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| **From:** | Greaney, Kevin |
| **To:** | David Stoner; James Gamertsfelder; Marty Stewart |
| **Cc:** | Egetter, David; eric.aufderhaar@ncdenr.gov; Bentkowski, Ben; Hunneke, William F; Chan, Sydney |
| **Subject:** | EPA Comments on Vapor Intrusion Workplan |
| **Date:** | Friday, October 15, 2021 3:05:00 PM |
| **Attachments:** | EPA Comments - Conbraco Vapor Intrusion Workplan - 2021-10-15.pdf |

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Dear All:

See attached VI workplan comments from EPA and NCDEQ. The VI workplan is approved. All comments must be addressed in the VI sampling report. Please contact me by email or phone if you have any questions.

Thank you,

Kevin Greaney
404-562-8568

***EPA General Comment on Voluntary Indoor Air Sampling to Evaluate Building Reentry***

Aalberts and Shield Engineering requested a deviation from the EPA Vapor Intrusion Guidance Manual to evaluate the occupied portions of the building with Vocarb units operating and Carbon HVAC filters (once available) installed. This voluntary sampling event would be the first of two possible iterations of sampling to possibly demonstrate that TCE concentrations in the indoor air are below 8.8 micrograms per cubic meter. Results from this preliminary indoor air sampling event(s) will not be incorporated into the VI Assessment or the VI Assessment Plan. The intention of this voluntary indoor air sampling event is to evaluate the possibility of reinhabiting the building with the short-term mitigation efforts (HVAC adjustments with filters, and Vocarb air purifying units) in place. Once data is submitted and validated, the EPA will re-evaluate the risk to building occupants in these areas accordingly.

***EPA General Comments to Vapor Intrusion Workplan***

On October 13, 2021, the EPA, NCDEQ, Conbraco and Shield Engineering met for a virtual conference to discuss the Vapor Intrusion Workplan submitted on October 11, 2021. During that conversation, Shield Engineering expressed logistical challenges in performing the full vapor intrusion sampling investigation (i.e., indoor air, sub-slab gas, and ambient air) for the entire building in a single day. While the EPA prefers evaluating the entire building in a single day, Shield Engineering requested an alternative approach due to the size of the building and the number of sampling points. Shield Engineering requested sectioning off the building for evaluation of indoor air and sub-slab gases in individual sections on separate days. EPA approves this approach and Shield Engineering should document how the building will be sectioned off for the specific sampling events and endeavor to achieve equivalent HVAC operating conditions for all sampling events.

***EPA Specific Comments to Vapor Intrusion Workplan***

**Section 3.1, page 8 –** *The Vapor Intrusion Workplan states, "The indoor air sampling will be completed prior to the sub-slab air sampling, because the sub-slab air sampling may release sub-slab vapors into the building air." This approach varies from EPA guidance that recommends sampling indoor air and sub-slab gases on the same day. The EPA recommends installing the vapor pins at least one day before any sampling begins. Sampling of indoor air, sub-slab gas, and ambient air can then be done congruently.*

**Section 3.2, page 8 –** *The Vapor Intrusion Workplan states ""Background" sub-slab air sample (SS-20) will be collected under the asphalt paving." As shared in previous comments and discussed in several teleconferences, the EPA will not accept any location on Conbraco property as a true background sample. The location recommended for background sampling is likely also contaminated. The EPA recommends identifying a location that is least likely to be impacted and will be considered for comparison purposes only. No samples collected will be considered background.*

**Section 3.2, page 10 –** *The section on vapor pin installation methods fails to recognize the time needed to equilibrate after installation.*

**Section 3.2, page 11 –** *The Vapor Intrusion Workplan states, "After the sub-slab sampling is complete, we plan to remove the sub-slab vapor pins and seal the core holes through the floor." The EPA recommends leaving the vapor pins in place for future sampling purposes. The EPA expects that several rounds of sampling will be required.*

**Section 7.0, page 12 -** *The Vapor Intrusion Workplan states, "Upon receipt of the laboratory results, Shield will review the indoor air data and compare the results to IASLs." Please compare the indoor air sampling results to the EPA Vapor Intrusion Screening Levels (VISLs) in addition to the IASLs.*

***NCDEQ Specific Comments to Vapor Intrusion Workplan***

**Section 2.1, Page 3 – top paragraph**. To clarify there are documents in the public regulatory record beyond inspection reports and a "Notification of Hazardous Waste Activity" that state Conbraco used and generated TCE waste. In an April 1990 letter to EPA, Conbraco states "Similarly, Conbraco has never used trichloroethylene ("TCE") as a compound in its manufacturing (casting) process at its facility; while TCE has been used in a vapor degreaser for parts cleaning in the facility…". In addition, annual waste generation reports filed by Conbraco from 1987 and 1989 indicate that TCE waste (F001) was generated in the amounts of 3,947 pounds and 9,767 pounds, respectively. The former TCE waste generating information was provided to Conbraco and Shield in an email dated 4/20/2021.

Action Item: No change is needed. This response from NCDEQ will be kept in the public record with your final Vapor Intrusion Workplan.

A response prior to submittal of the report is not required for the following items. However, please address the items in the report as noted below.

**Section 3.2, Page 9, first full paragraph**. Because generally little information is known about underground utility lines under the buildings and as-built drawings are not reportedly available, please record the utility locations as marked out by the contractor and revise as necessary the interior maps of the building tenant spaces.

Please record and put in the report how thick the concrete slab is, and where wider expansion joints are located in the slab. Also, please note in the report when the floors were last sealed with epoxy or other sealing material.

**Section 7.0, Page 12** – Request that the laboratory include the summa cannister vacuum gauge readings. Please also provide the vacuum gauge readings and the measurements of Temperature and Relative Humidity that were taken by Shield and recorded in your field notes.

**Other comments:**

1. For the report, evaluate if the carpet "dry cleaning machine" stored in the basement of Aalberts used dry-cleaning chemicals. The website of the manufacturer, HOST, indicates that their systems utilize "Dry Extraction". HOST currently sells dry materials that are spread out on the carpet, agitated and spread into carpet fibers and then vacuumed. Contact HOST and inquire if they previously sold chemicals containing dry-cleaning

solvent (tetrachloroethylene or PCE) that may have been used in the machine. Also, inquire with the operators of the machine (cleaning crew).

HOST has YouTube video showing use of the equipment along with other information at this link.

Corporate Carpet Cleaning | HOST Dry Carpet Cleaning and Grout Cleaning System

2. Check the ingredients on the can of “brake cleaner” and other products stored in the Turning Concepts space, along with other products that might be observed in the building, for the presence of PCE or TCE.

# FINAL VAPOR INTRUSION SAMPLING WORKPLAN
# CONBRACO INDUSTRIES, INC. - MATTHEWS FACILITY
# MATTHEWS, MECKLENBURG COUNTY,
# NORTH CAROLINA

CONBRACO
Industries, Inc.
701 Matthews-Mint Hill Road
Matthews, NC 28105
EPA I.D. No. NCD107868812

Prepared by:

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October 8, 2021

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## FIGURES

Figure 1: Site Location Map
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Table 1: Summary of Analytical Results - Groundwater

## APPENDICES

Appendix A: Conceptual Site Model Checklist
Appendix B: Indoor Air Building Survey and Sampling Form
Appendix C: Instructions for Occupants Indoor Air Sampling Events

## ABBREVIATIONS

Aalberts = Aalberts Integrated Piping Systems
COC = constituent of concern
Conbraco = Conbraco Industries, Inc.
CVOCs = chlorinated volatile organic compounds
DWM = NCDEQ Division of Waste Management
EPA = United States Environmental Protection Agency
IASLs = NCDEQ DWM Non-Residential Indoor Air Screening Levels
IDW = investigation derived waste
NCDEQ = North Carolina Department of Environmental Quality
NCDEQ Guidance = NCDEQ Vapor Intrusion Guidance dated March 2018
NUS = NUS Corporation
OSHA = Occupational Safety and Health Administration
PAR = Preliminary Assessment Report
PE = Professional Engineer
PG = Professional Geologist
QA/QC = quality assurance, quality control
Shield = Shield Engineering, Inc.
SGLSs = NCDEQ DWM Non-Residential Soil Gas Screening Levels
SOP/QAM = Standard Operating Procedures/Quality Assurance Manual
SWMUs = solid waste management units
TCA = 1,1,1-trichloroethane
TCE = trichloroethene
µg/L = micrograms per liter
V.I. = vapor intrusion
V.I. Workplan – Vapor Intrusion Sampling Workplan
VISL = V.I. Screening Level
VOCs = volatile organic compounds

## 1.0 INTRODUCTION

Shield Engineering, Inc. (Shield) presents this Final Vapor Intrusion Sampling Workplan (V.I. Workplan) for the Conbraco Industries Inc. (Conbraco) facility at 701 Matthews-Mint Hill Road, Matthews, NC. See this site location in Figure 1. This workplan is required in the United States Environmental Protection Agency's (EPA's) letter dated April 23, 2021, which references the previous Administrative Order on Consent (Docket No. 04-2003-4013) allowing the EPA to require additional work. The Site location can be seen in Figure 1 attached.

Shield and Aalberts Integrated Piping Systems (Aalberts) participated in a conference call with the EPA and North Carolina Department of Environmental Quality (NCDEQ) on May 14, 2021, in which the details for a V.I. Workplan were outlined. An initial V.I. Workplan was submitted to the EPA and NCDEQ on June 4, 2021. A subsequent conference call to discuss the V.I. Workplan was conducted with Shield, Aalberts, the EPA, and the NCDEQ on September 9, 2021. Further comments were received in writing from the EPA and NCDEQ on September 10, 2021, summarizing the conference call. An e-mail response confirming the approach was submitted by Shield to the EPA, NCDEQ, and Aalberts on September 20, 2021.

