundwater treatment system previously installed under an IRM.

2.6 OPERATIONS AND MAINTENANCE

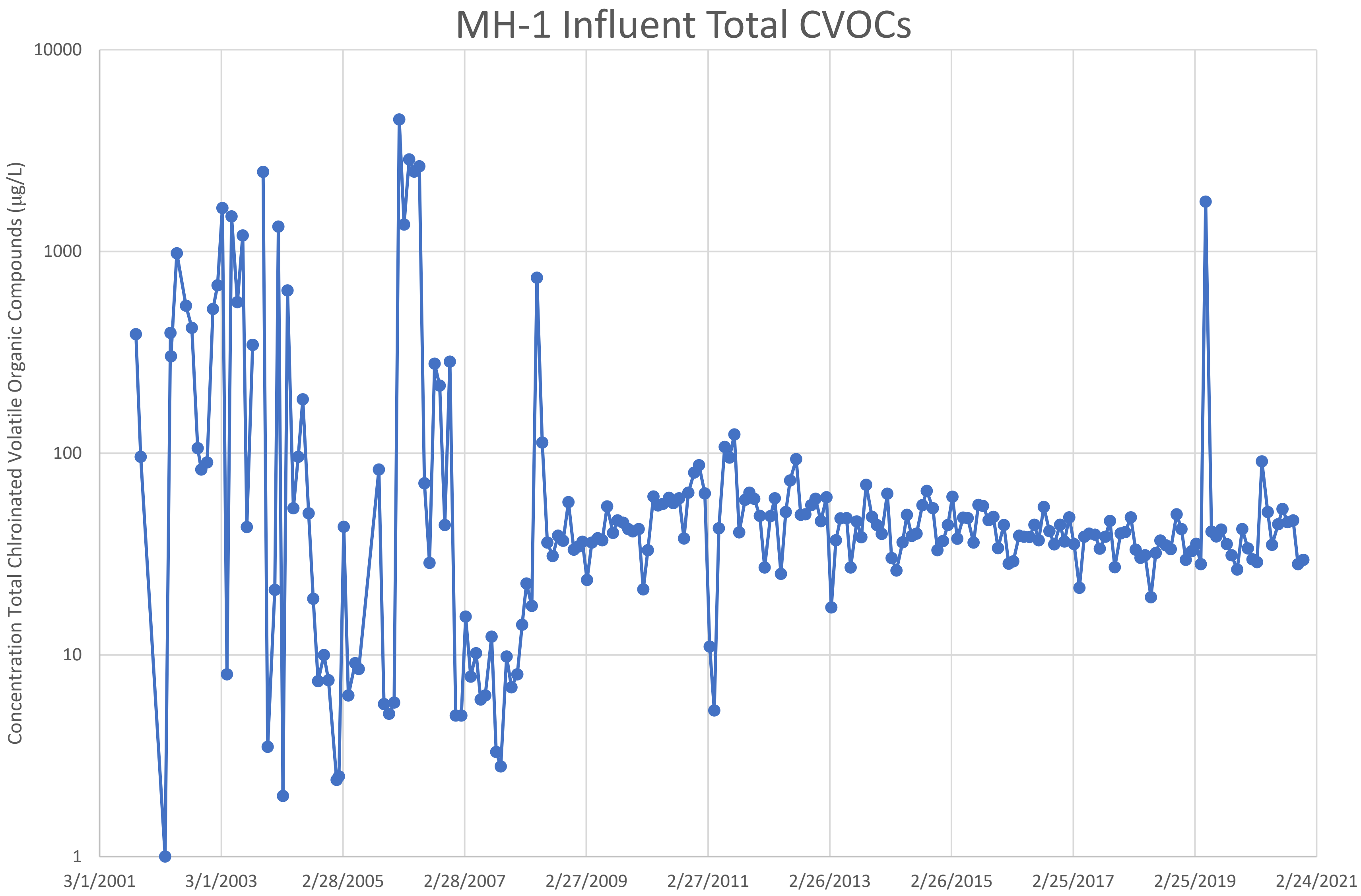
The Site has been in the Operations and Maintenance phase since 2001. Annual periodic review reports (PRRs) are developed to verify the selected remedy is in place and evaluate the performance and effectiveness of the remedy. Various upgrades or improvements to the groundwater treatment system have been incorporated since 2001 to continue operation and functionality of the system.

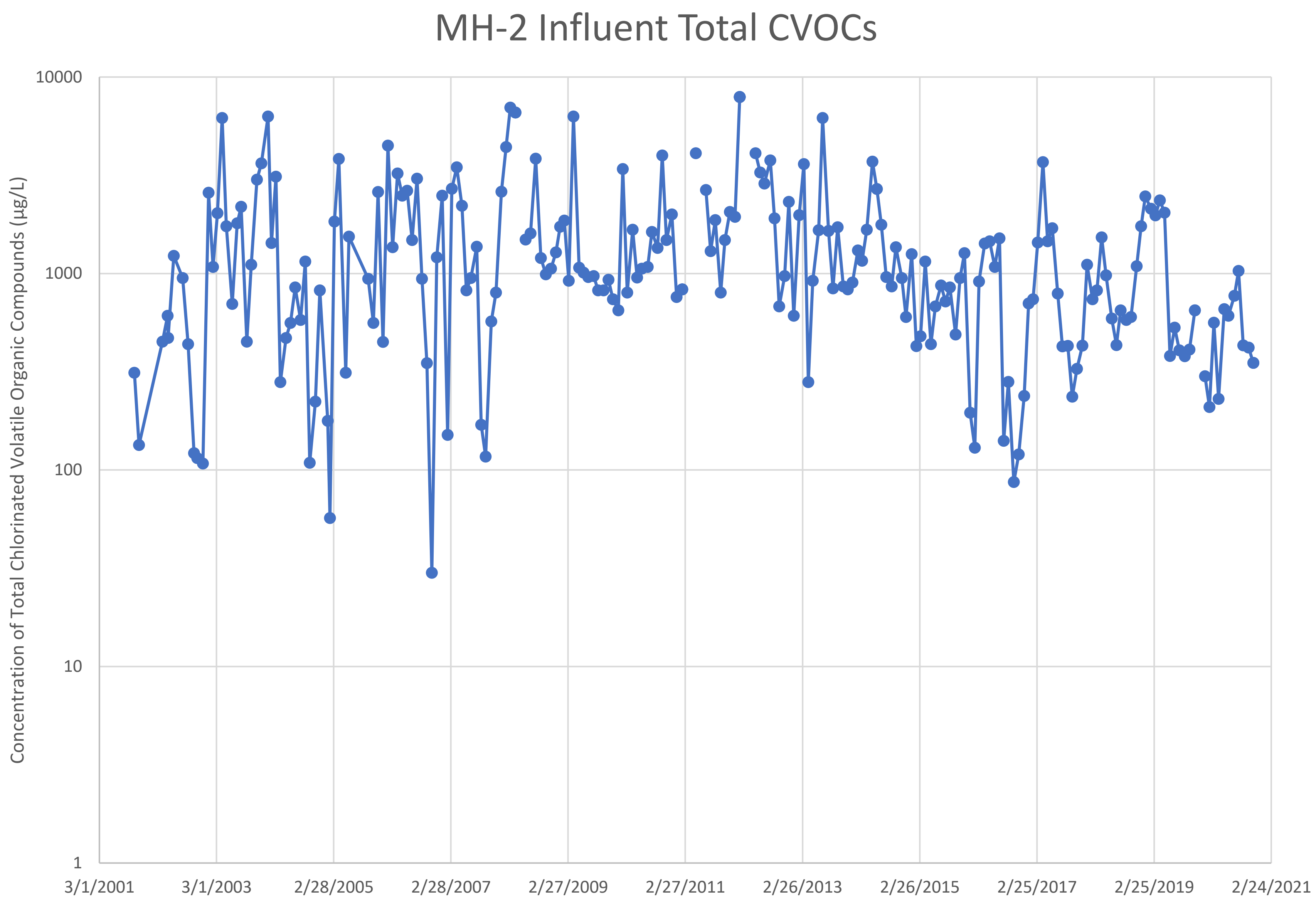
As previously discussed, the current groundwater pump and treat system is not functioning as intended due to the age of individual components, some dating back to the initial installation in 1995. The air stripper was not initially installed as a long-term remedy to groundwater contamination. The mass removal reported from 2010 through 2020 is presented on the following graph. The monthly mass removal ranges from nearly 0 pounds to a maximum of 15.0 pounds, but generally is less than 1 pound of mass removal monthly. Additionally, the influent concentration from the southern collection trench (MH-1) have stabilized at levels approximately one order of magnitude above of the TOGS 1.1.1. AWQS, presented in the MH-1 Influent Total CVOCs graph following the mass removal graph. One highly anomalous reading is identified in May 2019, but the remainder of analytical results have been less than 100 µg/L Total VOC concentrations since September 2011. The influent from the northern collection trench (MH-2) is consistently higher, approximately three orders of magnitude higher than the TOGS 1.1.1 AWQS, as noted in the graphs in this section. The plan and profile view of the northern collection trench is presented on Figure 4.

The continued operation of the groundwater treatment system via pump and treat with an air stripper may not be an effective method for continued management of contaminated groundwater at the Site.



Mass Removal Over Time (January 2010 through December 2020)
Pounds of Chlorinated Volatile Organic Compounds
16.0
14.0
12.0
10.0
8.0
6.0
4.0
2.0
0.0
Jan-10
Apr-10
Jul-10
Oct-10
Jan-11
Apr-11
Jul-11
Oct-11
Jan-12
Apr-12
Jul-12
Oct-12
Jan-13
Apr-13
Jul-13
Oct-13
Jan-14
Apr-14
Jul-14
Oct-14
Jan-15
Apr-15
Jul-15
Oct-15
Jan-16
Apr-16
Jul-16
Oct-16
Jan-17
Apr-17
Jul-17
Oct-17
Jan-18
Apr-18
Jul-18
Oct-18
Jan-19
Apr-19
Jul-19
Oct-19
Jan-20
Apr-20
Jul-20
Oct-20


MH-1 Influent Total CVOCs
Concentration Total Chlroinated Volatile Organic Compounds (µg/L)
10000
1000
100
10
1
3/1/2001
3/1/2003
2/28/2005
2/28/2007
2/27/2009
2/27/2011
2/26/2013
2/26/2015
2/25/2017
2/25/2019
2/24/2021


MH-2 Influent Total CVOCs
Concentration of Total Chlorinated Volatile Organic Compounds (µg/L)
10000
1000
100
10
1
3/1/2001
3/1/2003
2/28/2005
2/28/2007
2/27/2009
2/27/2011
2/26/2013
2/26/2015
2/25/2017
2/25/2019
2/24/2021

3.0 SUBSURFACE INVESTIGATION

This section describes the investigative activities to be completed at the Site for the purpose of delineating the shallow groundwater contamination to the northeast of the manufacturing facility for evaluation of alternatives to the groundwater pump and treat system.

3.1 SAMPLING APPROACH

A hydraulic push sampler will be utilized to characterize soil and collect groundwater samples from the area known to be contaminated with CVOCs in attempt to delineate the current extents of the CVOC plume. A Geoprobe® drilling rig will be utilized to install up to 30 soil borings to a maximum depth of 15 feet, assuming the till material is encountered approximately 11.5 feet below ground surface, or approximately 3 feet into the till material, whichever is encountered first.

At each soil boring location, soil samples will be collected continuously throughout the depth of each boring. Upon collection, each sample core will be examined by a qualified CHA environmental professional for visual and olfactory evidence of contamination and will be screened for the presence of volatile organic vapors using a photoionization detector (PID). Soil removed by the sampler will be containerized in 55-gallon drums for waste characterization and off-site disposal. Given that the purpose of this investigation is simply to delineate the plume, no analytical sampling for VOCs in soil is proposed. All field observations, soil classification, and PID readings will be noted on field logs at each location.

Each location will be sampled for groundwater using screen point sampling probes and disposal downhole tubing. The screen point sampler will be driven to the desired sampling depth, within the saturated soil perched on the till layer anticipated at 11.5 feet below ground surface. The protective sleeve of the sampler will be retracted to expose the stainless-steel screen and allow groundwater to hydrostatically enter annulus around the screen. Disposable polyethylene tubing will be placed down the hole to the screened interval. The polyethylene tubing will be connected to silicone tubing that is inserted into the mechanical rollers of a peristaltic pump. The peristaltic pump draws water from the subsurface through mechanical peristalsis. The formation will be purged in an attempt to reduce turbidity prior to sampling, but a temporary monitoring well is not anticipated to reach stability during purging. Prior to sampling, one field measurement of water quality parameters including pH, dissolved oxygen, oxidation reduction potential, temperature, specific conductance, and turbidity will be measured using a water quality multimeter. Grab samples of the groundwater will be collected from inside the drill rods and transferred to laboratory supplied bottles. Purge water will be containerized in 55-gallon drums for waste characterization and off-site disposal.

