



**Phoenix  
Environmental**

Consultants – Geologists - Scientists

**Phase 2 Environmental Site Assessment  
Former Keystone Printing  
882 Stout Lane  
Knockemstiff, Ohio 45601**



**Phoenix Project No. 2015-1234**

**Prepared for:**

BTF2, Ltd.

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**THIS REPORT HAS BEEN INTENTIONALLY ALTERED.  
NAMES OF CLIENTS, ADDRESSES, BUSINESSES,  
PHOTOS AND OTHER CLIENT-PRIVILEGED  
INFORMATION HAVE BEEN CHANGED TO PROTECT  
THE CLIENT.**

**RE: Limited Phase 2 Environmental Site Assessment  
Former Keystone Printing Property  
882 Stout Lane, Knockemstiff, OH 45601  
Phoenix Project No.: 2015-1234**

Dear Mr. MacFly:

## INTRODUCTION

As you requested, Phoenix Environmental, LLC (Phoenix), has conducted a Limited Phase 2 environmental site assessment (Phase 2 ESA) and report on behalf of the seller Mr. Biff Tannen of the Former Keystone Printing property at 882 Stout Lane, Knockemstiff, Ohio (hereinafter referred to as the "Site" or "Property"). Phoenix previously performed a Phase 1 ESA of the Property for Dr. Emmett Brown (Phoenix project number 2013-0916, report issued December 31, 2013), which indicated several on-Site Recognized Environmental Conditions (RECs), these included the following:

- Based on observations made during Phase 1 ESA site reconnaissance, an asphalt patch cut-out area was observed in the parking lot west of building 2. The owner was unaware of the reason for this asphalt patch area. Although the Site was not listed in the underground storage tank (UST) or leaking underground (LUST) databases, Bureau of Underground Storage Tank Regulations (BUSTR) did not maintain UST records until the mid-1980's. Based on industrial/manufacturing use of the Site since the 1960's and considering that asphalt patch areas similar to the one observed on-site may potentially indicate the former presence of a UST, this represents a REC to the Site.
- Based on observations made during the site reconnaissance, areas of chemical storage and significant staining were observed. According to the owner interview, the Site utilized a septic system until approximately 15 years ago. Based on this information, and considering the past use of the Site as an industrial printing facility for the past 30+ years, this represents a REC to the Site.
- Based on information provided by the Ohio Environmental Protection Agency (OEPA) on May 14, 1985, a citizen reported seeing twenty-five 5-gallon buckets containing various types of unknown waste chemicals disposed in a storm drain. The report also indicated that the previous owner has been in trouble with the OEPA several times for hazardous

waste problems. Based on the use of the Site as an industrial printing facility and the information provided in the OEPA report, past reported activities associated with this SPILLS database listing represents a REC to the Property.

The purpose of the Phase 2 ESA was to assess the presence or absence of chemicals of concern (COCs) in media (soil, groundwater and soil-gas) below the Property, as well as ascertain, if possible, if a UST or former UST were on the Property.

### **SCOPE OF SERVICES**

Based on the information available, Phoenix performed the following scope of services to meet the project objectives:

- Prior to drilling on the Site, Phoenix's subcontracted drilling firm contacted the Ohio Utility Protection Service (OUPS) and submitted a utility locate request for the Property;
- Phoenix engaged a geophysical subcontractor to conduct a geophysical survey in order to determine if evidence of current or historical USTs were evident at the Property;
- Phoenix supervised the activities of our drilling subcontractor during subsurface sampling to assess for impacts from past operations on the Site;
- Phoenix collected soil, groundwater and soil-gas samples from borings onsite;
- Phoenix reviewed and interpreted the received laboratory chemical analysis results, and compared results to applicable Ohio Voluntary Action Program (VAP) and/or BUSTR action levels for the analyzed compounds; and,
- Based on the findings of this scope of work, Phoenix prepared this written report. The report includes descriptions of the geophysical survey, soil borings, sampling and sample handling methods, tabulated analytical results, our observations, and interpretations of the assessment findings.