This final V.I. Workplan represents the work that is now being conducted at the site. These services are being performed in accordance with the Shield *Standard Operating Procedures/Quality Assurance Manual* (SOP/QAM), dated July 1, 2016, and the NCDEQ Division of Waste Management's (DWM) *Vapor Intrusion Guidance* dated March 2018 (NCDEQ Guidance).

## 2.0 BACKGROUND

### 2.1 Groundwater

Chlorinated volatile organic compounds (CVOCs) have been found in the groundwater at the site going back to the late 1980s. The previous consultant, Law Environmental, Inc., attributed these CVOCs to an upgradient source based on groundwater samples collected from WQ-1, an abandoned upgradient monitoring well previously located near the current monitoring well MW-A. Monitoring well WQ-1 exhibited similar levels of CVOCs as abandoned downgradient monitoring wells WQ-2 and WQ-3S (shallow) previously located near the current monitoring

well MW-C. In 1988, groundwater samples collected from the upgradient well WQ-1 contained 26 micrograms per liter (µg/L) of trichloroethene (TCE), and the downgradient wells WQ-2 and WQ-3S contained 14 and 33 µg/L of TCE, respectively. In 1988, a groundwater sample collected from monitoring well WQ-2 also contained 8 µg/L of trans-1,2-dichloroethene, a breakdown component of TCE.

Shield's January and April quarterly groundwater sampling events of monitoring wells MW-A through MW-D showed the upgradient well MW-A to be "clean" with respect to CVOCs. The downgradient well MW-C exhibited 53, 50.7, and 48.7 µg/L of TCE and 175, 165, and 166 µg/L of cis-1,2-dichloroethene, another breakdown compound from TCE. The side-gradient monitoring well MW-B exhibited 59.4 and 84.4 µg/L of TCE, and 1.1 µg/L of tetrachloroethene (PCE), which can be a parent compound of TCE. The other downgradient well MW-D has been "clean" with respect to CVOCs.

Due to detections of CVOCs in the groundwater, as required by the EPA and NCDEQ, five additional monitoring wells MW-E through MW-I were installed from August 2 through August 4, 2021, immediately around the building on the property at locations prescribed by the EPA and NCDEQ. The wells were sampled on August 5, 2021. The results of that sampling were submitted to the EPA and NCDEQ in a separate report entitled Quarterly Groundwater Monitoring Report – Third Quarter. Levels of TCE were found in monitoring wells MW-B, MW-C, MW-E, MW-F, MW-G, MW-H, and MW-I above the applicable 15A North Carolina Administrative Code 2L Groundwater Standards (2L Standards). Levels of PCE were detected in monitoring wells MW-B, MW-F, and MW-G above the 2L Standards. Levels of cis-1,2-dichloroethene were detected in monitoring wells MW-C, MW-G, MW-H, and MW-I above the 2L Standards. The groundwater sampling results can be seen in the attached Table 1. The well locations and VOCs sampling results can be seen in the attached Figure 2.

The NCDEQ and EPA provided a *Preliminary Assessment Report* (PAR), prepared by NUS Corporation (NUS) in 1991, which was not in Shield's files nor in the files of current Conbraco/Aalberts personnel. Based on this report the EPA has identified potential solid waste management units (SWMUs) where CVOCs were reportedly used or transported. Based on the NUS report, it appeared that Conbraco previously only used the CVOC 1,1,1-trichloroethane

(TCA), which is a different compound than TCE and has different breakdown compounds compared to TCE. TCA and its breakdown compounds have not been detected in the site monitoring wells. The NCDEQ subsequently informed Shield in their comments to the Initial V.I. Workplan, that there is data in the public record (e.g. compliance inspection and Notification of Hazardous Waste Activity) documenting TCE use at the facility in the past.

Final results from the August 5, 2021 groundwater results were received on August 25, 2021. Based on the elevated CVOCs levels detected immediately around the building, indoor air sampling of the occupied spaces of the building was initiated as soon as the required number of summa canisters could be delivered. Indoor air sampling of the occupied portions of the building was initiated on September 14, 2021 following this V.I. Workplan at the locations approved by the EPA and NCDEQ in their figure dated August 20, 2021.

## 2.2 Solid Waste Management Units

The following descriptions of the SWMUs relative to CVOCs were excerpted from the EPA's *Draft Vapor Intrusion Assessment and Review of Groundwater Recommendations*, dated April 16, 2021, and prepared by Ben Bentkowski, P.G. These descriptions were derived from the PAR prepared by NUS. All of the descriptions are "reportedly" accurate. Shield will endeavor to establish if these descriptions are indeed accurate.

### 2.2.1 SWMU Number 8 - Floor Drains/Sump/Sewer Discharge

SWMU Number 8 is located in the northwest corner and west-central portion of the building. The plant reportedly had four floor drains located in the west-central portion of the plant building. The floor drains were reportedly installed in 1957 during construction of the plant. Those drains reportedly carried floor wash water or spilled pressure-test water to a sump located in the boiler room. The sump was added to the discharge system in March 1989. Waste from the degreaser unit (SWMU Number 9) was reported to be disposed into the sump as well. A pump was said to be used to discharge sump contents into the municipal sewer system. The facility had a permit (No. 0357) to discharge its wastewater to the city of Charlotte sanitary sewer system. The permit was issued on January 4, 1989, and expired November 30, 1990.

### 2.2.2 SWMU Number 9 - Degreaser Unit

SWMU Number 9 is located in the southeast corner of the building. This unit was said to be a conveyor-type vapor degreaser. It was stated that approximately 400 gallons of TCA was used to degrease brass valve parts after machining. According to the NUS PAR, this unit was placed into service in 1962. Prior to this the plant was said to have used a batch degreaser. The degreaser unit reportedly managed waste TCA and sludges comprised of metal and dirt. Wastes were stated to be stored in a 55-gallon drum (SWMU Number 10) prior to disposal. This unit was said to rest on an aluminum containment pad with a capacity of 866 gallons. TCA and water were apparently separated in the pan, and a portable pump was to be used in the event of a spill.

In a March 27, 1989 report entitled "Closure Verification Clean Closure," prepared by Law Environmental, Inc. the location of the former "Vapor Degreaser" (SWMU Number 9) was located more to the center of the southern end of the building, west of location indicated by NUS.

### 2.2.3 SWMU Number 10 - Satellite Drum

SWMU Number 10 is located in the southeast corner of the building. A 55-gallon drum was reportedly used to contain sludges and waste TCA from the degreaser unit (SWMU Number 9). The drum was said to be shipped approximately every 60 days… for reclamation. This unit was placed in service in 1975... Prior to this, an unknown recycler had a similar setup in the plant. This SWMU apparently managed spent TCA, sludge, metal scrap and dirt. A drum of sorbent material was said to be kept adjacent to the satellite drum in the event of a spill.

### 2.2.4 Other Potential Sources

Since receipt of the EPA's *Draft Vapor Intrusion Assessment and Review of Groundwater Recommendations and* the submittal of the Initial V.I. Workplan, an internal reconnaissance of the building was conducted on August 17, 2021. During the reconnaissance, several potential routes of vapor intrusion (V.I.) such as open pipes and a trench with sump were observed, and potential sources of CVOCs were also identified. The HVAC (air handling) systems were evaluated on September 26, 2021 with assistance from an HVAC contractor during which operational zones for the HVAC units were identified.

## 2.3 EPA's Conceptual Site Model

The primary concern is to protect human health and the environment. In this V.I. Workplan, the primary objective of the Conceptual Site Model is to identify if a complete or incomplete pathway exists for the CVOCs to migrate to or from the subsurface environment, the building, and ultimately causing elevated risk to human health/the building occupants. CVOCs can rise in the water table to enter the soil and vice versa. In the soil, CVOCs can rise to building slabs, resulting in elevated levels of CVOCs in indoor air. CVOCs can also migrate in the opposite direction being discharged inside a building and migrating to the subsurface soils and groundwater.

The EPA has cited the potential for V.I. and a resulting potential for an impact to indoor air quality as a basis to require indoor air and sub-slab vapor sampling to further investigate for CVOCs. The EPA's *Draft Vapor Intrusion Assessment and Review of Groundwater Recommendations* summarized the SWMUs in the following Conceptual Site Model:

"*These three SWMU descriptions provide the basis for the V.I. conceptual site model and potential releases of solvents in the facility. Completed, machined parts were placed in a batch degreaser in the early days and later in a degreaser that had a conveyor mechanism (SWMU 9). This mechanism was within an 866-gallon containment structure. SWMU 10, the satellite drum area was located near the degreaser in the southeastern corner of the facility. A 55-gallon drum was used to contain sludges and waste 1, 1, 1-trichloroethane from the degreaser unit. (This is unusual in that all the analytical data provided contained analytical results for trichloroethylene but not 1,1,1-trichloroethane.) SWMU 8 comprises a series of four floor drains, the associated plumbing that brought the waste (water) to a sump (installed in 1989) prior to discharge to the city of Charlotte sewer system. The location and flow direction of the municipal sewer lines is not confirmed at this time.*

*Tracking the solvent pathways, new solvent was placed into the degreaser as needed. Immediately prior to that, waste solvent was removed from the degreaser and placed in the drum at SWMU 10. Any spillage during that transfer process is thought to have been contained in the 866-gallon containment structure, adsorbed by the sorbent kept near SWMU 10 or rinsed off the floor and into the floor drains. The NUS report states that "Waste from the degreaser*

*unit (SWMU No. 9) is disposed of into the sump as well." The specifics as to the waste characteristics or components are not specified in the report but liquids left the sump in the building and were transferred to the Charlotte sewer system...*"

The Conceptual Site Model will be an ongoing assessment of the various potential migration pathways for CVOCs. A groundwater investigation as discussed above is already in progress. This V.I. Workplan will address sub-slab vapors and indoor air vapors. It will be a goal of this work to identify CVOCs source areas within and underneath the building, the presence of vapors collecting beneath the building, and the presence of entry pathways and driving forces for gaseous CVOCs. Ultimately this work will result in a conceptually appropriate remedial approach. The details of the V.I. Workplan scope of work are provided below:

## 3.0 VAPOR INTRUSION INVESTIGATION PROCEDURES

### 3.1 Indoor Air Sampling

The indoor air sampling coupled with sub-slab air sampling is intended to target the above SWMU Numbers 8, 9, and 10. Based on the various conversations with the EPA and NCDEQ, additional somewhat gridded proposed indoor air sample locations have been added throughout the building both in open areas and in occupied portions of the building. The indoor air samples will be called IA-#s. Shield will also sample an upgradient location outside of the building (BG-#s) based on wind direction on the days of sampling. These locations were reviewed with and agreed upon with the EPA and NCDEQ and are shown on Figure 3. The EPA and NCDEQ requested Summa® (summa) canisters be used to collect the air samples at all locations, and the samples are to be analyzed for volatile organic compounds (VOCs) by the EPA TO-15 method.