The sample will be collected in bottles preserved by the laboratory and placed in an insulated cooler maintained at 4 degrees Celsius immediately after collection. Disposable nitrile gloves will be worn by the sampling personnel and changed frequently including directly before collecting the groundwater sample.

The samples will be transported under proper chain-of-custody to an Environmental Laboratory Approval Program (ELAP)-approved laboratory for analysis on a standard 10-day turnaround time.

Any non-disposable, down-hole equipment will be decontaminated with a distilled water and phosphate-free detergent rinse between sampling locations to prevent possible cross-contamination between locations. After completion, each borehole will be backfilled with bentonite chips and hydrated to seal the borehole. All expendable supplies will be disposed of off-site.

3.1.1 Sampling Locations

Proposed temporary sampling locations are shown on Figure 5. Up to 30 sampling locations are proposed. The locations of QAQC samples will be selected in the field based on quantity of water available at each location.

3.1.2 Permanent Groundwater Monitoring Wells

To evaluate the remedial effectiveness of the northern collection trench, four permanent groundwater monitoring wells will be installed in the locations shown on Figure 5. The groundwater monitoring wells will be installed with the intent of screening the first water bearing unit (estimated to be approximately 11.5-feet bgs). Monitoring wells will be developed prior to sampling and all purged water will be containerized for off-site disposal. After development, CHA will allow the wells to sit for a minimum of 24-hours. Groundwater levels will be measured and recorded after the 24-hour period. CHA will then purge each well until water quality readings (pH, ORP, conductivity, dissolved oxygen and turbidity) indicate that the well has reached stability. One sample will be collected at each location as described in the next section.

3.1.3 Groundwater Analytical

Each temporary location and the four permanent groundwater monitoring wells will be sampled for targeted CVOCs via EPA Method 8260C (to include cis-1,2-dichloroethene, trans-1,2-dichloroethene, trichloroethene, and vinyl chloride). CVOC analysis requires three 40-mililiter (mL) vials with septa lids, pre-preserved with 0.25 mL of hydrochloric acid. Quality assurance sampling will include one blind duplicate sample, one matrix spike, and one matrix spike duplicate for every 20 parent samples collected, and one trip blank to be analyzed with the parent samples for a total of seven samples. Additional information on quality assurance/quality control information (QAQC) is provided in Section 4.5.

Results of the groundwater investigation will be compared to the *Technical and Operational Guidance Series* (TOGS) 1.1.1. Glass GA Ambient Water Quality Standards and Guidance Values. The standard for the selected CVOC parameters are presented in Table 2, below.

Table 2. TOGS 1.1.1. Standards for Selected CVOCs

Parameter	CAS Number	Class GA AWQS (µg/L)	Undiluted Typical Method Detection Limit (MDL) (µg/L)	Undiluted Typical Laboratory Reporting Limit (RL) (µg/L)
Trichloroethene	79-01-6	5	0.6	5
trans-1,2-dichloroethene	156-60-5	5	0.59	5
cis-1,2-dichloroethene	156-59-2	5	0.57	5
Vinyl chloride	75-01-4	2	0.75	5

4.0 FIELD SAMPLING PLAN

4.1 FIELD DOCUMENTATION

Calibration of the field instruments will be completed prior to each day's use in accordance with the manufacturer's instructions. The field equipment will be maintained, calibrated and operated in a manner consistent with the manufacturer's guidelines and EPA standard methods. The majority of field measurements will be limited to organic vapor readings (PID readings), turbidity, and water level depth. Records of calibration, repair or replacement will be filed and maintained by the field team.

Pertinent field survey and sampling information will be recorded in a logbook or on field logs during each day of the field effort per CHA standard operating procedure (SOP) #101 Field Logbook and Photographs, provided in Appendix A of this Work Plan.

At a minimum, entries in a logbook will include:

- Date and time of starting work;
- Names of all personnel at site;
- Weather conditions
- Purpose of proposed work effort;
- Sampling equipment to be used and calibration of equipment;
- Description of work area;
- Location of work area, including map reference;
- Details of work effort, particularly any deviation from the field operations plan or standard operating procedures;
- Field observations;
- Field measurements (e.g., PID readings);
- Field laboratory analytical results;
- Daily health and safety entries, including levels of protection;
- Type, number, and location of samples;
- Geographic coordinates for the location of samples;
- Sampling method, particularly deviations from the standard operating procedures;
- Sample location and number; and
- Sample handling, packaging, labeling, and shipping information (including destination).

In addition to keeping logs, photographs will be taken to provide a physical record to augment the fieldworker's written observations. For each photograph taken, several items will be recorded in the field logbooks:

- Date and time;
- Name of photographer;
- General direction faced and description of the subject

The general QA objective for measurement data is to obtain reproducible and comparable measurements to a degree of accuracy consistent with the use of standardized procedures.

4.2 SAMPLE DESIGNATION

Samples will be identified in accordance with CHA SOP#103 Sample Naming and Numbering. In summary, each sample will be uniquely defined by including the media type and sequential number. The following abbreviations will be used to identify the sample types:

Groundwater……………………………GW
Soil Waste Characterization…………..SOIL-WC
Purge Water Waste Characterization……WATER-WC
Blind Duplicate…………………………CHA-1
Matrix Spike/Matrix Spike Duplicate……..MS-1/MSD-1

4.3 SAMPLE HANDLING

A new pair of disposable nitrile gloves will be used at each location. Additional glove changes will be undertaken as conditions warrant. Sample containers will be new and delivered from the laboratory prior to the sampling event. Sample containers will come with the proper volume of chemical preservative appropriate for the type of analysis as detailed in CHA SOP#603.

After sample collection, the sample containers will be logged onto a chain of custody record as described in Section 4.7. The sample containers will be placed on ice in laboratory-supplied rigid coolers after collection and labeling.

For this project CHA staff will hand deliver the sample coolers to the ELAP-certified laboratory or coordinate with their courier service. Samples will remain under the control of CHA's field representative until relinquished to the laboratory/courier under chain-of-custody.

4.4 INVESTIGATION DERIVED WASTE

One soil sample will be collected and analyzed for the following waste characterization parameters:

- Toxicity characteristic leaching procedure (TCLP) Volatile Organic Compounds (VOCs) via EPA Method 8260/1311
- TCLP Semi-volatile Organic Compounds (SVOCs) via EPA Method 8270/1311
- TCLP Metals via EPA Method 6010/7471/1311
- Total PCBs via EPA Method 8082
- TCLP Herbicides via EPA Method 8151/1311
- TCLP Pesticides via EPA Method 8081/1311
- Ignitability, reactivity, corrosivity

One purge water sample will be collected and analyzed for the following waste characterization parameters:

- TCL VOCs via EPA Method 8260
- TCL SVOCs via EPA Method 8270
- Target Analyte List (TAL) Metals via EPA Method 6010/7471
- Total PCBs via EPA Method 8082

The samples will be transported under proper chain-of-custody to an ELAP-approved laboratory for analysis on a standard 10-day turnaround time. Upon receipt of the analytical results, a waste disposal contractor will be utilized to remove the drums of excess soil and purge water for off-site disposal at a permitted facility.

4.5 QUALITY ASSURANCE/QUALITY CONTROL

The overall QA objective is to develop and implement procedures for sample preparation and handling, sample chain of custody (COC), laboratory analyses, and reporting, in order to provide accurate data. Specific procedures to be followed for sampling, sample custody and document control, calibration, laboratory analyses and data reduction, validation, assessment and reporting are presented in this Section and summarized in Table 3.

The purpose of this Section is to define the goals for the level of QA effort; namely, accuracy; precision and sensitivity of analyses; and completeness, representativeness and comparability of measurement data from the analytical laboratories. QA objectives for field measurements are also discussed.

Accuracy, Precisions and Sensitivity of Analyses

The fundamental QA objective with respect to the accuracy, precision and sensitivity of analytical data is to achieve the QC acceptance of each analytical protocol. The method precision (relative percent difference (RPD) of duplicate analysis) will be determined from the duplicate analyses of one blind duplicate indoor air sample. One blind duplicate and one matrix spike/matrix spike duplicate (MS/MSD) sample set will be collected for every 20 parent samples.

Completeness, Representativeness and Comparability

It is expected that all analyses conducted in accordance with the selected methods will provide data meeting QC acceptance criteria for 80 percent of all samples tested. Any reasons for variances will be documented.

The sampling program has been designed to provide data representative of Site conditions. During development of these networks, consideration was given to location of historic activities, existing data from past studies completed for the Site and the physical Site setting. The extent to which existing and planned analytical data will be comparable depends on the similarity of sampling and analytical methods. Comparability of laboratory analyses will be ensured by the use of consistent units. Following completion of data collection, the existing database will be evaluated for representativeness.

4.5.1 Field QA/QC Samples

The following QA/QC samples will be collected to check that sampling, transportation, and laboratory activities do not bias quality of the analytical results.

Trip Blank

A trip blank is prepared by the laboratory and always accompanies the sample bottles. One trip blank will be returned to the laboratory with each cooler containing aqueous samples of VOCs for analysis. The trip blank will be analyzed for Target Contaminant List (TCL) VOCs via EPA Method 8260.

Field Duplicate

For every 20 environmental samples, one field duplicate will be collected at the same location and time as the parent environmental sample. The field duplicate is designated by “CHA-1”, and soforth, and the identity of the field duplicate is not revealed to the laboratory. The analytical results of the field duplicated will be compared to the parent sample to evaluate sampling precision.

Matrix Spike/Matrix Spike Duplicates

An MS/MSD sample will be analyzed at a minimum frequency one sample for every 20 environmental samples of each media that are collected. Acceptable criteria and compounds that will be used for matrix spikes are identified in the appropriate methods. Percent spike recoveries will be used to evaluate analytical accuracy while RPD between matrix spike analyses will be used to assess analytical precision.

4.5.2 Laboratory QA/QC

Each sample or group of samples shipped to the laboratory for analysis will be given a unique identification number by the laboratory. The laboratory sample custodian will record the client name, number of samples and date of receipt of samples in the Sample Control Log Book. The Contract Laboratory will be responsible for maintaining analytical logbooks and laboratory data as well as sample inventory on hand for submittal to CHA on an "as required" basis. Samples will be maintained by the laboratory for a period of 30 days, under the conditions prescribed by the appropriate USEPA methods, for additional analyses, if necessary. Raw laboratory data files will be inventoried and maintained by the Contract Laboratory for a period of five years, at which time CHA will advise them as to the need for additional storage.

Specific procedures related to internal laboratory QC samples are described in the following subsections. Groundwater samples submitted to the laboratory will include the following internal laboratory QC samples: method blank, laboratory control sample, laboratory duplicate, surrogate analysis, and MS/MSD samples.

Method Blank Sample

A method blank is used to evaluate potential contamination from the laboratory and is processed through all preparation and analytical steps with the batch of samples. A method blank is processed at a minimum frequency of one per 20 samples. The method blank consists of a matrix similar to the associated samples that is known to be free of the analytes of interest. Each method blank is evaluated, and the source of any contamination is investigated. Corrective actions taken in the event a target analyte is detected at more than half the reporting limit will be documented. Corrective actions may include re-preparation and re-analysis of all samples (if possible). Data qualifiers must be applied to any result reported that is associated with a contaminated method blank.

Laboratory Control Sample

The Laboratory Control Sample (LCS) is used to evaluate the performance of the entire analytical system including preparation and analysis. An LCS is processed at a minimum frequency of 1 per preparation batch. In the case of a method that has no separate preparation step (e.g. volatiles), an LCS will be processed with no more than 20 samples of a specific matrix performed by the same analyst, in the same method, using the same standards or reagents.

The LCS consists of a matrix similar to the associated samples that is known to be free of the analytes of interest that is then spiked with known concentrations of target analytes. The LCS is evaluated against the laboratory-derived acceptance criteria.

Matrix Spike/Matrix Spike Duplicate Samples

The laboratory will be provided MS and MSD samples collected from a parent location to analyze method precision and accuracy.

Surrogate Analysis

Surrogates are organic compounds which are similar to the analytes of interest, but which are not normally found in environmental samples. Surrogates are added to samples, by the laboratory, to monitor the effect of the matrix on the accuracy of the analysis. Every blank, standard and environmental sample analyzed by GC or GC/MS, including MS/MSD samples, will be spiked with surrogate compounds prior to sample preparation.

Surrogates will be spiked into samples according to the appropriate analytical methods. Surrogate spike recoveries will be compared with the control limits set by procedures specified in the method (or from laboratory specific control limits) for analytes falling within the quantification limits without dilution. Dilution of samples to bring the analyte concentration into the linear range of calibration may dilute the surrogates out of the quantification limit; assessment of analytical quality in these cases will be based on the quality control embodied in the check and MS/MSD samples.