### **SITE DESCRIPTION**

The Site consists of an irregular-shaped Property comprised of two parcels, which total approximately 6.62 acres in size. Currently, the Site is developed with two buildings; a former printing/ office building (building 1) and a warehouse building (building 2), both constructed in 1968. The structures are one story in height, the printing/office building comprises a total of approximately 25,000 square feet of building space and the warehouse building comprises a total of approximately 8,000 square feet of building space. The printing/office building is bordered to the north, west and south by asphalt-paved parking lots and drives, the warehouse building is bordered in all directions by asphalt-paved parking lots and drives, and the balance of the Site consists mainly of landscaped areas. A telecommunications tower compound roughly 100'x100' and consisting of a monopole communications tower, equipment shelter and associated equipment is also located near the southwestern corner of the Site.

The Site is bound to the north by Stout Lane, beyond which is a vacant lot and D. Jones Manure Hauling; to the east by HUVr Tech., an electric skateboard manufacturer; to the south by the Hill Valley Surrogate Parenting Center, beyond which is vacant agricultural land; and, to the west by Domino's Hardware.

The United States Geological Survey (USGS), Knockemstiff Quadrangle 7.5 minute series topographical map was reviewed for this ESA. This map was published by the USGS in 1991. According to the contour lines on the topographical map, the Site is located approximately 1010 feet above mean sea level (MSL). The contour lines in the area of the Site indicate the area is sloping gently northwest toward an unnamed tributary.

The Site is identified in **Appendix A - Topographic Map**. Locations of samples collected are noted in **Appendix A - Sample Location Map**.

### **SITE GEOLOGY**

The Property is situated within the Interior Plains, in the south central area of the Central Lowlands physiographic province, and the Till Plains section of the State of Ohio. The Property is on the western edge of the Mad River Interlobate Plain boarding the Southern Ohio Loamy Till Plain. The Property sits on the outwash terrace of Hill's Creek. The surface geology consists of loamy, high-lime Wisconsinan age till, sand, and gravel outwash (Brockman, 1998) of an estimated depth between 0-30 feet.

### **GEOPHYSICAL SURVEY**

Phoenix subcontracted Grumman Exploration (Grumman) of Columbus, Ohio to perform a geophysical survey of the suspected UST area on the west side of the southern building at the Property. Additionally, Grumman conducted geophysical scans around the perimeters of the buildings and within the suspected septic leachfield on the east side of the Property.

The surveys were conducted on February 2, 2015. Complications and obstructions at the Property included the metal building siding, several reinforced concrete pads, several debris piles and icy ground conditions. The GPR system consisted of a Geophysical Survey Systems, Inc. (GSSI) SIR-3000 and 400 MHz antenna. EM scans were performed using a GSSI GEM-300 to help explore for large buried metallic objects or structures. The results of the surveys were noted in the field, marked on the ground surface.

Coincident anomalous EM 'metal' responses and strong GPR reflections were observed south of the southeast sector of the main building on site. The strengths and lateral extents of the strong EM 'metal' (in-phase) and GPR responses is consistent with the type of response that has been observed over underground storage tanks (USTs) at similar sites throughout the United States. The interpreted metal structure this location is believed to represent a single metal UST. The UST has an east-west aligned axis and appears to be approximately 10-ft long with a diameter on the order of 5-ft to 6.5-ft. An open fill port is located at the west end of the interpreted UST. No evidence of pipes leading to other areas were noted aside from an electrical conduit visible inside the fill port.

No anomalous strong EM in-phase responses were noted elsewhere within the investigation area. Isolated, small EM 'metal' responses were observed east of the garage building; these responses may represent metal storm drain grates, manhole covers and/or pieces of metal debris. No clear indication of backfilled excavations or former basements were noted within the investigation area, including a rectangular-shaped grassy area on the west side of the garage building (this was

the area identified as a potential UST area within the Phase 1 ESA report). Pipe responses were observed on the GPR records throughout the area between the two buildings and on the west side of the main building. Most of these appear to correspond to storm and sanitary sewer, electric, gas and similar utility piping. No clear indication of piping was observed east of the main building in the reported vicinity of a possible former septic leach field.

The GPR response in the region surrounding the southern garage building showed minimal signal attenuation effects. This response is favorable for GPR signal penetration and an interpretation of the GPR scans suggests a shallow layer of sand and gravel throughout the southern third of the Property.

**Appendix B** provides a photograph log of the GPR study area. A copy of Grumman's report is provided as **Appendix C**.