We will generally follow the NCDEQ Guidance during the collection of the indoor air samples. Following the NCDEQ Guidance, Shield has partially completed the *Conceptual Site Model Checklist* included in Appendix A and will complete the checklist after sampling and analyses are complete. Following the *NCDEQ Guidance*, Shield completed the *Indoor Air Building Survey and Sampling Form*, except Sections VI, VII, and VIII (the "*Sampling Form*") which

pertain to the actual sampling and will be filled out on the days of sampling. The previously completed *Indoor Air Building Survey and Sampling Form* is included in Appendix B.

The suspect SWMU locations were reviewed and the former uses could not be confirmed or denied since carpeting has been installed over some of the suspect SWMU areas, other suspect SWMU areas have an epoxy paint type coating, and all of these suspect SWMUs have been removed. Indoor and outdoor background potential sources of VOCs exist at the site. Some of these sources, such as nail polish, dry cleaned clothes from on-site workers, and background potential sources cannot be removed. We have asked that the small quantities of degreasers, cleaners, and various paints and finishes that were observed not be used prior to and during our testing. If possible, the indoor background sources will be removed from the sample areas at least 48 hours prior to sampling.

As requested by the EPA, indoor air samples are to be collected during normal building operations, with doors opening or closing as would normally be done. Per the NCDEQ Guidance, *Instructions for Occupants Indoor Air Sampling Events* (included in Appendix C) have been given to the Property Manager.

Since the intent of this work is to evaluate indoor breathing air, sample canisters will be located in the normal breathing zone (4.5 feet to 6 feet off the floor) when possible. Samples will be collected using individually certified six-liter summa canisters. Each summa canister will have a flow controller set to collect an approximate eight-hour sample. Pre- and post-collection vacuum readings will recorded for each canister. This sampling requires a balance between letting the samples collect for the full eight hours and/or meeting the targeted minus five (5) inches of mercury at the completion of the sampling. We will strive to meet both criteria, but we will end the sampling period when there is approximately minus five (5) inches of mercury vacuum remaining in each canister prior to closing the canister valves. No purging will be conducted since it is not applicable for indoor air sampling. Stabilization and leak check procedures are also not applicable.

Temperature and relative humidity data will be collected when the sample collection starts and finishes. Indoor air pressure at every sampling location, as well as outdoor air pressure, will also be measured on the days of sampling. This is the only "field screening" to be conducted. There will be no permanent sampling installations during this phase of work. Sampling field sheets will be submitted. See Appendix B. The indoor air sampling will be completed prior to the sub-slab air sampling, because the sub-slab air sampling may release sub-slab vapors into the building air. Field personnel will photograph the sample areas during the work. Anything else of note during these activities will be documented by field personnel.

## 3.2 Sub-Slab Air Sampling

We will generally follow the NCDEQ Guidance; however, the NCDEQ Guidance does not include the use of Vapor Pins® (vapor pins) which are a fairly new, less obtrusive method of sampling the sub-slab approved for this project by the EPA and NCDEQ. Per the NCDEQ Guidance, Shield has partially completed a *Conceptual Site Model* and *Indoor Air Building Survey and Sampling Form*. Those forms will be completed during this sampling, and after additional monitoring wells are installed and sampled. See Appendices A and B.

The *Conceptual Site Model* and *Indoor Air Building Survey* included completing checklists for the sampling locations noting indoor and background potential sources of volatile organic vapors. Indoor and background potential sources of VOCs exist at the site. Some of these sources, such as nail polish, dry cleaned clothes from on-site workers, and background potential sources cannot be removed. We have asked that the small quantities of degreasers, cleaners, and various paints and finishes that were observed not be used prior to and during our testing. If possible, these indoor background sources will be removed from the sample areas at least 48 hours prior to sampling.

As requested by the EPA, samples are to be collected during normal building operations, with doors opening or closing as would normally be done. Locations of each sample point were selected based on the same criteria as the indoor air sample locations. The actual location of the sub-slab sampling points will be dependent on access, utility lines, and site operations. The samples will be called SS-#s, most of which will be co-located with IA-# samples as shown on Figure 3. "Background" sub-slab air sample (SS-20) will be collected under the asphalt paving

using the same procedures as the other sub-slab samples.

Prior to installation of the vapor pins, Shield will contact a private utility location service for subsurface utility location to mark out any underground utilities and embedded rebar in the areas scheduled for work. We have already completed a visual inspection of the building looking for suspect locations of the former SWMUs numbers 8, 9, and 10, underground piping, trenches, and floor drains.

The vapor pins will be installed according to the Standard Operating Procedures (SOPs) provided by Vapor Pin® and each will be installed as a recessed sampling point completed with a flush mounted protective cover. The vapor pins will be constructed of stainless steel and decontaminated prior to use.

First, holes approximately 1½ inches in diameter will be drilled approximately 1½ inches into the concrete floor (not fully through the floor). A 5/8-inch hole will then be drilled through the remaining concrete floor into the sub-slab material. Shield will drill the holes through the slab not much deeper than the bottom of the concrete. If the concrete slab is found to be less than three inches thick, recessed installation may not be possible.

Next, a dedicated vapor pin will be installed into each 5/8-inch, drilled hole. Clean, dedicated, teflon, teflon lined, tygon, or nylon tubing will be connected to the vapor pins. The sampling tubing and in-place vapor pins will be purged using a dedicated syringe (Model BD® 60 ml. Ref 309653). Leak detection will be accomplished using one of two methods:

1. A helium shroud testing system. A shroud will be placed over the vapor pin in a fashion that the sample tubing can penetrate the shroud. The shroud will be filled with laboratory grade helium until the helium concentration within the shroud reaches approximately 40% or greater. A real-time helium detector will be connected to the sample tubing to measure if any helium is leaking from the shroud into the sub-surface. The presence of methane may cause false positive helium detections during the leak test. In this situation, Shield will compare the helium detector readings prior to the use of the helium shroud with readings during the use of the helium shroud. If the helium detector readings are similar, the sampling train and vapor pin will be considered leak free. If the helium detector readings are significantly higher with the helium shroud in

use, the sampling train and/or vapor pin will be reconnected/reinstalled and leak tested again. Once it is determined that no helium is leaking to the sub-surface, and the purging is complete, the summa canister attached to the sample tubing will be opened and the sub-slab sample collection will be initiated. A shut-in test will also be completed for all sample train components located outside of the helium shroud.

OR

2. A shut-in test of the sampling train and a water dam leak test method following the Vapor Pin® SOPs. Since the vapor pins are proposed to be installed in the flush-mount (countersunk) configuration, the larger hole will be used as a water dam. The sample tubing will be connected to the top of the vapor pin. Distilled water will be poured into the larger hole to immerse base of the vapor pin, and if desired, the tubing connection at the top of the vapor pin. The water will be allowed to equilibrate as concrete will absorb some of the water, which is normal. The sample will be purged, and if additional water is lost to the sub-slab, the purging will be stopped. The water will be removed from the water dam, and the sampling train and/or vapor pin will be reconnected/reinstalled and leak tested again. Once it is determined that no water is leaking to the sub-surface, and the purging is complete, the summa canister attached to the sample tubing will be opened and the sub-slab sample collection will be initiated.

Batch certified summa canisters, with one to six-liter capacities, will be used to collect the sub-slab vapor samples. The summa canisters will be under vacuum and when opened will draw sub-slab vapors into the canisters. Flow restrictors will be supplied by the laboratory and will be requested to provide approximately 200 milliliters or less per minute. This equates to a sample collection time of approximately 5 to 30 minutes per sample depending on the canister capacity. We will stop the sampling by closing the valve when there is approximately minus five inches of mercury vacuum remaining in each canister.

The air temperature, relative humidity, and differential air pressure will be recorded at the time each sample is collected. Pre- and post-sampling vacuum readings of the canisters will be documented. After sampling, a secure cover will be installed over each hole to protect the vapor pin. The vapor pin and protective cover will be constructed of stainless steel. Sampling field sheets will be submitted. See Appendix 2.

After the sub-slab sampling is complete, we plan to remove the sub-slab vapor pins and seal the core holes through the floor slab to prevent these core-holes from being potential conduits for vapors to migrate from the subsurface through the floor and into the indoor air.

## 4.0 LABORATORY ANALYSES

The summa canisters will be previously batch or individually certified by the laboratory. The samples will be delivered under proper chain of custody to the laboratory. The vacuum reading of each summa canister will be recorded by the laboratory upon receipt of the canisters at the lab. The samples will be analyzed for volatile organic compounds by the EPA Method TO-15. The detection levels for each parameter will be requested to meet the applicable NCDEQ Non-Residential Vapor Intrusion Screening Levels (VISLs) Indoor Air Screening Levels (IASLs) or Sub-Slab and Exterior Soil Gas Screening Levels (SGSLs). There are no exceedingly short laboratory hold times of concern. Level II deliverables will be requested from the laboratory.