Table 3. Analytical Methods/Quality Assurance Summary

Matrix (Sample Type)	Analysis	Parameter/Fraction	Number of Primary Samples	Number of Duplicates/ MS/MSD	Number of Trip Blanks/Field Blanks/Equipment Blanks	Sampling Locations	Minimum Sample Volume/ Container	Sample Preservation	Technical Holding Time
Groundwater	8260C	Select VOCs	34	2/2/2	1 per field day/0/0	GW-01 through GW-30, MW101 through MW-104	(3) 40 mL vials	Hydrochloric Acid, pH<2, 4 deg C	14 days
Soil Investigation Derived Waste	8260C/1311	TCLP VOCs	1	0/0/0	0/0/0	Drummed Investigation Derived Waste	(1) 2 ounce amber glass	Cool to 4 deg C	28 days
	8270/1311	TCLP SVOCs					(1) 8 ounce amber glass	Cool to 4 deg C	14 days
	6010/7471/1311	TCLP Metals					(1) 8 ounce	Cool to 4 deg C	6 months
	8082	Total PCBs					(1) 4 ounce amber glass	Cool to 4 deg C	14 days
	8151/1311	TCLP Herbicides					(1) 8 ounce amber glass	Cool to 4 deg C	14 days
	8081/1311	TCLP Pesticides					(1) 8 ounce amber glass	Cool to 4 deg C	14 days
	9045D	pH (corrosivity)					(1) 4 ounce	Cool to 4 deg C	14 days
	1030	Ignitability					(1) 8 ounce	None	None
	7.3	Reactivity (Cyanide & Sulfide)					(1) 8 ounce	Cool to 4 deg C	14 days
Purge Water Investigation Derived Waste	8260C	TCL VOCs	1	0/0/0	0/0/0	Drummed Investigation Derived Waste	(3) 40 mL vials	Hydrochloric Acid, pH<2, 4 deg C	14 days
	8270D	TCL SVOCs					(2) 250 mL Amber Glass	Cool to 4 deg C	7 days for extraction, 40 days after extraction
	6010/7471	TAL Metals					(1) 250 mL Plastic	H2SO4 to pH<2, 4 deg C	6 months
	8082	PCBs					(2) 250 mL Amber Glass	Cool to 4 deg C	7 days for extraction, 40 days after extraction

4.6 PROCEDURES USED TO ASSESS PERFORMANCE

4.6.1 Precision

Precision will be assessed by comparing the analytical results between duplicate spike analyses. Precision as RPD will be calculated as follows:

$$\text{Precision} = \frac{[D_2 - D_1]}{(D_1 + D_2)/2} \times 100$$

D_1 = matrix spike recovery
D_2 = matrix spike duplicate spike recovery

Acceptance criteria for duplicate soil samples will be ≤30% RPD. Acceptance criteria for duplicate water samples will be ≤20% RPD between field and laboratory data.

Percent relative standard deviation or the RPD between matrix spike analyses will be used to assess laboratory analytical precision. Acceptable criteria and compounds that will be used are identified in the appropriate EPA methods.

4.6.2 Accuracy

Accuracy will be assessed by comparing a set of analytical results to the accepted or "true" values that would be expected. In general, MS/MSD and surrogate spike recoveries will be used to assess accuracy. Accuracy as percent recovery will be calculated as follows:

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

A = The analyte determined experimentally from the spike sample.
B = The background level determined by a separate analysis of the unspiked sample.
C = The amount of spike added.

Percent spike recoveries in MS/MSD and surrogate spike recoveries will be used to evaluate analytical accuracy. Acceptable criteria and compounds that will be used for matrix spikes are identified in the appropriate EPA methods.

The evaluation of accuracy of field measurements will be limited to checking the reproducibility of the measurement in the field by obtaining multiple readings and by calibrating the instruments (where appropriate).

4.6.3 Completeness, Representativeness and Comparability

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under normal conditions.

To be considered complete, the data set must contain all QC check analyses verifying precision and accuracy for the analytical protocol. In addition, all data are reviewed in terms of stated goals in order to determine if the database is sufficient.

When possible, the percent completeness for each set of samples will be calculated as follows:

$$\text{Completeness} = \frac{\text{valid data obtained}}{\text{total data planned}} \times 100 \text{ percent}$$

A completeness goal of 100 percent has been established for this project. However, if the completeness goal is not met, site decisions may be based on any, or all of, the remaining, validated data. Representativeness will be addressed by collecting the samples as described in this document. Comparability will be addressed by collecting, analyzing, and reporting the data as described in this document.

4.6.4 Outliers

Procedures discussed previously will be followed for documenting deviations. In the event that a result deviates significantly from method established control limits, this deviation will be noted and its effect on the quality of the remaining data will be assessed and documented.

4.7 CHAIN OF CUSTODY

As per CHA SOP#105, a chain of custody (COC) will be maintained to document the transfer of all samples. Each sample container will be properly sealed. Sample container labels will include the sample name, required analysis, and date and time of collection. Sample containers will be taken to the Contract Laboratory courier center.

Each box of samples will contain an appropriately completed COC form. One copy will be returned to CHA upon receipt of the samples by the laboratory. One copy will be returned to CHA with the data deliverables package.

Upon receipt of the cooler at the laboratory, it will be inspected by the designated sample custodian. The condition of the sample containers will be noted on the COC record sheet by the sample custodian. The sample custodian will also document the date and time of receipt of the container and sign the form.

If damage or discrepancies are noticed, they will be recorded in the remarks column of the record sheet, and be dated and signed. Any damage or discrepancies will be reported to the lab supervisor who will inform the lab manager and CHA Project Manager.

5.0 HEALTH AND SAFETY PLAN

A site-specific Health and Safety Plan (HASP) was prepared following an assessment of known physical and chemical hazards present at the site and an evaluation of the risks associated with the assessment and remedial actions. Available Site information was examined and adequate warnings and safeguards for field personnel were selected and implemented. All CHA field personnel are required to review and sign the HASP before entering the field. Subcontractors to CHA are required to develop and implement their own HASP. A copy of the site-specific HASP is provided in Appendix B.

6.0 COMMUNITY AIR MONITORING PLAN

A Geoprobe® investigation is minimally intrusive, fugitive dust generation or migration is not anticipated, and there is limited potential impact to the community. Additionally, the likely presence of VOCs at levels that would require action is not anticipated. Therefore, a standalone CAMP is not necessary to conduct this work. A qualified environmental professional will be on-site with a PID to screen the minimal amount of soil and groundwater generated during investigative activities.

7.0 SCHEDULE

The following table provides an estimated schedule to complete the investigation described in this work plan. The overall progress of the project will be dependent upon a number of factors including, but not limited to, NYSDEC review and approval timeframes, time of year during which the field work commences, availability of subcontractors, and coordination of access agreements between CP, responsible parties, and Site owners.

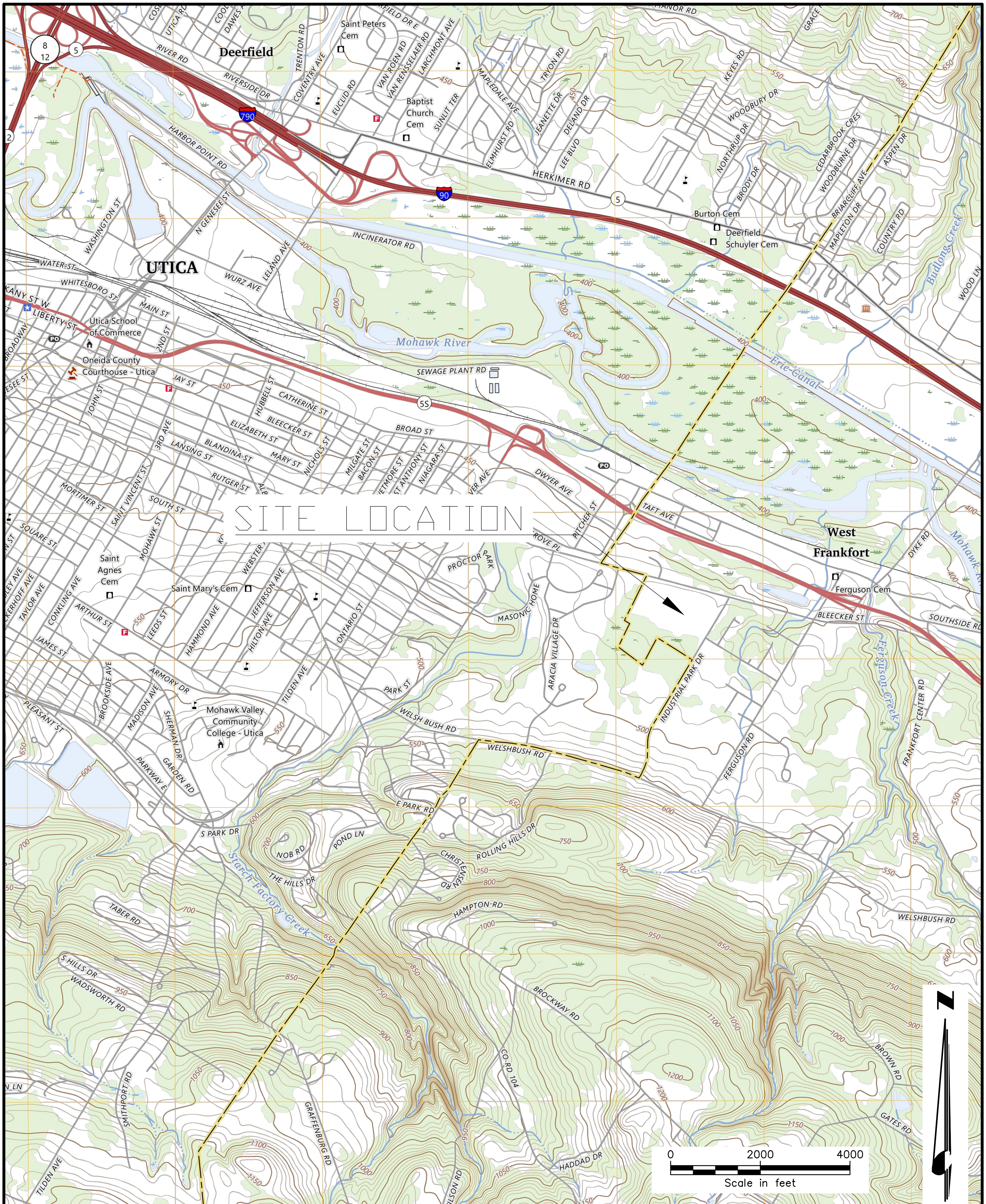
Table 4. Project Schedule

Description of Activity	Estimated Timeline
NYSDEC Review and Comment Period	October 2023 – actual March/April 2024
NYSDEC Approval of Work Plan	October 2024
Access Agreements in Place	October 2024
Implementation of the Investigation	November 2024
Report of Investigation and Alternatives Analysis	6 Weeks Following Completion of Investigation

8.0 REPORTING

Upon completion of the groundwater investigation, CHA will prepare a report presenting a summary of field activities, analytical results with comparison to the applicable TOGS 1.1.1. Ambient Groundwater Standards and Guidance Values, and conclusions and recommendations regarding the current extent of CVOC contamination impacts on the area northeast of the manufacturing building. A brief alternatives analysis of remedial approaches will be prepared to evaluate options best suited for managing contaminated shallow groundwater on the northeast portion of the Site.