### **SOIL SAMPLING**

On February 2, 2015, Phoenix's drilling subcontractor (Enviro-Core of Plain City, Ohio) installed nine soil borings at the Site. Boring logs are presented in Appendix D. Phoenix selected boring locations based on information from the Phase 1 ESA, utility locations and geophysical survey results.

The geoprobe direct push borings (identified as EB-1 through EB-9) were advanced with 4-foot long sampling tubes with individual disposable acetate liners to collect soil samples. Soil samples were collected continuously from the ground surface to depths up to 18 feet below ground surface or (bgs). Groundwater was encountered in each boring with the exception of EB-9.

Soils encountered generally consisted of fill underlain by native clay sand and gravel soils which was generally comprised of brown to dark brown to dark gray clay-silt with varying amounts of sand and gravel. Fill soils were present from ground surface 9 feet bgs except in B-4 which encountered apparent granular UST backfill. Native sand and gravel was encountered in B-5 at 9 feet bgs. Water seepage was present between 6 feet to 12 feet below ground surface in each boring with the exception of EB-9 which did not encounter water seepage. Additionally, two borings were installed in the printing press room; however, due to the unusual thickness of the concrete (~24 inches) these borings were not able to be completed. As such, no soil or groundwater samples were collected within this area.

Soils consisted of 4-inches to 6-inches of non-native topsoil from grade or beneath surface pavements (asphalt or concrete) beneath which were fill soils generally consisting of sand and gravel with varying amounts of clay and silt. Native soils beneath general consisted of sand and gravel underlain by clayey soils with the exception of borings EB-1 and EB-9 which encountered clayey soils followed by sand and gravel then clayey soils. Water seepage was present at depths ranging from 6 feet to 12 feet bgs.

Soil samples from each 2-foot interval were placed into food-grade, re-sealable plastic bags for headspace screening with a Mini-Rae 3000 photoionization detector (PID) with a 10.6 electro-volt lamp. The PID is capable of detecting some VOC, and is used as a screening tool in selecting



samples for laboratory analysis. The bagged samples were allowed to volatilize for 10 to 15 minutes. Then, the tip of the PID was placed into the sample bag and a reading was taken for approximately 10 seconds. The PID detected VOC concentrations [ranging from 0.0 parts per million, (ppm) to a maximum reading of 6.0 ppm] in the soil samples screened. The PID readings are shown on the attached boring logs. No visual or olfactory evidence of impacts were observed in the borings. A copy of the PID calibration record is included in **Appendix E**.

Phoenix selected the sample with the highest PID reading for laboratory chemical analysis from the borings. Soil samples for volatile organic compounds (VOCs) were collected using a Terra Core sampler. This sampling method uses a disposable plastic tool to collect 5 gram samples of soil which are preserved in the field in order to reduce VOC loss. One 5 gram sample was extruded into a 40 ml vial preserved with methanol and two samples were extruded into two 40 ml vials preserved with sodium bisulfate. PAHs and TPH were collected into two 4-ounce unpreserved glass jars. RCRA 8 metals were collected in select locations into a 2 ounce unpreserved glass jar. Lastly, soils for total solids analysis were collected from each sample location into two 2-ounce glass jars. Following sample collection, the samples were immediately placed in an ice-filled cooler for preservation.

#### **GROUNDWATER SAMPLING**

After the completion of each boring, with the exception of EB-4 (which encountered low PID readings) and EB-9 (which did not encounter water), Phoenix advised Enviro-Core personnel to install a 1-inch diameter temporary PVC monitoring well in the boring. A grab groundwater sample was collected using new vinyl tubing and a stainless steel check ball sampler. Phoenix collected two 40 milliliter (ml) vials and sealed with zero head space with hydrochloric acid preservative for VOC analysis, three unpreserved 40 ml vials for PAH analysis and a 500 ml plastic jar preserved with nitric acid for RCRA 8 metals analysis from each sample location (EB-1 through EB-3 and EB-4 through EB-8), with the exception of EB-8 which did not produce sufficient quantity for metals analysis. Immediately following sample collection, the groundwater samples were placed in an ice-filled cooler for preservation.