## 5.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Quality assurance/quality control (QA/QC) measures will include collecting at least one outdoor background air sample each day of indoor air sampling per the NCDEQ Guidance to identify possible outside sources of VOC vapors. Background samples will be collected using the same procedures as the other indoor air samples. Background indoor air samples will also be collected from the normal breathing zone (4.5 feet to 6 feet off the floor). The “background” sub-slab air sample will be collected under the asphalt paving using the same procedures as the other sub-slab samples. Additional QA/QC measures will include collecting one duplicate indoor air sample and one duplicate sub-slab sample on each day of their respective sampling.

Per the NCDEQ Guidance, a particulate filter will be used before the summa canister to avoid clogging. Leak detection as described above will be performed. Pre- and post-sampling vacuum readings of the summa canisters will be documented. Summa canisters which indicate a pre-sampling vacuum reading greater than 10% lower than what the laboratory notes on the delivery paperwork will not be used. We will end the sampling period with approximately minus five inches of mercury remaining in each summa canister prior to closing the canister valves. The vacuum reading of each summa canister will also be recorded by the laboratory upon receipt of the canisters at the laboratory. After the samples are collected, the summa

canisters will be delivered under proper chain of custody to a North Carolina-certified laboratory. The laboratory will have one to six-liters of air to analyze per sample, which is more than sufficient to run the TO-15 analyses.

Trip blanks are not planned for collection since they are not typically collected for air sampling. The samples will be located using field measurements to fixed structures in the building since a global positioning system device will not work within the building. Field personnel will be 40-hour Occupational Safety and Health Administration (OSHA) certified. In addition, a site-specific Health and Safety Plan has been prepared.

## 6.0 INVESTIGATION DERIVED WASTE MANAGEMENT

The only investigation derived waste (IDW) that will be generated from this activity will be a minimal amount of concrete dust and sample tubing. Used sample tubing will be taken off site and disposed of with normal business refuse. Should any VOCs be in the concrete they will likely volatilize from the heat generated during the concrete drilling. However, any recoverable dust will be added to the IDW drums of soil cuttings already awaiting disposal.

## 7.0 REPORTING

Upon receipt of the laboratory results, Shield will review the indoor air data and compare the results to the IASLs. The sub-slab data will be compared to the SGSLs. Per the NCDEQ Guidance, if constituents of concern (COCs) are detected in both the indoor air and sub-slab samples, a comparison will be made to see if the same chemicals are detected in both the indoor air and the sub-slab samples. The NCDEQ Guidance presents various scenarios for further work or no further action depending on levels of COCs detected in the indoor air and sub-slab air samples. Shield will follow these various scenarios. Additional sampling may be recommended. Shield will also use the EPA's Vapor Intrusion Screening Level (VISL) calculator or NCDEQ's Risk Calculator to identify chemical levels of concern based on default residential or non-residential exposure scenarios.

Our report will be entitled *Vapor Intrusion Sampling Report*. The approximate sample locations will be shown based on interior measurements in respect to available aerial photographs of the buildings. Approximate coordinates of the sub-slab sample locations will then be determined

using computer-aided design software and reported in decimal degrees and the State Plane Coordinate System using the North American Datum of 1983 (NAD83). The coordinates will be tabulated and included as an appendix in the report. Electronic Data Deliverable (EDD) tables will be uploaded or forwarded to the EPA and NCDEQ in their requested formats.

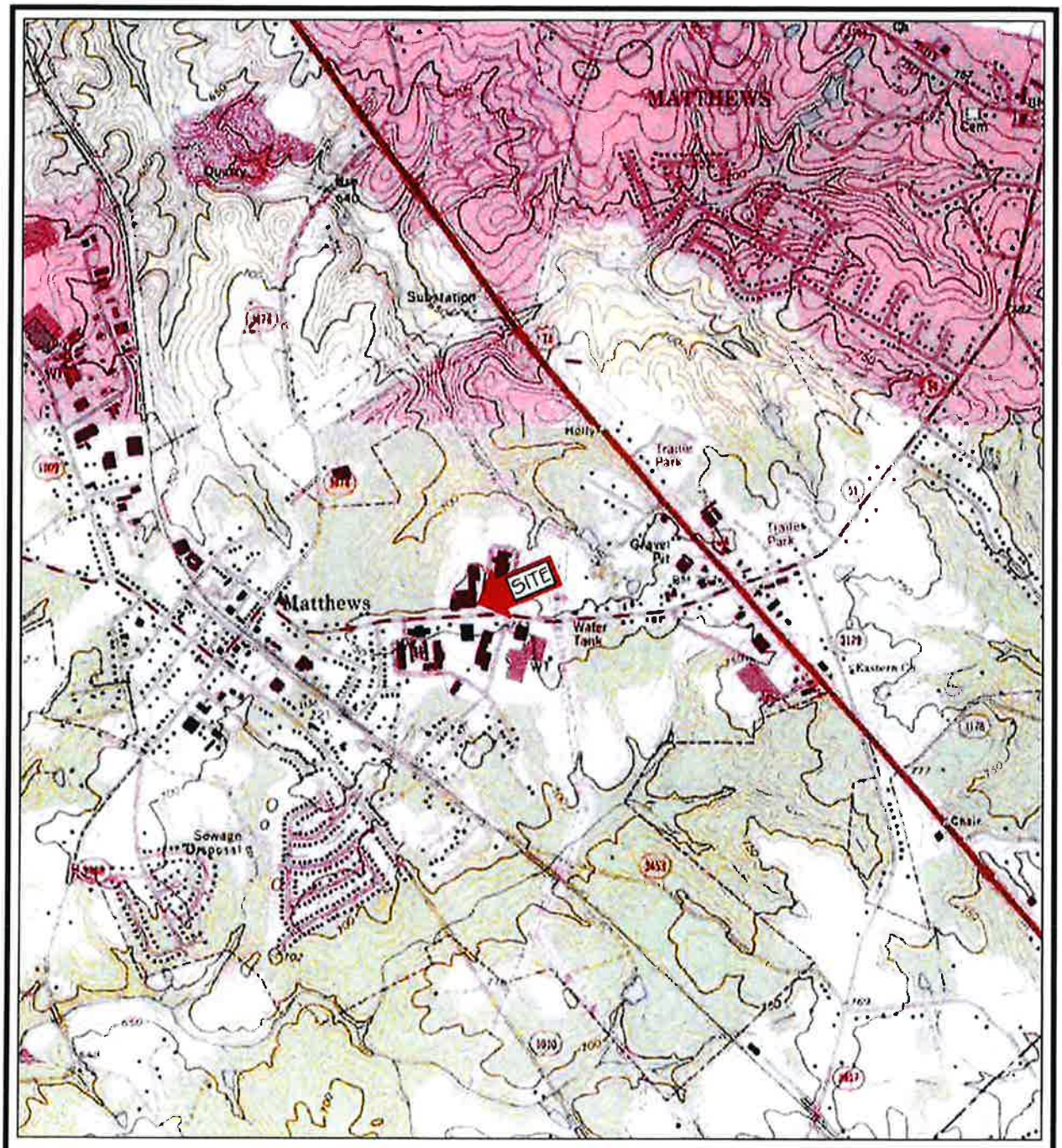
The sampling data will be summarized in the report containing a description of field activities. Photographs will be included. A summary of the findings and recommendations will be provided. Tables will be provided showing the current assessment results compared to applicable screening levels. A figure or figures showing the current assessment locations and any exceedances to applicable standards will be provided with media sampled noted in the legend(s), graphic scale(s), and north arrows. A groundwater potentiometric map, based on recent data, with graphic scale and north arrow will be provided. Shield's Professional Engineering (PE) number and the individual PE or Professional Geologist (PG) overviewing the work will sign and seal the report.

The report will be prepared and submitted following the schedule prepared below:

## 8.0 SCHEDULE

An initial Vapor Intrusion Workplan was submitted to the EPA and NCDEQ for review. Further comments were received from the EPA and NCDEQ. Those comments have been addressed in this Final V.I. Workplan. Some targeted sampling has already been completed. The EPA and NCDEQ should review this Final V.I. Workplan and let us know if there are any further requirements as the sampling proceeds further. Shield has and will continue to notify the EPA and NCDEQ of the dates that the field work is scheduled. The laboratory results should be available approximately two weeks after the sampling. Data evaluation and our report of findings should take about four weeks to complete once the laboratory data is received. We will strive to have the report submitted within six weeks of receiving the final sampling results.

# FIGURES




N

GRAPHIC SCALE
0 1,000' 2,000'
SCALE: 1 in. = 2,000 ft.

SOURCE: NATIONAL GEOGRAPHIC USGSTOPO, 7.5 MINUTE MAP SERIES, MATTHEWS, NORTH CAROLINA.