FIGURES



CHA

One Park Place, 300 South State Street, Suite 600
Syracuse, NY 13202
315.471.3920 . www.chacompanies.com

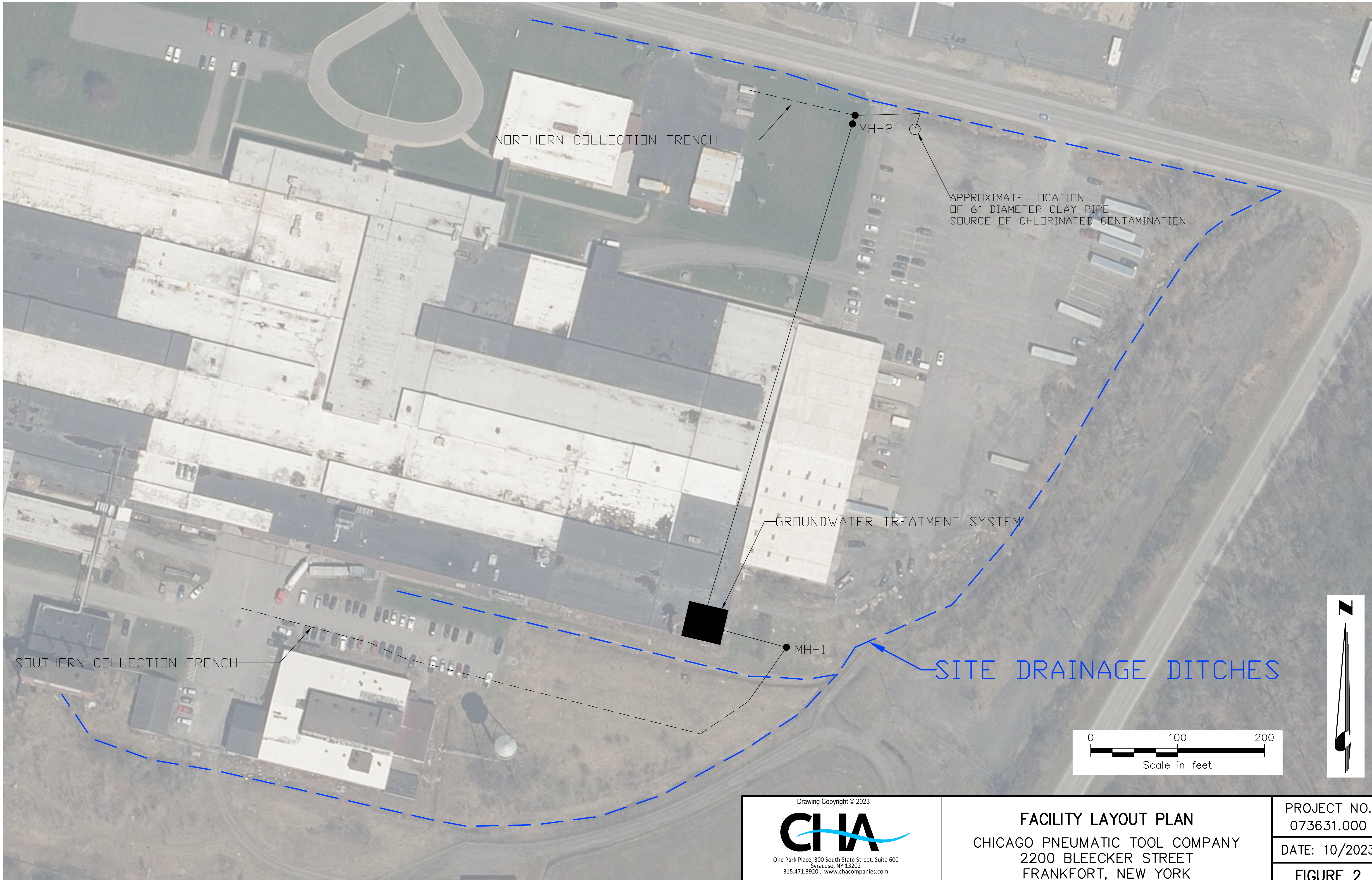
SITE LOCATION MAP

CHICAGO PNEUMATIC TOOL COMPANY
2200 BLEECKER STREET
FRANKFORT, NEW YORK

PROJECT NO. 073631.000

DATE: 10/2023

FIGURE 1



CHA
One Park Place, 300 South State Street, Suite 600
Syracuse, NY 13202
315.471.3920 . www.chacompanies.com

FACILITY LAYOUT PLAN

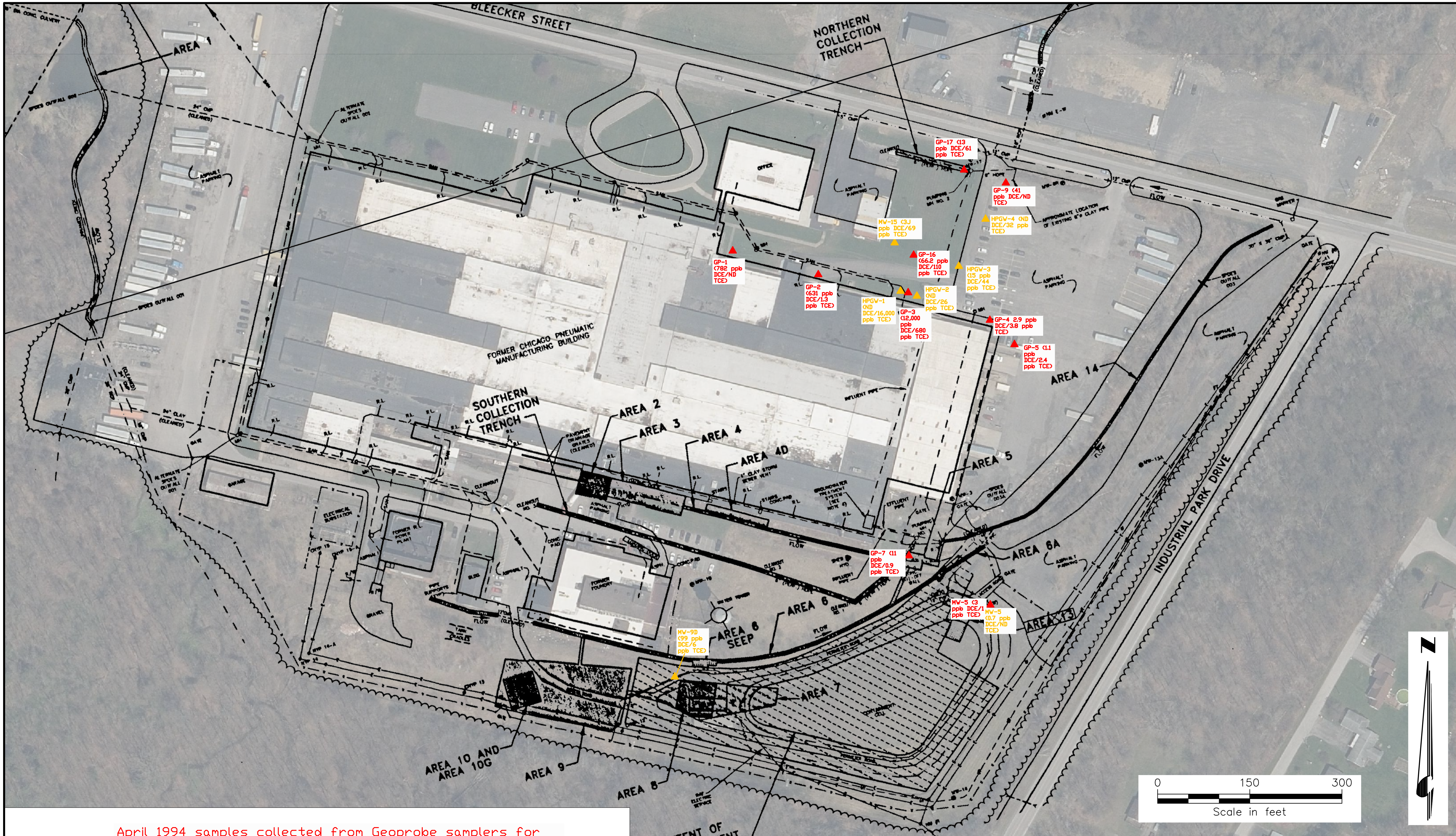
CHICAGO PNEUMATIC TOOL COMPANY
2200 BLEECKER STREET
FRANKFORT, NEW YORK

PROJECT NO.
073631.000

DATE: 10/2023

FIGURE 2

File: V:\PROJECTS\ANY\K6\073631.000\09_DESIGN\DRAWINGS\ENV\SITE_HISTORY.DWG Saved: 10/4/2023 3:33:36 PM Plotted: 10/4/2023 3:34:02 PM Current User: Ehmann, Karyn LastSavedBy: 5768



▲ GP-2 (631 ppb DCE/13 ppb TCE) April 1994 samples collected from Geoprobe samplers for 1,2-Dichloroethene and Trichloroethene

▲ HPGW-3 (15 ppb DCE/44 ppb TCE) December 1994 samplers collected from hydropunch samples for 1,2-Dichloroethene and Trichloroethene

CHA
One Park Place, 300 South State Street, Suite 600
Syracuse, NY 13202
315.471.3920 . www.chacompanies.com

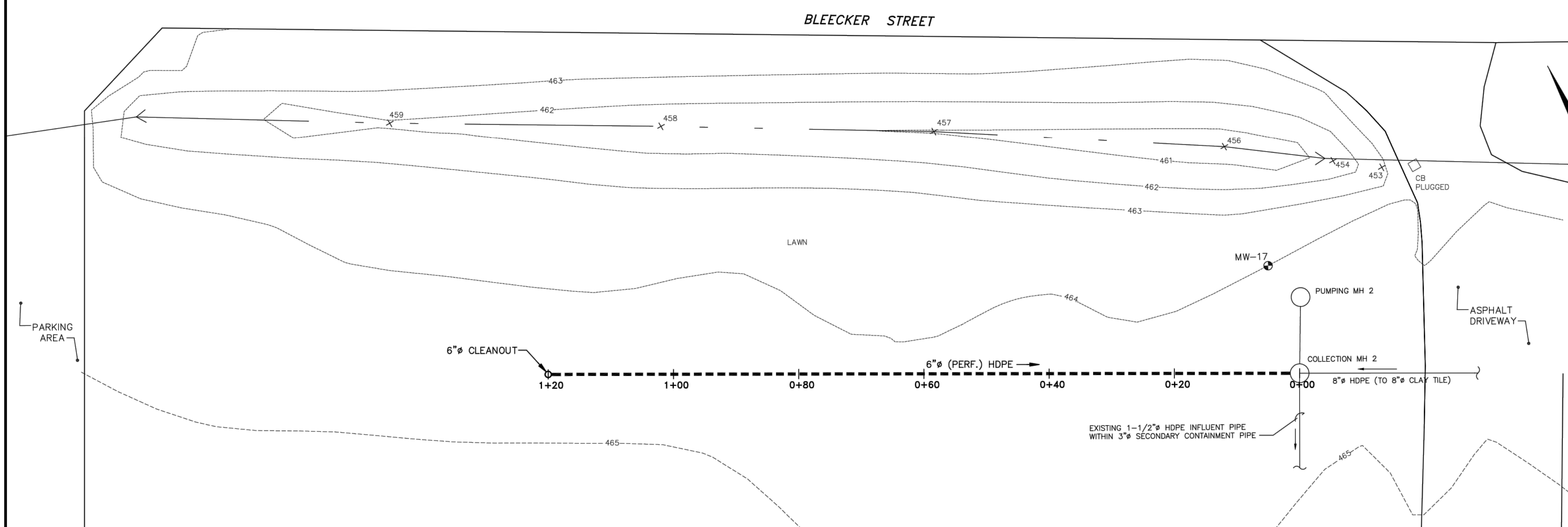
AREAS OF CONCERN AND HISTORICAL GROUNDWATER SAMPLE RESULTS

CHICAGO PNEUMATIC TOOL COMPANY
2200 BLEECKER STREET
FRANKFORT, NEW YORK

PROJECT NO. 073631.000

DATE: 10/2023

FIGURE 3



PLAN

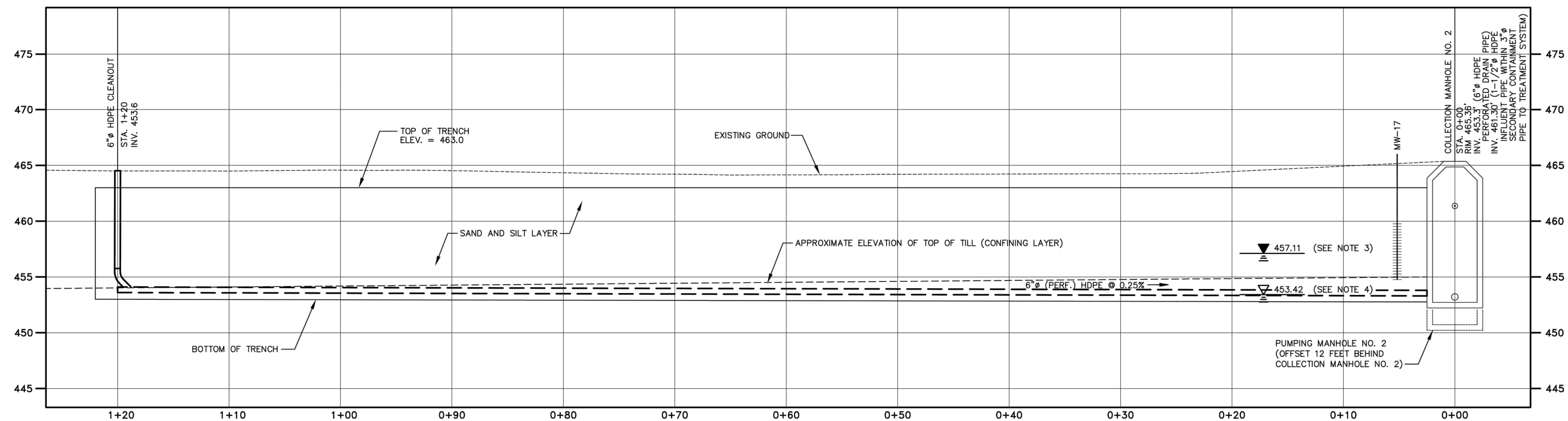
SCAL

LEGEND:

- 0+20 — NEW GROUNDWATER COLLECTION TRENCH
- EXISTING PIPE
- 464 — TOPOGRAPHICAL CONTOUR
- EXISTING CULVERT
- CB — EXISTING CATCH BASIN
- PUMPING MH 2 — EXISTING MANHOLE
- EXISTING BOLLARD
- EXISTING DRAINAGE DITCH

GENERAL NOTES:

1. ELEVATIONS BASED ON NORTH AMERICAN VERTICAL DATUM OF 1988.
2. EXISTING SITE PLAN INFORMATION BASED ON A SURVEY PERFORMED BY BLASLAND, BOUCK & LEE, INC., DATED 10/97.
3. GROUNDWATER SURFACE ELEVATION BASED ON OVERBURDEN GROUNDWATER ELEVATION MEASURED AT MW-17 ON 9/13/01.
4. GROUNDWATER SURFACE ELEVATION BASED ON OVERBURDEN GROUNDWATER ELEVATION MEASURED AT NCT ON 10/28/11.
5. DRAWING MODIFIED FROM BLASLAND, BOUCK, & LEE, INC. FIGURE NO. G-18, DATED APRIL 1998.