#### **SOIL GAS SAMPLING**

To assess the vapor intrusion pathway, four soil vapor points (SG-1 through SG-4) were installed on the Property. Soil gas points were installed on February 2, 2015 by Enviro-Core to determine VOC sub-slab vapor concentrations on the Site. Phoenix personnel oversaw these sub-slab vapor point installations. SG-1 through SG-3 were installed in main building (building 1) and SG-4 was installed in the southern building (building 2). They were installed by drilling a 5/8-inch diameter hole through the slab with a hammer drill and approximately 1-inch into the underlying soil to form a void. The drill bit was removed and the hole was brushed free of debris with a bottle brush. Following this, the lower end of Vapor Pin™ assembly was placed into the drilled hole. A protective, plastic cap was placed over the pin and it was tapped into place using rubber hammer.

After installation Vapor Pins™, Phoenix used a MSA Altair 5x four gas meter to purge each soil vapor point for 60 seconds and to measure the concentrations of VOCs, oxygen, hydrogen sulfide and carbon monoxide. PID readings ranged from 3.1 ppm to 28.1 ppm. Oxygen levels in each point decreased from ambient concentrations (20.8%) indicating an adequate surface seal. After

allowing the sub-slab vapor points to equilibrate, Phoenix set up a 6-liter Summa canister at each point. The Summa canisters were collected to the Vapor Pin™ using new teflon tubing with a small piece of new silicone tubing. Phoenix opened the Summa canister regulator valve, recorded the vacuum present and allowed the Summa to collect samples for 60 minutes. After the sample collection was complete, Phoenix personnel recorded the remaining vacuum, turned the Summa canister valve to off and replaced the brass nut. The sub-slab vapor sample canisters were labeled and placed in the laboratory supplied shipping container. A chain of custody label was affixed to the box and it remained under Phoenix control until it was shipped to the laboratory. A copy of the MSA Altair 5x four gas meter calibration record is included in **Appendix E**.

### **LABORATORY ANALYSIS**

Phoenix maintained custody of the soil, groundwater and sub-slab vapor samples from time of collection until they were picked up for shipment by Federal Express. Samples were shipped under strict chain of custody protocol to ESC Laboratories in Mt. Juliet, Tennessee. ESC analyzed the soil samples from EB-1 through EB-7 for VOCs by US EPA Method 8260, Total Petroleum Hydrocarbons – Diesel Range Organics (TPH-DRO) using US EPA Method 8015M, Polynuclear Aromatic Hydrocarbons (PAHs) using US EPA Method 8270 and RCRA 8 Metals using US EPA Method 6010 and 7074. ESC analyzed soil sample EB-8 for VOCs and RCRA 8 Metals, and soil samples EB-9 for VOCs. Groundwater from temporary wells EB-1 through EB-3 and EB-5 through EB-8 for VOCs, PAHs and RCRA 8 Metals, with the exception of EB-5 and EB-8 which were only analyzed for VOCs and PAHs. The sub-slab vapor samples from SG-1 through SG-4 were analyzed for VOCs using method US EPA Method TO-15V. A copy of ESC's analytical results and chain of custody forms are included in **Appendix G**.

### **SOIL ANALYTICAL RESULTS**

Laboratory analysis indicated no detections of PAHs or TPH C12-C34 compounds above laboratory method detection levels or applicable Ohio VAP Generic Direct Contact Soil Standards (GDCSS) or Ohio Bureau of Underground Storage Tank Regulation (BUSTR) action levels.

Total Petroleum Hydrocarbons (TPH) Diesel Range Organics (DRO) (C6-C12), several RCRA 8 Metals and PAHs were detected in soils. The concentrations present were below their respective Ohio VAP GDCSS or BUSTR action levels. Soil analytical data are shown in **Appendix F - Table 1 (Soil Analytical Results)**.

### **GROUNDWATER ANALYTICAL RESULTS**

Phoenix compared groundwater analytical results with BUSTR groundwater ingestion action levels and Ohio EPA VAP generic unrestricted potable use standards (GUPUS). No PAHs were detected above the laboratory method detection limits. Various metals were detected in groundwater (arsenic, mercury, barium, chromium and lead) above their respective Ohio VAP GUPUS; however, due to the nature of the groundwater sampling (grab samples from temporary wells), these metal impacts appeared to be due to soil entrainment and likely do not reflect actual metals concentrations in groundwater. One VOC, tetrachloroethylene (also, known as perchloroethylene, "Perc" or PCE) was present in groundwater at the central portion of the building at a concentration of 0.02 milligrams per liter (mg/L) which exceeds the Ohio VAP standard of 0.005 mg/L. Groundwater analytical data is presented in **Appendix F - Table 2 (Groundwater Analytical Results)**.