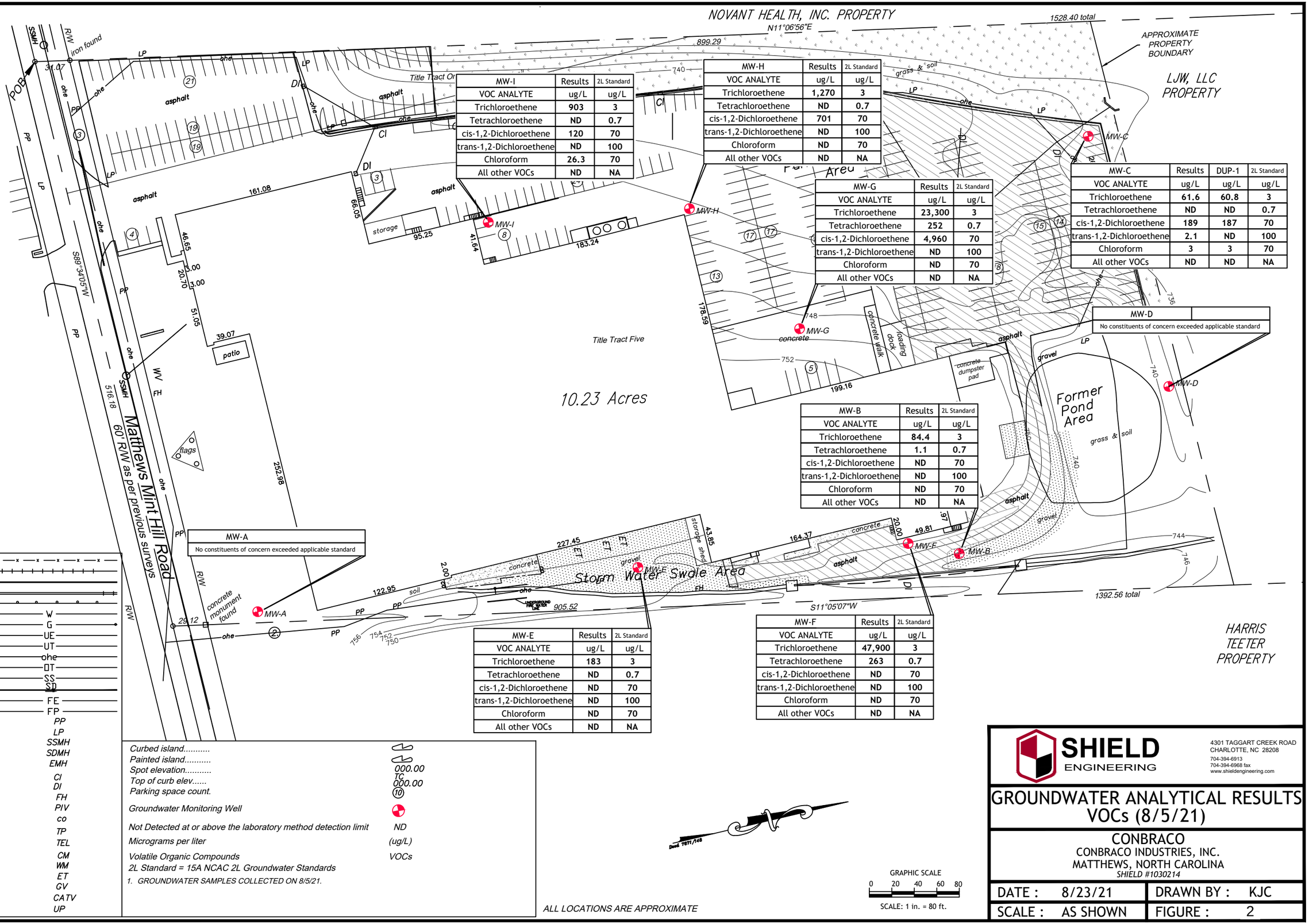
SHIELD ENGINEERING
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
704-394-0513
704-394-6985 fax
www.shieldengineering.com

# SITE LOCATION MAP

CONBRACO INDUSTRIES, INC.
MATTHEWS-MINT HILL ROAD
MATTHEWS, NORTH CAROLINA
*SHIELD # 1030214*

| | | | |
|---|---|---|---|
| DATE : | 04/16/07 | DRAWN BY : | RBS |
| SCALE : | AS SHOWN | FIGURE : | 1 |

H:\PROJECTS\2007\CONBRACO RCRA PROJECTS\ACTIVE PROJECTS\1030214\FIGURES\FIG 1




| MW-I | Results | 2L Standard |
|---|---|---|
| VOC ANALYTE | ug/L | ug/L |
| Trichloroethene | **903** | **3** |
| Tetrachloroethene | **ND** | **0.7** |
| cis-1,2-Dichloroethene | **120** | **70** |
| trans-1,2-Dichloroethene | **ND** | **100** |
| Chloroform | **26.3** | **70** |
| All other VOCs | **ND** | **NA** |

| MW-H | Results | 2L Standard |
|---|---|---|
| VOC ANALYTE | ug/L | ug/L |
| Trichloroethene | **1,270** | **3** |
| Tetrachloroethene | **ND** | **0.7** |
| cis-1,2-Dichloroethene | **701** | **70** |
| trans-1,2-Dichloroethene | **ND** | **100** |
| Chloroform | **ND** | **70** |
| All other VOCs | **ND** | **NA** |

| MW-G | Results | 2L Standard |
|---|---|---|
| VOC ANALYTE | ug/L | ug/L |
| Trichloroethene | **23,300** | **3** |
| Tetrachloroethene | **252** | **0.7** |
| cis-1,2-Dichloroethene | **4,960** | **70** |
| trans-1,2-Dichloroethene | **ND** | **100** |
| Chloroform | **ND** | **70** |
| All other VOCs | **ND** | **NA** |

| MW-C | Results | DUP-1 | 2L Standard |
|---|---|---|---|
| VOC ANALYTE | ug/L | ug/L | ug/L |
| Trichloroethene | **61.6** | **60.8** | **3** |
| Tetrachloroethene | **ND** | **ND** | **0.7** |
| cis-1,2-Dichloroethene | **189** | **187** | **70** |
| trans-1,2-Dichloroethene | **2.1** | **ND** | **100** |
| Chloroform | **3** | **3** | **70** |
| All other VOCs | **ND** | **ND** | **NA** |

| MW-D | |
|---|---|
| No constituents of concern exceeded applicable standard | |

| MW-B | Results | 2L Standard |
|---|---|---|
| VOC ANALYTE | ug/L | ug/L |
| Trichloroethene | **84.4** | **3** |
| Tetrachloroethene | **1.1** | **0.7** |
| cis-1,2-Dichloroethene | **ND** | **70** |
| trans-1,2-Dichloroethene | **ND** | **100** |
| Chloroform | **ND** | **70** |
| All other VOCs | **ND** | **NA** |

| MW-A | |
|---|---|
| No constituents of concern exceeded applicable standard | |

| MW-E | Results | 2L Standard |
|---|---|---|
| VOC ANALYTE | ug/L | ug/L |
| Trichloroethene | **183** | **3** |
| Tetrachloroethene | **ND** | **0.7** |
| cis-1,2-Dichloroethene | **ND** | **70** |
| trans-1,2-Dichloroethene | **ND** | **100** |
| Chloroform | **ND** | **70** |
| All other VOCs | **ND** | **NA** |

| MW-F | Results | 2L Standard |
|---|---|---|
| VOC ANALYTE | ug/L | ug/L |
| Trichloroethene | **47,900** | **3** |
| Tetrachloroethene | **263** | **0.7** |
| cis-1,2-Dichloroethene | **ND** | **70** |
| trans-1,2-Dichloroethene | **ND** | **100** |
| Chloroform | **ND** | **70** |
| All other VOCs | **ND** | **NA** |

*Legend*

| | |
|---|---|
| Fence | x x x x x x |
| Railroad | |
| Building | |
| Curb line | |
| Guard rail | |
| Water line | W |
| Gas line | G |
| Underground elec. | UE |
| Underground tele | UT |
| Overhead electric.. | ohe |
| Overhead telephone | OT |
| Sanitary sewer | SS |
| Storm drain | SD |
| Flood district limit. | FE |
| Floodway limit | FP |
| Power pole | PP |
| Light pole | LP |
| San. swr. manhole | SSMH |
| Storm dr. manhole | SDMH |
| Power manhole | EMH |
| Curb inlet | CI |
| Drop inlet | DI |
| Fire hydrant | FH |
| Post indicator valve | PIV |
| San. swr. cleanout. | co |
| Telephone pedestal. | TP |
| Telephone manhole... | TEL |
| Concrete monument.. | CM |
| Water meter | WM |
| Electric transformer.. | ET |
| Gas valve | GV |
| Cable TV ped | CATV |
| Common utility pole. | UP |

| | |
|---|---|
| Curbed island | |
| Painted island | |
| Spot elevation | 000.00 |
| Top of curb elev | TC 000.00 |
| Parking space count. | (10) |
| Groundwater Monitoring Well | |
| Not Detected at or above the laboratory method detection limit | ND |
| Micrograms per liter | (ug/L) |
| Volatile Organic Compounds | VOCs |

2L Standard = 15A NCAC 2L Groundwater Standards

1. GROUNDWATER SAMPLES COLLECTED ON 8/5/21.

ALL LOCATIONS ARE APPROXIMATE

Deed 7671/148

GRAPHIC SCALE
0 20 40 60 80
SCALE: 1 in. = 80 ft.


SHIELD ENGINEERING
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# GROUNDWATER ANALYTICAL RESULTS VOCs (8/5/21)

## CONBRACO

CONBRACO INDUSTRIES, INC.
MATTHEWS, NORTH CAROLINA
*SHIELD #1030214*

| | | | |
|---|---|---|---|
| DATE : | 8/23/21 | DRAWN BY : | KJC |
| SCALE : | AS SHOWN | FIGURE : | 2 |

C:\Users\jgamertsfelder\Shield Engineering\Projects - Active Projects\1030214-04 Matthews Closure Plan Execution\Assessment Report\Drawings\FIG 1 - GW Results & VOCs.dwg

Legend

| | | | |
|---|---|---|---|
| Fence..... | | Cable TV ped..... | CATV |
| Railroad..... | | Common utility pole. | UP |
| Building..... | | Curbed island..... | |
| Curb line..... | | Painted island..... | |
| Guard rail..... | | Spot elevation..... | 000.00 |
| Water line..... | W | Top of curb elev..... | TC 000.00 |
| Gas line..... | G | Parking space count. | (10) |
| Underground elec. | UE | Groundwater Elevation Contour | |
| Underground tele | UT | Groundwater Monitoring Well | |
| Overhead electric.. | ohe | (with relative groundwater elevation) | |
| Overhead telephone | OT | | |
| Sanitary sewer..... | SS | Indoor Air Sample Points (IA) and/or | |
| Storm drain..... | SD | Sub Slab Soil Gas Sample Points (SG) | |
| Flood district limit. | FE | | |
| Floodway limit..... | FP | | |
| Power pole..... | PP | | |
| Light pole..... | LP | | |
| San. swr. manhole | SSMH | | |
| Storm dr. manhole | SDMH | | |
| Power manhole..... | EMH | | |
| Curb inlet..... | CI | | |
| Drop inlet..... | DI | | |
| Fire hydrant..... | FH | | |
| Post indicator valve | PIV | | |
| San. swr. cleanout. | co | | |
| Telephone pedestal. | TP | | |
| Telephone manhole... | TEL | | |
| Concrete monument.. | CM | | |
| Water meter..... | WM | | |
| Electric transformer.. | ET | | |
| Gas valve..... | GV | | |

NOTES:

DEPTH TO WATER MEASUREMENTS COLLECTED ON JANUARY 19, 2021.