PROFILE

File: V:\PROJECTS\ANY\K6\073631.000\09_DESIGN\DRAWINGS\ENV\SITE_HISTORY.DWG Saved: 10/4/2023 10:57:32 AM Plotted: 10/4/2023 11:04:48 AM Current User: Ehmann, Karyn LastSavedBy: 5768

Plan and profile of the northern collection trench obtained from Synapse Risk Management, LLC Remedial Design Specification Figure G-18, dated November 2011. Figure not to scale.

CHA
One Park Place, 300 South State Street, Suite 600
Syracuse, NY 13202
315.471.3920 . www.chacompanies.com

NORTHERN COLLECTION TRENCH
CHICAGO PNEUMATIC TOOL COMPANY
2200 BLEECKER STREET
FRANKFORT, NEW YORK

PROJECT NO. 073631.000
DATE: 10/2023
FIGURE 4

Geoprobe Boring Location, Groundwater Sample

PERMANENT GROUNDWATER MONITORING WELL LOCATION

One Park Place, 300 South State Street, Suite 600
Syracuse, NY 13202
315.471.3920 . www.chacompanies.com

PROPOSED SAMPLING LOCATIONS

CHICAGO PNEUMATIC TOOL COMPANY
2200 BLEECKER STREET
FRANKFORT, NEW YORK

PROJECT NO. 073631.001

DATE: 09/2024

FIGURE 5

APPENDIX A

CHA Standard Operating Procedures

Author: Chris Burns
Reviewer: Seth Fowler
Sandy Warner

FIELD LOGBOOK AND PHOTOGRAPHS

A. PURPOSE/SCOPE:

To produce an accurate and reliable record of all field activities, including field observations, sample collection activities, etc.

All pertinent field survey and sampling information shall be recorded in a logbook or on field logs during each day of the field effort.

In addition to keeping logs, photographs will be taken to provide a physical record to augment the field worker's written observations. They can be valuable to the field team during future inspections, informal meetings, and hearings. Photographs should be taken with a camera-lens system having a perspective similar to that afforded by the naked eye. A photograph must be documented if it is to be a valid representation of an existing situation.

B. EQUIPMENT/MATERIALS:

- Bound Field Book (with waterproof paper) or Field Logs
- Chain-of-Custody, Other Appropriate Forms
- Indelible Ink Pens
- Digital Camera with 50 mm lens or similar.

C. PROCEDURE:

1. At a minimum, entries in a logbook shall include:
   a. Date and time of starting work
   b. Names of all personnel at site
   c. Summary of key conversations with contractors, agency representatives, etc.
   d. Purpose of proposed work effort
   e. Sampling equipment to be used
   f. Field calibration of equipment or documentation of calibration of rented equipment
   g. Description of work area
   h. Location of work area, including map reference. Document sample locations with references to fixed landmarks (e.g., 10 feet from southwest corner of building).
   i. Details of work effort, particularly any deviation from the field operations plan or standard operating procedures
   j. Field observations and field measurements (e.g., pH)
   k. Field laboratory analytical results
   l. Personnel and equipment decontamination procedures
   m. Daily health and safety entries, including levels of protection
   n. Type and number of samples

FIELD LOGBOOK AND PHOTOGRAPHS

o. Sampling method, particularly deviations from the standard operating procedures

p. Sample location and number

q. Sample handling, packaging, labeling, and shipping information (including destination)

r. Time of leaving site.

For each photograph taken, several items shall be recorded in the field logbooks:

a. Date and time – Camera set to record on photo

b. Name of photographer

c. General direction faced and description of the subject

d. Sequential number of the photograph

e. Always attempt to include an object in the photograph that helps show scale

f. Always try to shoot at approximately 50mm focal length (what human eye sees).

2. Each day's entries will be initialed and dated at the end by the author, and a line will be drawn through the remainder of the page.

D. QA/QC REQUIREMENTS:

All entries in the logbook shall be made in indelible ink. All corrections shall consist of single line-out deletions that are initialed.

The field task leader shall be responsible for ensuring that sufficient detail is recorded in the logbooks, and shall review the site logbooks daily.

E. SPECIAL CONDITIONS:

Photographs should be downloaded from the camera to the project folder and notes regarding the photographs should accompany the photos. Photographs should be no larger than 2 MB each unless they are being utilized for presentation purposes. CHA has software available to decrease file sizes if necessary.

As noted above, if a bound logbook is not used, then a field observation form must be used and information above should be captured on the form.

F. REFERENCES:

None

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 10/2/15

Author: Sarah Benson
Reviewer(s): Keith Cowan
Sandy Warner

SAMPLE NAMING AND NUMBERING

A. PURPOSE/SCOPE:

The success of large environmental programs is greatly affected by the efficiency of data management and analysis. When performing environmental sampling, one of the most critical steps is appropriately naming or numbering samples so that they are uniquely identified and can be distinguished from all other samples by all future users.

Some of the potential benefits that can be obtained by adopting a naming convention include the following:

a. To ensure that every sample collected at a site has a unique identifier

b. To enhance clarity in cases of potential ambiguity

c. To help avoid "naming collisions" that might occur when the data is imported into our Equis or other databases; and

d. To provide meaningful data to be used in project handovers.

Note that many of our sampling programs are performed at sites with previously established sample locations and in these cases, we would not change sample names. Additionally, this process shall be applied at larger, more complex sites, and/or sites that are required to follow a site- specific QAAP. Simpler naming conventions may be implemented for small, simple sites.

B. EQUIPMENT/MATERIALS:

- Field Logbook
- Field Sample Login Sheet
- Site Map/ Work Plan
- Sampling Forms
- Chain-of-Custody
- Sample Containers with Labels

C. PROCEDURE:

1. Each sample shall be uniquely defined by a multi-field name. In general, three fields are required: [Project # or Name] – [Media Type] – [Location Name/Sequential Number].

2. If using a site name, abbreviate to 2-3 letters. (e.g., Congress St site would be “CS”).

3. Use the following abbreviations for media types:

Subsurface Soil .... SOIL
Surface Soil .... SURF
Sediment .... SED
Groundwater .... GW
Surface Water .... SW
Waste Water .... WW
Soil Vapor .... SV
Storm Water .... STORM

Author: Sarah Benson
Reviewer(s): Keith Cowan
Sandy Warner

SAMPLE NAMING AND NUMBERING

4. All samples collected at a site shall be numbered sequentially for each media type, regardless of the field event or project phase. The use of hyphens to separate segments of a sample name is beneficial for sample name readability. It is also beneficial to use enough leading zeros to accommodate the Sequential Number (or sys_loc_code) portion of the sample name, which will assist in sorting sample IDs in the data management program or database (see EQUIS discussion below).
5. Do not include information such as time, sample depths, etc. in the name. This information should be recorded as defined in Section F (below).
6. In no cases shall the multi-field name be longer than 30 characters, including dashes. Ensure that each name is clearly written on both the sample label as well as the Chain of Custody.
7. Do not use special characters (e.g. #, ‘, “, @, !) when naming samples. Including such characters in the Serial Number (sys_loc_codes) or Sample Number (sys_sample_codes) can be incompatible with the database.
8. For QA/QC blank samples use the following abbreviations in place of the media type:

   Trip Blank..TB
   Equipment Rinse (Field Blank) ....FB
   Duplicate..DUP
   Matrix Spike ....MS
   Matrix Spike Duplicate..........................SD

   For Duplicate and MS/MSD samples we need to make sure we include the parent sample name. Add the DUP, MS or MSD indicator after the Sequential Number.

   For Blind Duplicate samples, use the CHA indicator in place of the Sequential Number. The location should be recorded in the field logs for our evaluation purposes. For example, a blind duplicate sample number for soil collected at the 005 location would be “CS-SOIL-CHA-1.”

   You would record in the field log that the blind soil duplicate CHA-1 has SOIL-12345-005 as its parent sample.

9. Option to Include the Sample Collection Date - As an option, the date may be included in the sample name. NYS Electronic Data Deliverable guidance suggests using dates in the YYYYDDMM format. Placing the year first provides for ease of sorting data in the database:

   However, adding the date adds 9 characters to the sample name thus increasing the complexity of sample numbering. The date is captured on the Chain-of-Custody and in field records.

D. QA/QC REQUIREMENTS:

All data must be documented on field data sheets or within site logbooks.

Field personnel should verify that all sample data and supporting information in log books is correct prior to leaving the site.

SAMPLE NAMING AND NUMBERING

E. SPECIAL CONDITIONS:

NYSDEC EQUIS Considerations:

NYSDEC uses EQuIS for data management and generally requires data to be submitted in EQuIS format. EQuIS has three different sample name related fields, a sample_name, a sys_sample_code and a location_name. Location_name will almost always be simplified to something like SW-1, GW-2 etc. and is usually the last field of the sample name.

In terms of the other two, sample_name is what we record in the field. That is limited to 30 characters of text.

The laboratory generates the sys_sample_code by taking the sample_name field and adding another qualifier, such as the sample delivery group or work order number. EQuIS requires that the sys_sample_code field be unique within a database. This is limited to 40 characters of text so it typically will be the sample name plus up to 10 characters.

It is recommended to keep the CHA sample name as short as possible to work with the EQuIS format. The basic sample names identified above are 14 to 17 characters long. If the optional date format is used, sample names will be 23 to 26 characters which is near the limit for what EQuIS can accommodate (and you may have issues physically fitting the sample names legibly into the COC form).

F. REFERENCES:

NYSDEC, DER-10, Technical Guidance for Site Investigation and Remediation, May 2010, http://www.dec.ny.gov/docs/remediation_hudson_pdf/der10.pdf

NYSDEC, Electronic Data Delivery Manual, January 2013, http://www.dec.ny.gov/docs/remediation_hudson_pdf/eddmanual.pdf

New Jersey Department of Environmental Protection, August 2005, Field Sampling Procedures Manual, Chap. 6, http://www.nj.gov/dep/srp/guidance/fspm/

G. APPENDICES/FORMS:

Not Applicable

END OF SOP

Final Check by C. Burns 12/2/15

Author: Sarah Newell, Mark Corey
Reviewer: Keith Cowan, Sandy Warner

COMPLETING A CHAIN-OF-CUSTODY RECORD

A. PURPOSE/SCOPE:

This protocol provides a standard operating procedure (SOP) for initiating and maintaining a Chain of Custody (COC) document. A COC is a legal document designed to track persons who are responsible for the preparation of the sample container, sample collection, sample delivery, sample storage, and sample analysis. A COC is an appropriate format to record important data associated with each individual sample. In general, a sample requiring a COC will follow a path as follows:

Sample Collector → Sample Courier/Operator → Sample Custodian

Verification of who has possessed the samples and data and where the samples have been is completed when staff follow chain-of-custody procedures.

B. EQUIPMENT/MATERIALS:

- Chain of Custody form
- Ball-point, permanent pens
- Gallon-Sized Ziploc Bag (to keep COC dry)
- Field Logbook
- Custody seals
- Padlock(s) (optional)

C. PROCEDURE:

1. Once a sample has been determined to require a COC, the Sample Collector must initiate the COC. The Sample Collector must fill in the fields provided on the COC. The words “Chain of Custody” must be located in a conspicuous location at the top of the document.
2. The form is generally a three-page carbon copy document, including a white, yellow and pink sheet. While CHA generally uses COCs provided by the applicable laboratory, it is important to ensure that the COC from each lab contains places for all necessary information.
3. The COC at that time should include the fourteen-digit CHA project number and phase, the project name and location.
4. The Client Information Section must be completed. In most cases the “client” will be CHA Consulting, Inc.
5. The first field of information is the Sample Identification or Sample Identification Number. This identification/number must match the identification/number located on the sample container.
6. An information line for the date, time, phone number, printed name of Sample Collector, signature of Sample Collector, organization name (no acronyms), organization’s full mailing address, and sample description must also be included.
7. Sampling personnel should enter the sample number(s) (which should correspond with a unique number on a sample container [SOP #103] if applicable, and parameters to be analyzed. The “Sample ID” must be included and must match the number on the sample.

Author: Sarah Newell, Mark Corey
Reviewer: Keith Cowan, Sandy Warner

COMPLETING A CHAIN-OF-CUSTODY RECORD

8. Subsequent fields must be provided to allow for documentation of information about any subsequent Sample Couriers/Operators or Sample Custodians. These fields must contain the date, time, phone number, printed name of person taking custody of sample, signature of person taking custody of sample and organization name (no acronyms).
9. Field Information - The COC must contain places to enter the following field information: sample number, sampling date, and type of sample. Other field information may be recorded as specified in the field sampling plan or proposal for the project. It is imperative that there be only one sample with a particular sample number per project/study so as to prevent duplicates in Excel files and EQuIS databases.
10. Laboratory Information - Once the sample is delivered to the lab, the laboratory personnel will sign and date the "received by" line located at the bottom of the COC. Other laboratory information may be recorded as specified in the project/study work plan/proposal.
11. Signatures - The COC must contain places for all people who handle the sample to sign his/her name. This is a record of persons who had custody of the sample during all steps of the process from container preparation, sample collection, sample storage and transport, and sample analysis. There should be signature lines to relinquish custody of the sample and to receive custody of the sample.

D. QA/QC REQUIREMENTS:

The Field Team Leader or senior person on the sampling team will review the completed COC form to verify that all fields are properly completed. For purposes of this SOP, signing the form under Collected/Delivered by is considered evidence that the COC form has been checked for accuracy and completeness.

E. SPECIAL CONDITIONS:

Whenever samples are split with a source or government agency, a separate chain of custody form should be completed for the samples and the relinquisher (sampler) and recipient should sign. If a representative is unavailable or refuses to sign for the samples, this can be noted in the “remarks” area of the form. When appropriate, as in the case where the representative is unavailable, the custody record should contain a statement that the samples were delivered to the designated location at the designated time. A copy of the chain of custody form for split samples must be kept with the project file.

Samples may require short term storage in field locations prior to delivery to the laboratory for analyses. The storage may be in vehicles or lodging locations. The samples must be secured to limit access to them. A locked vehicle is considered controlled access. However, simply a locked lodging room is not secure due to potential custodial access. If an unattended lodging room is used for sample storage, the samples must be further secured. This may entail a padlock on the ice chest, samples in an ice chest secured in an inner bag with a custody seal on it, and/or ice chest taped shut with custody seal on the outside of it.

F. REFERENCES:

Sampling Guidelines and Protocols, NYSDEC, http://www.dec.ny.gov/regulations/2636.html
Chain of Custody Protocol is in Appendix 5X.2.

Author: Sarah Newell, Mark Corey
Reviewer: Keith Cowan, Sandy Warner

COMPLETING A CHAIN-OF-CUSTODY RECORD

Chain of Custody Procedures for Samples and Data, EPA 50 minute Self Instructional Course:
http://www.epa.gov/apti/coc/

SOP for Chain of Custody, EPA Region 1:
http://www.epa.gov/region6/qa/qadevtools/mod5_sops/misc_docs/r1_chain-of-custody.pdf

G. APPENDICES/FORMS:

CHA COC Form

END OF SOP

Final Check by C. Burns 10/7/15

Author: Meghan Platt, P.E.
Reviewer: Scott Smith, P.E.

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

A. PURPOSE/SCOPE:

The following standard operating procedure (SOP) presents general guidelines for sample containers, volumes, preservations and holding times associated with air, water and soil/sediment samples. Field personnel are responsible for ensuring that state-specific standards/guidelines/regulations are followed, where applicable.

Improper preserving, storing and handling of air, water and soil/sediment samples are critical if the integrity of the samples are to be maintained. Samples collected in the field may undergo biological, chemical or physical changes following removal from their environment. In order to minimize those changes, many samples must have preservatives in the form of strong acids or bases added prior to delivery to the laboratory. If samples are to be collected as part of a government program, the governing agency typically must be notified 30 days prior to sample collection.

B. EQUIPMENT/MATERIALS:

Pre-cleaned sample containers along with associated preservations within the sample containers will be provided to CHA from the analytical laboratory. The field geologist/engineer will provide the necessary personal protective equipment to place samples collected within the appropriate sample containers per SOPs 300 through 417. However, if field preservation is required the following equipment and materials shall be obtained:

- Hydrochloric (HCl) Acid Reagent A.S.C. 38%
- Nitric (HNO3) Acid Reagent A.S.C. 71%
- Sodium Hydroxide (NaOH) 97%
- 10 mL glass pipettes
- Narrow range (0-3 and 12-14) pH paper
- Nitrile gloves

C. PROCEDURE:

1. Review Table 1 which details typical parameters of interest at environmental sites and the associated methods, preservation, container type, holding time and required sample volume.
2. Obtain pre-cleaned and pre-preserved sample containers from the laboratory. If pre-preserved sample containers were provided skip to Step 7; if not proceed to Step 3.
3. Put on a clean pair of nitrile gloves.
4. In a clean, non-dusty environment, remove the cap of the sample container.
5. Using a clean, 10 mL glass pipette draw the required amount of acid or base and insert into the sample container.
6. Volatile Organic Compounds – 2 mL of HCl acid (water samples).
7. Total and Dissolved Metals (including mercury) – 5 mL Nitric acid (water samples).
8. Cyanide – 15-20 Sodium Hydroxide pellets (water samples).

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

9. Chemical Oxygen Demand, Oil and Grease, Organic Carbon, Phenolics, Total Dissolved Phosphorous, Hydrolyzable Phosphorus, Ammonia, Nitrate and Nitrite – 5 mL Sulfuric acid (water samples).
10. Immediately replace and tighten the sample container cap.
11. Collect sample using equipment and procedures outlined in other SOPs as appropriate. The volume of the sample collected shall be sufficient to conduct the analysis required, as well as associated quality assurance/quality control samples (QA/QC). QA/QC samples shall be collected in accordance with SOP 605.
12. Place samples immediately in the pre-preserved sample containers.
13. Chill all samples to 4ºC from sample collection until laboratory analysis.
14. Package and ship samples per SOP #607.

D. QA/QC REQUIREMENTS:

This section includes QA/QC requirements associated with sample containers, volumes, preservations, and holding times. The following general requirements apply to this SOP:

1. All data must be documented on field data sheets or within site logbooks.
2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan.
3. Equipment checkout and calibration activities must occur prior to sampling/operation, and must be documented.
4. QA/QC samples shall be collected in accordance with SOP 605.

The following procedure shall be conducted to provide a QA/QC check of water (aqueous) samples to ensure the samples were preserved to the proper pH prior to shipping for laboratory analysis.

Volatile Organic Compounds:

1. Collect one additional VOA vial at every third aqueous sampling location.
2. Fill the extra vial with the sample.
3. Using the extra VOA vial, remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of water.
4. Place two drops of the water on a 1-inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add additional HCL to the remaining 3 VOA vials prior to collecting the sample.
7. Discard the vial used to check the pH.

SAMPLE CONTAINERS, VOLUMES, PRESERVATIONS AND HOLDING TIMES

Total and Dissolved Metals, Mercury, Ammonia, Nitrate plus Nitrite, Total Dissolved Phosphorus, COD, Oil & Grease, Organic Carbon, Phenolics

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle to mix the acid and water.
3. Remove the cap and using a clean, 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1 inch strip of 0-3 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not less than 2, add appropriate additional Sulfuric Acid to the sample using a clean pipette.
7. Recheck sample using steps 2 through 6 until sample pH is less than 2.

Cyanide

1. Collect sample and tightly reseal the cap.
2. Agitate the sample by gently shaking the sample bottle until the NaOH pellets are dissolved.
3. Remove the cap and using a clean 10 mL glass pipette extract approximately 1 mL of sample.
4. Place approximately two drops of sample on a 1-inch strip of 12-14 range pH paper.
5. Compare pH strip's color while wet with that of the color key included on the pH paper container.
6. If pH is not greater than 12, add additional NaOH to the sample using standard procedures.
7. Recheck sample using steps 2 through 6 until sample pH is greater than 12.

E. SPECIAL CONDITIONS:

Not Applicable

F. REFERENCES:

Alpha Analytical Aqueous and Soil/Solid Reference Guides.

G. APPENDICES/FORMS:

Table 1 Laboratory Analysis: Summarizing parameters, methods, preservations, container type, holding times and minimum sample volumes are included as an attachment to this SOP.

END OF SOP

Final Check by C. Burns 10/27/15

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
WATER						
Acid Soluble & Insoluble Sulfide	-----	9030B	Cool to 4 deg C No Headspace	P or G	7 Days	8 oz.
Acidity as CaCO3	305.1	2310B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity	-----	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Alkalinity as CaCO3	310.1	2320B	Cool to 4 deg C	P or G	14 Days	100 mL
Ammonia	350.2/.3	4500-NH3 B,E	Cool to 4 deg C, H2SO4 to pH<2	P or G	28 Days	400 mL
Aromatic Hydrocarbons	602	8021B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon- faced silicone septum	14 Days	40 mL
Biochemical Oxygen Demand	405.1	5210B	Cool to 4 deg C	P or G	48 Hrs.	500 mL
Bromide	300	-----	None	P or G	28 Days	250 mL
Calcium	-----	3120B	HNO3 to pH<2	P or G	6 Months	100 mL
Calcium- Hardness	200.7	3111B	HNO3 to pH<2	P or G	6 Months	100 mL
Carbamates	531.1	-----	Cool to 4 deg C, 0.08% Na2S2O3 if residual chlorine present	G, screw cap Teflon faced silicone septum	14 Days	100 mL mL
Carbonaceous BOD	-----	5210B	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Chloride	300	4500-CL D 4110	Cool to 4 deg C	P or G	28 Days	100 mL
Chloride, Residual Disinfectant	-----	4500Cl-G	Cool to 4 deg C	P or G	Analyze Immediately	200 mL
COD	410.4	5220D	H2S04 to pH<2, Cool to 4 deg C	P	28 days	250 mL
Color	-----	2120B	Cool to 4 deg C	P or G	24 Hrs	100 mL
Conductivity	-----	2510B	Cool to 4 deg C	P or G	28 Days	100 mL
Cyanide	335.4	4500-CN C&E	Cool to 4 deg C NaOH pH>12	P or G	14 Days	250 mL
Cyanide	335.2	9010B, 9012A, 9014	Cool to 4 deg C, NaOH to pH>12 0.6 g ascorbic acid if residual chlorine present	P or G	Sulfide absent, 14 days; sulfide present 24 Hrs	250 mL
Cyanide, Amenable	335.1					
Dioxin	-----	8280A	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
DRO	-----	8015B	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Escherichia Coli	-----	9222B	0.008% Na2S203 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Extractable Org. Compounds			Cool to 4 deg C, Store in dark	G, Amber Teflon-lined screw cap	*7 days	4000 mL

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Fecal Coliform	-----	9222B or D	0.008% Na2S203 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fecal Streptococci	-----	9230C	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Fluoride	300	4500 F-B,C S	Cool to 4 deg C	P or G	28 Days	300 mL
Foaming Agents (MBAS)	-----	5540C	Cool to 4 deg C	P or G	48 Hrs	250 mL
Gases	-----	3810	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present 1:1 HCl to pH <2	G, Vial screw cap with center hole Teflon- faced silicone septum	7 days without HCl 14 days with HCl	40 mL
GRO	-----	8015B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon- faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL
Hardness			HNO3 to pH<2	P	6 months	1000 mL
Heterotrophic Plate Count	-----	9215B	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Hexavalent Chromium	7196A	3500Cr-D	Cool to 4 deg C	P	24 hours	500 mL
HPLC (Explosive)	------	8330	Cool to 4 deg C	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000mL
HPLC (Explosive)	------	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap		1000mL
Mercury	-----	7470A	Cool to 4 deg C	P or G	28 Days	8 oz.
Metals	200.7	-----	HNO3 to pH<2	P	6 Months	100 mL
Nitrate	300	-----	Cool to 4 deg C	P or G	48 Hrs.	100 mL
Nitrate (Chlorinated)	353.2	4500-NO3 F	Cool to 4 deg C	P or G	48 Hrs	250 mL
Nitrate (Non- chlorinated)	353.2	4500-NO3 F	H2SO4 to pH<2, Cool to 4 deg C	P or G	14 Days	250 mL
Nitrite	300, 353.2, 354.1	4500-NO3 D	Cool to 4 deg C	P or G	48 Hrs	100 mL
Odor	-----	2150B	Cool to 4 deg C	G only	24 Hrs	200 mL
Oil and Grease		1664	HCl to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	1000 mL
Organic Nitrogen	351.1	-----	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	500 mL