INDOOR AIR SAMPLES IA-1 THROUGH IA-14 AND BG-1 COLLECTED ON 9/14/21.

INDOOR AIR SAMPLES IA-15 THROUGH IA-23, BACKGROUND SAMPLE BG-2, AND SUB SLAB VAPOR SAMPLES SS-1 THROUGH SS-20 ARE PROPOSED AT LOCATIONS SHOWN.

BACKGROUND AIR SAMPLE LOCATION (BG-2) TO BE DETERMINED IN FIELD BASED ON WIND DIRECTION.

ALL LOCATIONS ARE APPROXIMATE

Deed: 7671/148

Novant Health, Inc.
6088/949

N11°06'56"E 899.29

1528.40 total

622.99

APPROXIMATE PROPERTY BOUNDARY

POB

SSMH

R/W

iron found

S89°34'05"W 516.18

Matthews Mint Hill Road
60' R/W as per previous surveys

Title Tract One

Parking Lot

asphalt

APPROXIMATE AREA OF GROUND LEVEL "BASEMENT"

161.08

95.25

46.55

20.70

51.05

39.07

patio

flags

252.98

227.45

122.95

29.12

concrete monument found

MW-A (71.60)

MW-C (51.99)

MW-D (63.67)

MW-B (54.84)

Storm drain structure paved over. Unknown location.

Title Tract Two

pond

Former Pond

Groundwater Flow Direction

concrete

concrete walk

loading dock

covered parking

concrete dumpster pad

gravel

Storm Water Swale Area

Corrugated Storm Pipe

905.52

S11°05'07"W

1392.56 total

588.85

Former
PCA National, Inc.
7671/148

Title Tract Four

18' 10' setback

Variable Width Right of Way

Matthews Township Parkway

20' Buffer (Plat Book 23/313)

30' Buffer (Plat Book 29/718)

30' driveway easement

existing concrete curb

nail found

178.91

S01°21'55"E

15' driveway easement

N88°46'34"E

187.10

Pizzagalli Properties, LLC
9968/599

IA-1/SS-12
IA-2
IA-3/SS-13
IA-4
IA-5/SS-14
IA-6
IA-7/SS-18
IA-8
IA-9
IA-10/SS-4
IA-11/SS-1
IA-12
IA-13/SS-2
IA-14
IA-15/SS-5
IA-16/SS-6
IA-17
IA-18/SS-7
IA-19/SS-8
IA-20/SS-9
IA-21/SS-10
IA-22/SS-16
IA-23/SS-19
SS-3
SS-11
SS-17
IA-BG/SS-15
BG-2/SS-20
BG

BATHROOM DRAINS (MULTIPLE)
FLOOR DRAIN
SINK DRAIN
TRENCH DRAIN
JANITORIAL SUPPLY CLOSET
ROOF DRAIN
UTILITY TRENCH
POSSIBLE DRAIN LINE
STORAGE
"FLOOR CLEANING MACHINE" (GROUND LEVEL)
"FLOOR CLEANING MACHINE" (BASEMENT)
CLEANOUT
WATER LINE
NATURAL GAS LINE?

INTERIOR SPACE USE

- OCCUPIED - OFFICE SPACE/WAREHOUSE
- OCCUPIED - RECREATION (GYM)
- VACANT - OFFICE SPACE
- VACANT - OPEN AREA/WAREHOUSE

GRAPHIC SCALE

50 0 25 50 100 200

( IN FEET )
1 inch = 50 ft.

| REVISIONS | | |
|---|---|---|
| REV. | DATE | COMMENTS |
| | | |
| | | |
| | | |
| | | |

SHIELD ENGINEERING
4301 TAGGART CREEK ROAD
CHARLOTTE, NC 28208
704-394-6913
www.shieldengineering.com
License No. F-0856

| | |
|---|---|
| PROJECT#: | 1030214 |
| DATE: | 09/02/21 |
| PROJECT MGR: | WB |
| CHECKED BY: | DAS |
| DRAWN BY: | KJC |
| SCALE: | 1" = 50' |

# CONBRACO
## CONBRACO INDUSTRIES, INC
MATTHEWS, NORTH CAROLINA

PROPOSED INDOOR AIR AND SUB-SLAB VAPOR INTRUSION SAMPLING POINTS

FIGURE 4

C:\USERS\JGAMERTSFELDER\SHIELD ENGINEERING\PROJECTS - ACTIVE PROJECTS\1030214 MATTHEWS COMPLAINT & COMPLIANCE ORDER\DAS\FIGURES\PROPOSED IAW & SG LOCATIONS UPDATED 2021-09-20 FOR WORD.DWG

# TABLES

**Table 1 - Summary of Analytical Results - Groundwater**
**701 Matthews-Mint Hill Road**
**Matthews, Mecklenburg County, North Carolina**
**Project ID: 1030214-04**

| Analytical Method ---> | | | EPA Method 8260D | | | | | | EPA Method 6020B | | | | YSI Pro Plus | | | | | Hanna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte/Field Parameter ---> | | | Chloroform | cis-1,2-Dichloroethene | trans-1,2-Dichloroethene | Tetrachloroethene | Trichloroethene | All other VOCs | Copper | Iron | Lead | Zinc | pH | Specific Conductivity | Temperature | ORP | DO | Turbidity |
| **Sample ID** | **Media** | **Date Collected (m/dd/yyyy)** | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | s.u. | µs/cm | °C | mV | mg/L | NTU |
| MW-A | Groundwater | 1/19/2021 | ND | ND | ND | ND | ND | ND | 3.2 | **4720** | 0.17 | 18.9 | **6.14** | 91.5 | 19.3 | 170.3 | 5.06 | 38.20 |
| | | 4/20/2021 | ND | ND | ND | ND | ND | ND | ND | **1420** | ND | ND | **6.11** | 70.8 | 20.3 | 18.3 | 4.46 | 9.70 |
| | | 8/5/2021 | ND | ND | ND | ND | ND | ND | 11.0 | **15000** | ND | 68.9 | **6.21** | 52.6 | 22.3 | 185.6 | 4.06 | 12.10 |
| MW-B | Groundwater | 1/19/2021 | ND | ND | ND | ND | **59.4** | ND | 5.6 | **1240** | 0.4 | 17.6 | **5.16** | 44.1 | 19.5 | 210.2 | 4.63 | 8.49 |
| | | 4/20/2021 | ND | ND | ND | **1.1** | **84.4** | ND | 11.2 | **2500** | 1.2 | 32.9 | **5.13** | 43.1 | 20.5 | -50.8 | 1.40 | 9.40 |
| | | 8/5/2021 | ND | ND | ND | **1.1** | **84.4** | ND | ND | **1280** | ND | 11.4 | **6.35** | 37.9 | 23.9 | 111.8 | 3.61 | 4.23 |
| Dup-1 (MW-B) | Groundwater | 1/19/2021 | ND | ND | ND | ND | **62.9** | ND | 4.8 | **875** | 0.29 | 15.2 | **5.16** | 44.1 | 19.5 | 210.2 | 4.63 | 8.49 |
| MW-C | Groundwater | 1/19/2021 | ND | **175** | 1.1 | ND | **53.0** | ND | ND | 173 | ND | ND | **5.82** | 147.9 | 18.6 | 191.6 | 5.72 | 3.20 |
| | | 4/20/2021 | ND | **165** | 1.4 | ND | **50.7** | ND | ND | 205 | ND | ND | **5.82** | 141.4 | 20.6 | 19.6 | 3.53 | 5.80 |
| | | 8/5/2021 | 3.0 | **189** | 2.1 | ND | **61.6** | ND | ND | 176 | ND | ND | 6.52 | 149.2 | 22.6 | 136.2 | 2.92 | 4.82 |
| Dup-1 (MW-C) | Groundwater | 4/20/2021 | ND | **166** | 1.4 | ND | **48.7** | ND | ND | 231 | ND | ND | **5.82** | 141.4 | 20.6 | 19.6 | 3.53 | 5.80 |
| Dup-1 (MW-C) | Groundwater | 8/5/2021 | 3.0 | **187** | ND | ND | **60.8** | ND | ND | 166 | ND | ND | 6.52 | 149.2 | 22.6 | 136.2 | 2.92 | 4.82 |
| MW-D | Groundwater | 1/19/2021 | ND | ND | ND | ND | ND | ND | 0.92 | 297 | 0.15 | 9.9 | **5.42** | 58.0 | 16.2 | 219.7 | 6.60 | 9.80 |
| | | 4/20/2021 | ND | ND | ND | ND | ND | ND | ND | 282 | ND | 13.6 | **5.33** | 61.5 | 19.3 | 42.0 | 6.05 | 7.30 |
| | | 8/5/2021 | ND | ND | ND | ND | ND | ND | ND | **406** | ND | 17.0 | **5.54** | 37.7 | 22.1 | 234.2 | 4.61 | 9.89 |
| MW-E | Groundwater | 8/5/2021 | ND | ND | ND | ND | **183** | ND | NS | NS | NS | NS | **4.47** | 67.4 | 23.4 | 73.2 | 5.29 | 8.37 |
| MW-F | Groundwater | 8/5/2021 | ND | ND | ND | **263** | **47900** | ND | NS | NS | NS | NS | **5.22** | 31.9 | 25.3 | 246.5 | 4.89 | 42.20 |
| MW-G | Groundwater | 8/5/2021 | ND | **4960** | ND | **252** | **23300** | ND | NS | NS | NS | NS | **4.03** | 33.9 | 23.1 | 92.2 | 6.34 | 5.05 |
| MW-H | Groundwater | 8/5/2021 | ND | **701** | ND | ND | **1270** | ND | NS | NS | NS | NS | **4.59** | 81.5 | 24.4 | 108.5 | 4.80 | 5.12 |
| MW-I | Groundwater | 8/5/2021 | 26.3 | **120** | ND | ND | **903** | ND | NS | NS | NS | NS | **4.17** | 38.9 | 24.6 | 134.1 | 3.75 | 6.66 |