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Organochlorine Pesticides/PCB	608	8081A,8082	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present If aldrin is to be determined bind to pH 5-9.	G, Amber Teflon-lined screw cap	7 days until extraction 40 days after extraction	1000 mL
Ortho Phosphate	300	4500 P-E	Cool to 4 deg C	P or G	48 Hrs	50 mL
Orthophosphate	365.2	-----	Filter immediately, Cool to 4 deg C	P or G	48 Hrs.	50 mL
pH, Hydrogen ion	-----	4500-H-B	Cool to 4 deg C	P or G	Analyze Immediately	25 mL
Phenols	420.1	9065, 510ABC	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	500 mL
Pseudomanas Aeruginosa	-----	9213E	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Purgeable Halocarbons	601	8021B	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon- faced silicone septum	14 Days	40 mL
Radiological	-----	-----	HNO3 to pH<2	P or G	6 Months	100 mL
Residue- Settleable (SS)	160.5	-----	Cool to 4 deg C	P or G	48 Hrs.	1000 mL
Residue-filtered (TDS)	160.1	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-non- filtered (TSS)	160.2	-----	Cool to 4 deg C	P or G	7 Days	100 mL
Residue-Total Volatile Solids	160.4	2540 E	Cool to 4 deg C	P or G	7 Days	100 mL
Salinity	-----	2520 C	Cool to 4 deg C	G	28 Days	100 mL
Semivolatile Organic Compounds (Unregulated)	525.2	-----	If residual chlorine is present, add 40-50 mg Sodium Thiosulfate. If not chlorinated, add 6N HCl to pH<2 Cool to 4 deg C	G, Amber Teflon-lined screw cap	7 Days for extraction, 30 after extraction	1000 mL
Semivolatile Organics	625	8270C	Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Amber Teflon-lined screw cap	7 days for extraction 40 days after extraction	1000 mL
Silica	200.7	-----	Cool to 4 deg C	P only	7 Days	50 mL
Specific Conductance	120.1	-----	Cool to 4 deg C	P or G	28 Days	100 mL
Sulfate	300	4500-SO4	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfate	375.4	-----	Cool to 4 deg C	P or G	28 Days	50 mL
Sulfide	376.2	9030 B, 4500S2-AD	Cool to 4 deg C, add zinc plus NaOH to pH>9	P or G	7 Days	50 mL
Sulfite (SO3)	377.1	-----	None Required	G, Bottle and Top	Analyze immediately	50 mL
Surfactants (MBAS)	425.1	-----	Cool to 4 deg C	P or G	48 Hrs.	250 mL

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
TDS			Cool to 4 deg C	P	7 days	500 mL
Temperature	-----	2550B	None	P or G	Analyze Immediately	1000 mL
Temperature	170.1	-----	None Required	G, Bottle and Top	Analyze immediately	1000 mL
Total Kjeldahl Nitrogen	353.3/.1	4500Norg-C	H2S04 to pH<2 , Cool to 4 deg C	P	28 days	250 mL
Total Coliform	-----	9221D	0.008% Na2S203 if residual chlorine present 0.3 mL/125 mL 15% EDTA if > 0.01 mg/L heavy metals	Sterile P or G	30 Hrs. for Drinking Water 6 Hrs. for Waste Water	125 mL
Total Dissolved Solids	160.1	2540C	Cool to 4 deg C	P or G	7 Days	100 mL
Total Hardness	130.2 , 200.7	-----	HNO3 to pH<2 H2SO4 to pH<2	P or G	6 Months	100 mL
Total Kjeldahl Nitrogen	351.3	-----	H2SO4 to pH<2	P or G	28 Days	500 mL
Total Metals	200.7 200.8	6010B, 6020, 7000A	HNO3 to pH<2	P	6 months (Hg 28 days)	500 mL
Total Organic Carbon (TOC)	415.1	9060, 5310C	H2SO4 to pH<2, Cool to 4 deg C	G, Amber Teflon-lined screw cap	28 days	80 mL
Total Organic Halides		5320B	1N H2SO4 to pH<2	P or G	28 Days	50 mL
Total Phosphorus	365.2	-----	Cool to 4 deg C, H2SO4 to pH<2	G	28 Days	50 mL
Total Recoverable Oil & Grease	413.1,166 4A	-----	Cool to 4 deg C, HCL or H2SO4 to pH<2	G	Petroleum Based 3 Days; Non-Petroleum Based 24 hours	1000 mL
Total-Residue (TS)	160.3	2540B	Cool to 4 deg C	P or G	7 Days	100 mL
Turbidity	180.1	2130B	Cool to 4 deg C	P or G	48 Hrs	100 mL
Volatile Organics	624	8260B	1:1 HCl to pH <2, Cool to 4 deg C 0.008% Na2S2O3 if residual chlorine present	G, Vial screw cap with center hole Teflon-faced silicone septum	7 days w/o HCl 14 days w/HCl	40 mL
Volatiles (Regulated)	524.2	-----	Cool to 4 deg C HCl to pH<2	G, Vial screw cap with center hole Teflon-faced silicone septum	14 Days	60-120 mL
SOIL						
Acid Soluble & Insoluble Sulfide	-----	9030B	Cool to 4 deg C, no headspace	P or G	7 Days	8 oz.
Amenable Cyanide	-----	9213	Cool to 4 deg C	P or G	14 Days	4 oz.
Bromide	-----	9211	Cool to 4 deg C	P or G	28 Days	8 oz.
Cation - Exchange Capacity	-----	9080, 9081	None	P	-----	8 oz.
Chloride	-----	9212, 9056, 9253	None	P or G	28 Days	8 oz.
Chlorinated Herbicides	-----	8151A	Cool to 4 deg C	G, wide mouth, teflon liner	14 Days	8 oz.
Corrosivity pH Waste>20% water	-----	9040B	Cool to 4 deg C	P	Analyze Immediately	4 oz.

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Corrosivity Toward Steel	-----	1110	Cool to 4 deg C	P	14 Days	4 oz.
Cyanide		9010B, 4500CN	Cool to 4 deg C	G, Amber	14 Days	4 oz
Dioxin	-----	8280A	Cool to 4 deg C	G	14 Days	8 oz.
DRO	-----	8015B	Cool to 4 deg C	G, Amber	14 Days	4 oz.
Extractable Organic Compounds			Cool to 4 deg C, Store in dark	G	14 days	8 oz
Extractable Sulfide	-----	9031	Cool to 4 deg C, fill top of sample with 2N Zinc Acetate until moistened	P or G	7 Days	8 oz.
Fluoride	-----	9214	None	P	28 Days	8 oz.
Gases	-----	3810	Cool to 4 deg C	G, Amber	14 Days	8 oz.
Grain Size			N/A	G	N/A	8 oz
GRO	-----	8015B	Cool to 4 deg C, check state regulations for proper preservative. NJ (methanol), PA (encore samplers) NY (cool to 4 deg C).	G, Amber VOA vial	14 Days	15 Grams
HPLC (PAH)	------	8310	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 days until extraction 40 days after extraction	4 oz.
Ignitability	-----	1010	None	P or G	None	8 oz.
Ignitability of Solids		1030	None	P or G	None	8 oz.
Mercury	245.1	7471A	Cool to 4 deg C	G, Amber	28 Days	4 oz.
Metals	-----	6010B, 6020, 7000A	Cool to 4 deg C	G, Amber	6 Months	8 oz.
Moisture Content			Store in airtight jar 3-30 deg C	G	N/A	8 oz
Nitrate	-----	9210	Cool to 4 deg C	P or G	48 Hrs	8 oz.
Oil & Grease (Sludge, Sludge- Hem)	-----	9071B	Cool to 4 deg C	G	28 Days	8 oz.
Organochlorine	-----	8081A	Cool to 4 deg C	P or G	14 Days	8 oz.
Paint Filter Liquids Test	-----	9095A	Cool to 4 deg C	P or G	-----	8 oz.
PCBs	-----	8082	Cool to 4 deg C	G, Amber Teflon-lined screw cap	14 Days	4 oz.
pH	-----	9045C	Cool to 4 deg C	G, Amber	Analyze Immediately	4 oz.
pH, Soil and Waste	-----	9045A	Cool to 4 deg C	G	Analyze Immediately	8 oz.
Phenol	-----	9065, 9066, 9067	Cool to 4 deg C	G, Amber	28 Days	4 oz.
Radiological	-----	-----	Cool to 4 deg C	G	6 Months	8 oz.
Reactivity Cyanide	-----	SW-846 7.3.3.2	Cool to 4 deg C	P	14 Days	8 oz.
Reactivity Sulfide	-----	SW-846 7.3.4.2	Cool to 4 deg C	P	14 Days	8 oz.
Semivolatile Organics	-----	8270C	Cool to 4 deg C	G, Amber	14 Days	8 oz.

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume
Sulfate	-----	9035, 9036, 9038	Cool to 4 deg C	P or G	28 Days	8 oz.
Sulfides	-----	9215	Cool to 4 deg C	P or G	7 Days	8 oz.
TCLP Metals	-----	1311, 6010B, 6020, 7000A, 7470A	Cool to 4 deg C	G, Amber	180 Days (Hg 28 days)	8 oz
TCLP Herbicides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Pesticides	-----	1311	Cool to 4 deg C	G, Amber	14 Days	8 oz.
TCLP Semivolatile Organics	-----	1311, 8270C, 8081A, 8151A	Cool to 4 deg C	G, Amber Teflon Lined	14 Days	8 oz.
TCLP Volatile Organics	-----	1311, 8260B	Cool to 4 deg C	G, Amber VOA Vial Teflon Lined	14 Days	8 oz.
Temperature	-----	2550	-----	P	Analyze Immediately	4 oz.
TOC		Lloyd Kahn Method	Cool to 4 deg C	G, Amber	14 days	4 oz.
Total Coliform	-----	9131	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Coliform	-----	9132	Cool to 4 deg C	Sterile, P or G	6 Hrs	4 oz.
Total Cyanide	-----	9013	Cool to 4 deg C	P or G	14 Days	8 oz.
Volatile Organic Compounds	-----	8260B	Cool to 4 deg C Check individual state regulations for proper preservative. NJ (methanol), PA (encore samplers), NY (cool to 4 deg C)	G, wide mouth, teflon liner	14 Days	4 oz.
Volatile Organic Compounds	-----	8021		G, wide mouth, teflon liner	14 Days	4 oz.
CLP Sampling and Holding Time Information						
Cyanide (aqueous)	ILM04.1		NaOH to pH>12, Cool to 4 deg C	P	12 Days VTSR	1000ml
Cyanide**	ILM04.1		Cool to 4 deg C	G		8 oz
Mercury (aqueous)	ILM04.1		HNO3 to pH<2, Cool to 4 deg C	P	26 Days VTSR	1000ml
Mercury (solid/soils)	ILM04.1		Cool to 4 deg C	G		8 oz
Metals (aqueous)	ILM04.1		HNO3 to pH<2, Cool to 4 deg C	P	180 Days VTSR	1000ml
Metals (solid/soils)	ILM04.1		Cool to 4 deg C	G		8 oz
PCBs (aqueous)	OLM04.2		Na2S203, Cool to 4 deg C	G	See Note 7	1000ml
PCBs (solid/soils)	OLM04.2		Cool to 4 deg C	G	See Note 6	8 oz
Pesticides (aqueous)	OLM04.2		Na2S203, Cool to 4 deg C	G	See Note 7	1000ml
Pesticides (solid/soils)	OLM04.2		Cool to 4 deg C	G	See Note 6	8 oz
Semivolatile Organic Compounds (aqueous)	OMLO4.2		Cool to 4 deg C	G	See Note 8	1000ml
Semivolatile Organic Compounds (solid/soils)	OLM04.2		Cool to 4 deg C	G	See Note 6	8 oz
Volatile Organic Compounds (aqueous)	OLM04.2		HCL pH < 2, Cool to 4 deg C	G	W/preservative: 10 days VTSR; W/O: 7 days VTSR	40ml
Volatile Organic Compounds (solid/soils)	OLM04.2		Cool to 4 deg C	G	10 Days VTSR	4 oz

Table 1

Laboratory Analysis	EPA Method	Standard Method and/or SW846 Method	Preservation	Container	Holding Time	Minimum Volume

Notes:

1. P - Plastic.
2. G - Glass.
3. Minimum volume is the minimum volume required by the laboratory to conduct the analysis. The laboratory will likely require additional sample volume.
4. * Extraction within seven (7) days of collection; analysis within 40 days of extraction.
5. **When chlorine is present ascorbic acid is used to remove the interference (0.6 g ascorbic acid).
6. VTSR - Validated time of sample receipt.
7. Ten (10) days from VTSR for extraction and 40 days following extraction.
8. Five (5) days from VTSR for extration 14 days after extraction.
9. Five (5) days from VTSR for extraction 40 days after extraction.
10. Holding times are from the time of sample collection unless otherwise noted.

APPENDIX B

Health and Safety Plan

SITE HEALTH AND SAFETY PLAN

PROJECT INFORMATION

Project Name: Groundwater Investigation	**CHA Project No.** 073631
Project Start Date: **Completion Date:**	**Anticipated Weather Condition(s):**
Project Location: Former Chicago Pneumatic Tool Company, 2200 Bleecker Street, Frankfort, New York	**Project Task:** Subsurface investigation and groundwater sampling. *Complete a Site Health & Safety Plan per Task*

Description of Work:
Be Specific: Utilize contracted drilling firm to investigate subsurface groundwater in the northeastern portion of the Site.

Key Personnel: *Responsibilities:*	Samantha Miller *Project Manager*	Karyn Ehmann *Field Team Leader*	Karyn Ehmann *Site Safety Officer*

Description of Hazards:
Heavy equipment, low level chlorinated volatile organic compounds, typical field work conditions.

	TASK HAZARDS		TASK SAFETY MEASURES & PPE
Eye	Chemical Exposure High Heat/Cold Dust/Flying Debris Impact Light/Radiation	Yes ☐ No ☒ Yes ☐ No ☒ Yes ☒ No ☐ Yes ☒ No ☐ Yes ☒ No ☐	☒ Safety Glasses ☐ Safety Goggles ☐ Face Shield ☒ Shaded Lenses
Head	Impact Electrical Shock Lack of Visibility	Yes ☒ No ☐ Yes ☐ No ☒ Yes ☐ No ☒	☒ Hard Hat: ☐ Orange or ☐ White or ☐ Blue ☐ Reflector Tape (Required for night operations)
Foot	Chemical Exposure High Heat/Cold Impact/Compression Slips/Trips Puncture Slippery/Wet Surface Explosive/Flammable Atmospheres Electrical	Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒	☒ Work Boots ☐ Ankle Protection ☐ Rubber Boots ☐ Insulated Boots ☐ Non-slip Soles ☐ Chemical resistant ☒ Steel Toed Boots ☐ I/75 C/75 (Impact/Compression) ☐ Cd Type 1 or 2 (Conductive) ☐ PR (Puncture Resistant) ☐ Mt/70 or 50 or 30 (Metatarsal) ☐ EH (Electrical Hazard) ☐ SD Type I or II (Static Dissipative)
Hand	Chemical Exposure High Heat or Cold Cuts/Abrasion Puncture Electrical Shock Bloodborne Pathogen	Yes ☒ No ☐ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒	☒ Work Gloves ☐ Leather Gloves ☐ Latex Gloves ☐ Vinyl Gloves ☐ Neoprene Gloves ☐ Butyl Gloves ☐ Rubber Gloves ☒ Nitrile Gloves ☐ Insulated Gloves ☐ Metal Mesh Gloves
Body/Torso	Chemical Exposure Extreme Heat/Cold Abrasion Lack of Visibility Impact Electrical Arc	Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒	☐ Tyvek Suits: ☐ White or ☐ Yellow ☐ UV Protection ☐ Cooling/Heating Vests ☐ Coveralls ☐ Reflective Vest ☐ Electrical Safety PPE
Fall	Fall Hazard	Yes ☐ No ☒	☐ Harness ☐ Fall Protection Lanyard
Noise	Noise Hazard	Yes ☒ No ☐	☒ Ear Plugs ☐ Ear Muffs
Respiratory	Chemical Exposure Confined Spaces Particulate Exposure	Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒	☐ Respirator: ☐ ½ Face or ☐ Full Face ☐ Cartridge: ☐ P or ☐ OV or ☐ C ☐ PA/PR

Biohazards	Poisonous Plants Ticks Bee Stings Poisonous Snakes Pigeon Guano Large Mammals Dry Weather (e.g. wildfires)	Yes ☐ No ☒ Yes ☒ No ☐ Yes ☒ No ☐ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒ Yes ☐ No ☒	☒ SOPs ☒ Ivy Block ☐ Insect Repellent ☐ Allergy Kits ☐ Chaps ☐ PPE ☐ Long Pants/Sleeves ☒ Tick Removal Kit ☐ Epipen ☒ Be Alert/Observant ☐ Dust/Nuisance Respirator
Additional Equipment	As Needed		☐ Traffic Cones ☐ 2- Way Radios ☐ First Aid Kit ☐ Beacon Light ☐ Signage ☐ Flashlight/Floodlights ☒ Hand/Power Tools ☐ Ladders ☐ Flags
Hazard Communication Plan	Is CHA bringing chemicals on site? (e.g., survey paint, sample preservative, etc.)	Yes ☒ No ☐ HCl (in lab bottles) Alconox Non-Phosphate Detergent	If yes, where will CHA Safety Data Sheet (SDS) for chemicals in use be stored: ☐ CHA Vehicle ☐ Field Office ☐ Attached to this HASP
	Is this a multi-employer job site with chemical use by others on site?	Yes ☐ No ☒	If yes, detail the following information: General Contractor: Location of SDS for chemicals in use on site:
	If yes to multi-employer job site with chemical use by others on site, will CHA rely on the host employer (client or general contractor) Hazard Communication Plan?	Yes ☐ No ☐	If yes, it is each CHA employee's right to know and to have access to the host employer's hazard communication program for those chemicals in use at a multi-employer job site. If you have any questions, contact the CHA Project Manager or Corporate Health & Safety.
	If CHA is relying on the host employer's (client or general contractor) hazard communication plan, indicate below how CHA staff will have access to this Plan which must include the following information: • Access to SDS for each hazardous chemical that an employee may be exposed to while working: • Any precautionary measures that need to be taken to protect employees during the workplace's normal operating conditions and in foreseeable emergencies • Labeling system used in the workplace		
	Refer to the CHA <u>Hazard Communication Program</u> for additional information		

SITE CONTROL

Site Control/Site Security[1]: ***Describe Measures*** None	Maintenance and Protection of Traffic (M&PT)[3] : ☐ Y ☒ N *If yes, sketch information on separate sheet*
Confined Space Entry: *If Yes, Attach Evaluation Form, Permit and Checklist*	☐ Y ☒ N

Work at Height *If Yes, attach Elevated Work Plan*	☐ Y ☒ N
Decontamination: *If Yes, Describe Procedures*	☒ Y ☐ N Decontamination of non-dedicated field equipment between sampling locations.
Site Monitoring[2]: *If Yes, Describe Procedures*	☒ Y ☐ N Monitor work are with photoionization detector for the presence of VOCs.

CONTINGENCY PLAN

Emergency Contacts: *Provide Telephone Numbers*	Police: 911 Ambulance: 911 Fire: 911 Hospital: 911	Client Contact: Client Phone #: CHA PM Phone #: 915329-9898 Poison Control: 1-800-222-1222

Route to Hospital:
(hospital route map included as Attachment)

Communication: ☒ Cell Phone ☐ Nearest Pay Phone ☐ Pager

Comments:

PLAN SIGN-OFF

Name:	Name:	Name:	Name:
X:	X:	X:	X:
Date:	Date:	Date:	Date:
Name:	Name:	Name:	Name:
X:	X:	X:	X:
Date:	Date:	Date:	Date:

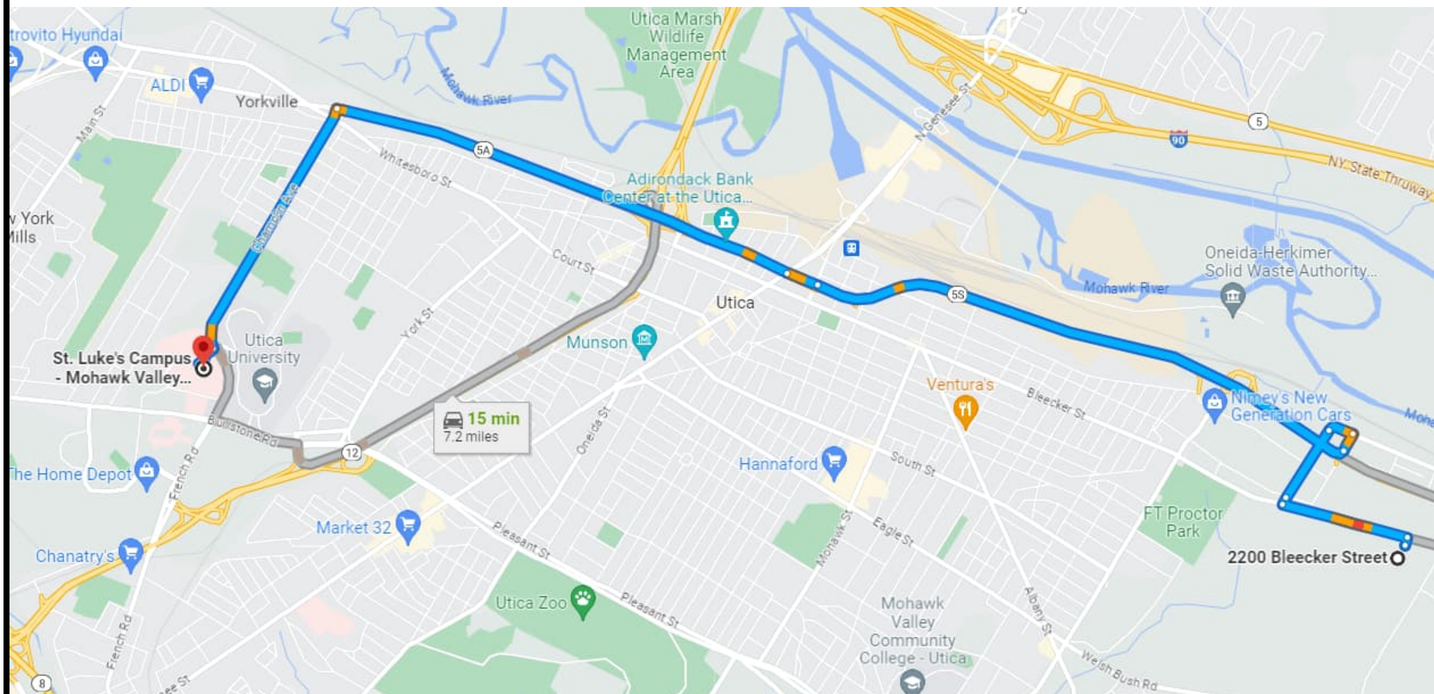
SAFETY TRAINING/MEDICAL MONITORING

Type:	Type:	Type:	Type:
Date:	Date:	Date:	Date:
Type:	Type:	Type:	Type:
Date:	Date:	Date:	Date:

1. Who is providing site control/site security, if any, for this task? Examples of Site Control/Site Security include police, client representative(s), owner(s), CHA or client supervisors
2. What are you monitoring on site, if any, for this task? Examples of Site Monitoring include air monitoring, like carbon monoxide or oxygen levels or wet bulb temperatures
3. Includes Traffic Management Plans
§

SOURCE: Google Maps

Attachment 1 - Emergency Evacuation Plan and Hospital Route Map



Start: 2200 Bleecker Street

Leave site parking lot and turn LEFT
Turn RIGHT on Pitcher Street
Continue onto Broad Street
Turn RIGHT onto Turner Street
Turn RIGHT onto NY-5S W
At the traffic circle, take the 2^{nd} exit onto Liberty Street/Oriskany Street East
Continue STRAIGHT onto Liberty Street/Oriskany Street West for approximately 2.0 miles
Turn LEFT onto Champlin Avenue
Continue STRAIGHT to the destination.

End: St. Luke's Campus – Mohawk Valley Health System
1656 Champlin Avenue, Utica, New York 13502

CHA ©2023
300 South State Street Suite 600, Syracuse, NY 13202
www.chacompanies.com

NOT TO SCALE | DATE: October 2023

FIGURE 1
DIRECTIONS TO NEAREST HOSPITAL
2200 Bleecker Street
Frankfort, New York

CHA