**Table 2 - Summary of Analytical Results - Groundwater**
**701 Matthews-Mint Hill Road**
**Matthews, Mecklenburg County, North Carolina**
**Project ID: 1030214-04**

| Analytical Method ---> | | | EPA Method 8260D | | | | | | EPA Method 6020B | | | | YSI Pro Plus | | | | | Hanna |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Analyte/Field Parameter ---> | | | Chloroform | cis-1,2-Dichloroethene | trans-1,2-Dichloroethene | Tetrachloroethene | Trichloroethene | All other VOCs | Copper | Iron | Lead | Zinc | pH | Specific Conductivity | Temperature | ORP | DO | Turbidity |
| **Sample ID** | **Media** | **Date Collected (m/dd/yyyy)** | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | µg/L | s.u. | µs/cm | °C | mV | mg/L | NTU |
| Rinsate Blank | Water | 1/19/2021 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NS | NS | NS | NS | NS | NS |
| Trip Blank | Water | 1/19/2021 | ND | ND | ND | ND | ND | ND | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Rinsate Blank | Water | 4/20/2021 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NS | NS | NS | NS | NS | NS |
| Trip Blank | Water | 4/20/2021 | ND | ND | ND | ND | ND | ND | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| Rinsate Blank | Water | 8/5/2021 | ND | ND | ND | ND | ND | ND | ND | ND | ND | ND | NS | NS | NS | NS | NS | NS |
| Trip Blank | Water | 8/5/2021 | ND | ND | ND | ND | ND | ND | NS | NS | NS | NS | NS | NS | NS | NS | NS | NS |
| *NC 2L Standards (µg/L)* | | | **70** | **70** | **100** | **0.7** | **3** | **Varies** | **1000** | **300** | **15** | **1000** | **6.5 - 8.5** | **NE** | **NE** | **NE** | **NE** | **NE** |

Notes:
VOCs = Volatile Organic Compounds
All concentrations reported in micrograms per liter (µg/L), except field parameters measured with the YSI Pro Plus meter and Hanna meter
ND = Not Detected at or above laboratory reporting limits
NE = Not Established
NS= Not Sampled
s.u. = Standard Units
ORP = Oxidation Reduction Potential
DO = Dissolved Oxygen
µs/cm = microsiemens per centimeter
mV = millivolts
mg/L = milligrams per liter
NTU = Nephelometric Turbidity Units
**Bolded values** exceed the NC 2L Standards
Underlined values exceed the NC Gross Contaminant Levels (GCLs)

# APPENDIX A

## CONCEPTUAL SITE MODEL CHECKLIST

The information included in this checklist may be useful for developing a site-specific conceptual migration model and in planning soil gas sampling. The investigator may use this checklist to compile information for each site.

### Utilities and Process Piping

√ Locate and map out all underground utilities near the soil or groundwater impacts. Pay particular attention to utilities that connect impacted areas to occupied buildings.

*See details in attached Workplan and Appendix B.*

√ Locate and map out all underground process piping near the soil or groundwater impacts.

*See details in attached Workplan and Appendix B.*

### Buildings (Receptors)

√ Locate and map out existing and potential future buildings.

*See Figure 2 attached to Workplan. Potential future buildings are unknown.*

√ Identify the occupancy and use of the buildings (e.g., residential, commercial). You may need to interview occupants to obtain this information.

*Commercial, occupants are approximately 50 adult workers predominantly located in the southern, northern, and western perimeters of the building.*

√ Describe the construction of the building including materials (e.g., wood frame, block), openings (e.g., windows, doors), and height (e.g., one story, two story, multistory). Determine whether there is an elevator shaft in the building.

*Building is concrete and cinder block construction with many windows and doors. Due to sloping ground elevation differences, part of the building (approximately 4,400 square feet) has two floors.*

√ Describe the foundation construction:

- Type (e.g., basement, crawl space, slab on grade)

  *Slab*

- Floor construction (e.g., concrete, dirt)

  *Concrete*

- Depth below grade

*Not applicable (N/A)*

√ Describe the HVAC system in the building:

- Type (e.g., forced air, radiant)

  *Forced air. Approximately 40 roof units.*

- Equipment location (e.g., basement, crawl space, utility closet, attic, roof)

  *Roof.*

- Source of return air (e.g., inside air, outside air, combination)

  *Unknown.*

- System design considerations relating to indoor air pressure (e.g., positive pressure is often the case for commercial buildings)

  *Unknown. To be sampled under normal operating conditions.*

√ Describe sub-slab ventilation systems or moisture barriers present on existing buildings, or identify building- and fire-code requirements for sub-slab ventilation systems (e.g., for methane) or moisture barriers below foundations.

*None known to be present N/A.*

**Source Area – *To be completed after the monitoring well installations and sub-slab sampling.***

Locate and map out the source area for the vapor-phase contaminants related to the subsurface vapor intrusion pathway.

*To be determined.*

_ Describe the presence, distribution, and composition of any NAPL at the site.

*None known to be present N/A.*

Identify the vapor-phase contaminants that are to be considered for the subsurface vapor intrusion pathway.

*Chlorinated volatile organic compounds.*

Describe the status and results for the delineation of contamination in environmental media, specifically soil and groundwater, between the source area and the potential impacted buildings.

*To be determined.*

Describe the environmental media (e.g., soil, groundwater, both) containing contaminants. Groundwater.

Describe the depth to source area.

*Unknown/to be determined.*

Describe the potential migration characteristics (e.g., stable, increasing, decreasing) for the distribution of contaminants.

*Unknown/to be determined.*

**Geology/Hydrogeology – *To be completed after the monitoring well installations and sub-slab sampling.***

Review all boring logs, monitoring well construction, and soil sampling data to understand the following:

- Heterogeneity/homogeneity of soils and the lithologic units encountered and the expected/observed contaminant migration:
    - Depth and lateral continuity of any confining units that may impede contaminant migration
    - Depth and lateral continuity of any highly transmissive units that may enhance contaminant migration
- Depth of vadose (unsaturated) zone, capillary fringe, and phreatic (saturated) zone:
    - Note any seasonal water table fluctuations and seasonal flow direction changes (hydraulic gradient).
    - Note the depth interval between the vapor source and the ground surface.
    - Note the presence of any perched aquifers.
    - Note where the water table intersects the well screen interval or the presence of submerged screen.

Describe distinct strata (soil type and moisture content, e.g., moist, wet, dry) and the depth intervals between the vapor source and ground surface.

Describe the depth to groundwater.

Describe groundwater characteristics (e.g., seasonal fluctuation, hydraulic gradient).

**Site Characteristics –** ***To be completed after the monitoring well installations and sub-slab sampling.***

Estimate the distance from edge of groundwater plume to building.

Determine nearby potential sources.

Estimate the distance from vapor source area to building.

Describe the surface cover between the vapor source area and the potentially impacted building.

# APPENDIX B

# INDOOR AIR BUILDING SURVEY
# and SAMPLING FORM

Site Name: Conbraco ID#: NCD107868812

Preparer's name: Wes Barfield Date: 06/02/2021

Preparer's affiliation: Shield Engineering Phone #: 704-394-6913

## Part I - Occupants

Building Address: 701 Matthews-Mint Hill Road, Matthews, NC 28105

Property Contact: Eric Miller Owner / Renter / other: Property Manager

Contact's Phone: home ( ) work (704) 849-9203 cell (704) 614-3707

# of Building occupants: Children under age 13 ____ Children age 13-18 ____ Adults Approx. 50

## Part II – Building Characteristics

Building type: residential / multi-family residential / office / strip mall / commercial / (industrial)

Describe building: Cinder block structure with many additions Year constructed: Original portion - 1958

Sensitive population: day care / nursing home / hospital / school / other (specify): No

Number of floors below grade: 0 (full basement / crawl space / slab on grade)

Number of floors at or above grade: One (limited two floor portion)

Depth of basement below grade surface: NA ft. Basement size: NA $ft^2$

Basement floor construction: concrete / dirt / floating / stone / other (specify): NA

Foundation walls: (poured concrete / cinder blocks) / stone / other (specify) ____

Basement sump present? *Yes* / (*No*) Sump pump? *Yes* / *No* NA Water in sump? *Yes* / *No* NA

Type of heating system (circle all that apply):

(hot air circulation) hot air radiation wood steam radiation
heat pump hot water radiation kerosene heater electric baseboard
other (specify): Approximately 40 roof units

Type of ventilation system (circle all that apply):

central air conditioning (mechanical fans) bathroom ventilation fans
individual air conditioning units kitchen range hood fan outside air intake
other (specify): Approximately 40 roof units

Type of fuel utilized (circle all that apply):

(Natural gas) / (electric) / fuel oil / wood / coal / solar / kerosene

Are the basement walls or floor sealed with waterproof paint or epoxy coatings? *Yes / No*

NA.

Is there a whole house fan? *Yes / (No)* Numerous fans in facility

Septic system? *Yes / Yes (but not used) / (No)*

Irrigation/private well? *Yes / Yes (but not used) / (No)*

Type of ground cover outside of building: (grass) / (concrete) / (asphalt) / other (specify) Stone

Existing subsurface depressurization (radon) system in place? *Yes / (No)* *active / passive*

Sub-slab vapor/moisture barrier in place? *Yes / (No)*

Type of barrier: _____

## Part III - Outside Contaminant Sources

TC Transcontinental (700 Crestdale Rd)

Facility Systems Services, Inc. (930 Matthews-Mint Hill Rd)

Other stationary sources nearby (gas stations, emission stacks, etc.): Sell Ethics (941 Matthews-Mint Hill Rd)

Heavy vehicular traffic nearby (or other mobile sources): Yes

## Part IV – Indoor Contaminant Sources

Identify all potential indoor sources found in the building (including attached garages) and crawlspace (if present), the location of the source (floor and room), and whether the item was removed from the building 48 hours prior to indoor air sampling event. Any ventilation implemented after removal of the items should be completed at least 24 hours prior to the commencement of the indoor air sampling event.

| Potential Sources | Location(s) | Removed (Yes / No / NA) |
|---|---|---|
| Gasoline storage cans | No | NA |
| Gas-powered equipment | No | NA |
| Kerosene storage cans | No | NA |
| Paints / thinners / strippers | Yes - SG-6/IA-6 Main Floor west-central portion | No |
| Cleaning solvents | Yes - Janitorial and degreasers*, west-central and northeast portion | No |
| Oven cleaners | No | No |
| Carpet / upholstery cleaners | Yes, carpet "dry cleaning machine"- southwest lower floor | No |
| Other house cleaning products | Yes | No |
| Moth balls | No | NA |
| Polishes / waxes | Suspected - southeast area | No |
| Insecticides | Plastic pest control boxes in central portion | No |
| Furniture / floor polish | Suspected | No |
| Nail polish / polish remover | Suspected | No |
| Hairspray | Suspected | No |
| Cologne / perfume | Suspected | No |
| Air fresheners | In restrooms | No |
| Fuel tank (inside building) | No | NA |
| Wood stove or fireplace | No | NA |
| New furniture / upholstery | Yes. Southwest portion | No |
| New carpeting / flooring | Yes. Southwest portion | NA |
| Hobbies - glues, paints, etc. | Yes. Southwest portion | No |

*Including Trichloroethene

Part V – Miscellaneous Items

Do any occupants of the building smoke? *Yes* / (No) Not Inside How often? _____

Last time someone smoked in the building? Unknown hours / *days* *ago*

Does the building have an attached garage ~~directly connected to living space~~ not a living space? *Yes* / *No* West-central side of building

If so, is a car usually parked in the garage? *Yes* / *No* Sometimes

Are gas-powered equipment or cans of gasoline/fuels stored in the garage? *Yes* / (No)

Do the occupants of the building have their clothes dry cleaned? (Yes) / *No* Suspected

If yes, how often? weekly / monthly / 3-4 times a year Unknown

Do any of the occupants use solvents in work? (Yes) / *No*

If yes, what types of solvents are used? Degreasers - west-central portion of building

If yes, are their clothes washed at work? *Yes* / (No)

Have any pesticides/herbicides been applied around the building or in the yard? (Yes) / No

If so, when and which chemicals? Monthly. Perimeter and Restrooms

Has there ever been a fire in the building? (Yes) / *No* If yes, when? Outside Transformer within last month

Building was previously a foundry

Has painting or staining been done in the building in the last 6 months? *Yes* / (No)

If yes, when _____ and where? _____

Part VI – Sampling Information - To be completed during sampling

Sample Technician: _____ Phone number: ( ) _____ - _____

Sample Source: Indoor Air / Crawlspace Air / Sub-Slab / Near Slab Soil Gas / Exterior Soil Gas

Sampler Type: Tedlar bag / Sorbent / Stainless Steel Canister / Other (specify): _____

Analytical Method: TO-15 / TO-17 / other: _____ Cert. Laboratory: _____

Sample locations (floor, room):

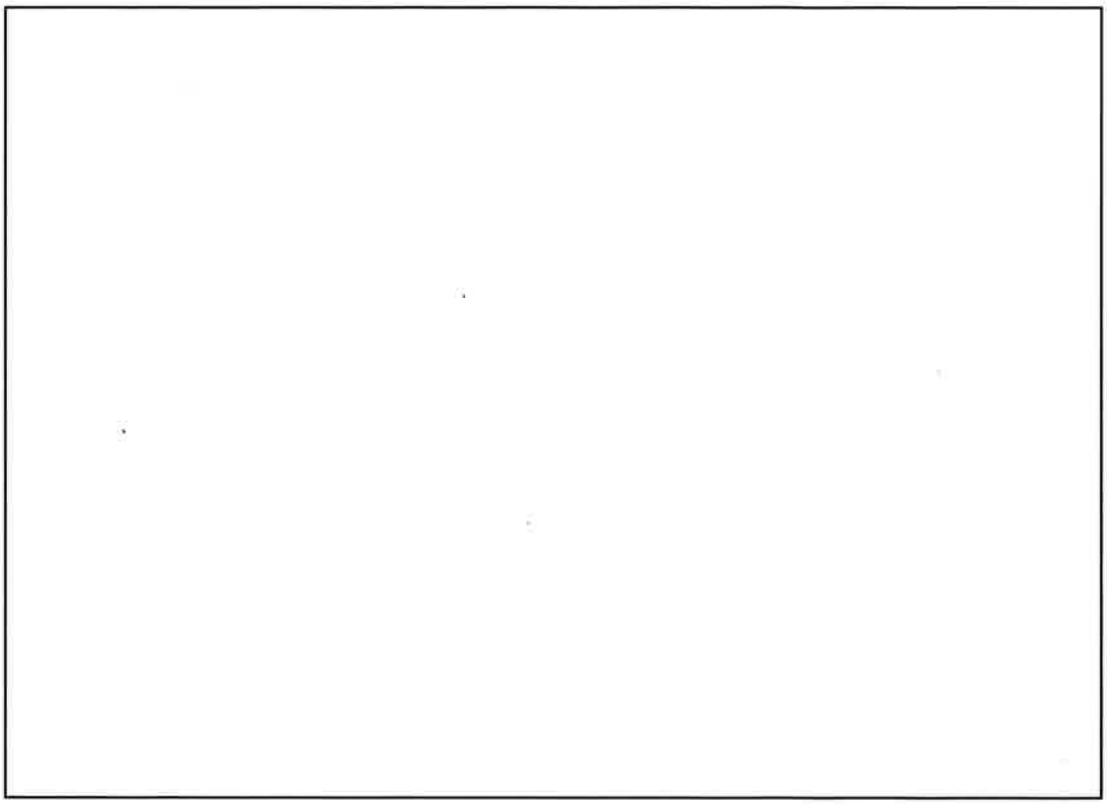
Field ID # _____ - _____ Field ID # _____ - _____

Field ID # _____ - _____ Field ID # _____ - _____

Were "Instructions for Occupants" followed? *Yes* / *No*

If not, describe modifications: _____

*Provide Drawing of Sample Location(s) in Building*



Part VII - Meteorological Conditions

Was there significant precipitation within 12 hours prior to (or during) the sampling event? *Yes / No*

Describe the general weather conditions: _____

_____

Part VIII – General Observations

Provide any information that may be pertinent to the sampling event and may assist in the data interpretation process (e.g., observed that drycleaner operated with door or windows propped open for ventilation).

_____

_____

_____

(Adapted from the NJDEP Vapor Intrusion Guidance, October 2005)

# APPENDIX C

# Instructions for Occupants
# Indoor Air Sampling Events

In order to collect an indoor air sample in your structure that is both representative of indoor conditions and avoids the common sources of background air contamination associated with household activities and consumer products, the Division of Waste Management (DWM) requests your assistance.

**To the extent possible, please follow the instructions below starting at least 48 hours prior to and during the indoor air sampling event:**

- Operate your heating and/or whole-house air conditioner as appropriate for the current weather conditions
- Do not use wood stoves, fireplaces or auxiliary heating equipment
- Do not open windows or keep doors open
- Avoid using window air conditioners, fans or vents
- Do not smoke in the building
- Do not use air fresheners or odor eliminators
- Do not use paints or varnishes (up to a week in advance, if possible)
- Do not use cleaning products (e.g., bathroom cleaners, furniture polish, appliance cleaners, all-purpose cleaners, floor cleaners)
- Do not use cosmetics, including hair spray, nail polish remover, perfume, etc.
- Avoid bringing freshly dry-cleaned clothes into the building
- Do not engage in indoor hobbies involving the use of solvents
- Do not apply pesticides
- Do not store containers of gasoline, oil or petroleum-based or other solvents within the building or attached garages (exception: fuel oil tanks)
- Do not operate or store automobiles in an attached garage
- Do not operate gasoline-powered equipment within the building, attached garage or around the immediate perimeter of the building

You will be asked a series of questions about the structure, consumer products you store in your building, and household activities typically occurring in the building. These questions are designed to identify "background" sources of indoor air contamination. While this investigation is looking for a select number of chemicals related to the subsurface contamination, the laboratory may be analyzing the indoor air samples for a wide variety of chemicals. Thus, tetrachloroethene used in dry cleaning or acetone found in nail polish remover might be found in your sample results.

Typical air sampling equipment

Your cooperation is greatly appreciated.
If you have any questions about these instructions, please feel free to contact:

_____

_____

(Adapted from NJDEP Vapor Intrusion Guidance, October 2005)