### **SOIL GAS ANALYTICAL RESULTS**

Numerous VOCs (including elevated concentrations of PCE) were detected in sub-slab vapor sampled in both buildings above their respective generic screening levels. The comparison of the sub-slab vapor results with the generic screening levels are presented in **Appendix F - Table 3 (Soil-Gas Analytical Results)**. Based on the results, screening levels are exceeded for VOCs.

### **FINDINGS & CONCLUSIONS**

Phoenix has completed a limited Phase 2 at the subject Property. The purpose of the Phase 2 was to evaluate subsurface conditions related to the former use of the Property as an industrial printing facility, a Spill report in 1993, historic use of a septic leachfield and a suspected UST west of building 2. In order to evaluate these environmental concerns, a total of nine borings were completed at the subject Property for the collection of soil and groundwater, four Vapor Pins™ were installed to investigate VOC sub-slab vapor concentrations and a geophysical survey was conducted.

A geophysical survey conducted at the Property indicated the likely presence of a UST on the Property south of building 1. The UST has an east-west aligned axis and appears to be approximately 10-ft long with a diameter on the order of 5-ft to 6.5-ft. The size of the UST was not directly determinable but it is likely between 1,000 to 4,000 gallons in size. Two soil and groundwater samples were collected proximal to the suspected tank. Impacts in soil or groundwater were not detected.

The soil and groundwater results from this investigation were compared with their applicable Ohio BUSTR action levels and Ohio VAP standards. Laboratory analysis of soils indicated no detections of PAHs or TPH C12-C34 compounds above laboratory method detection limits or applicable Ohio VAP Generic Direct Contact Soil Standards (GDCSS) or Ohio Bureau of Underground Storage Tank Regulation (BUSTR) action levels. Total Petroleum Hydrocarbons (TPH) Diesel Range Organics (DRO) (C6-C12), several RCRA 8 Metals and PAHs were detected in soils. The concentrations present were below their respective Ohio VAP GDCSS or BUSTR action levels.

Phoenix compared groundwater analytical results with BUSTR groundwater ingestion action levels and Ohio EPA VAP generic unrestricted potable use standards (GUPUS). No PAHs were detected above the laboratory method detection limits. Various metals were detected in groundwater (arsenic, mercury, barium, chromium and lead) above their respective Ohio VAP GUPUS; however, due to the nature of the groundwater sampling (grab samples from temporary wells), these metal impacts appeared to be due to soil entrainment and likely do not reflect actual metals concentrations in groundwater. One VOC, tetrachloroethylene (also, known as perchloroethylene, "Perc" or PCE) was present in groundwater at the central portion of the building at a concentration of 0.026 milligrams per liter (mg/L) which exceeds the Ohio VAP standard of 0.005 mg/L.

Numerous VOCs including elevated concentrations of PCE were detected in sub-slab vapor sampled in both buildings above their respective generic screening levels.



## **RECOMMENDATIONS**

Based on the results of this limited Phase 2 investigation, further investigation is needed to determine the specific source and extent of the VOC impacts in soil and groundwater. Although RCRA 8 Metals exceeded GUPUS in groundwater, these concentrations appear to be attributable to soil particle entrainment.

Numerous VOCs including elevated concentrations of PCE were detected in sub-slab vapor sampled in both buildings above their respective generic screening levels. Additional evaluation is required to determine if the indoor air exceedances from sub-slab vapor are a concern to building occupants.

The UST encountered on the Property should be removed in accordance with Ohio's Bureau of Underground Storage Tank Regulations (BUSTR) UST closure requirements at Ohio Administrative Code 1301:7-9-12. Soils and groundwater proximal to the UST did not exceed their respective BUSTR action levels or VAP standards.

Phoenix appreciates the opportunity to serve you on this project. Please contact Phoenix if you have any questions, or need additional services.

Respectfully submitted,

**Phoenix Environmental, LLC**

Jeff Paetz, PG, VAP-CP #315  
President, Senior Geologist

Jeffrey Hullinger, PE, VAP-CP #214  
Senior Review

Appendices: Appendix A - USGS Topographic Map  
Boring Location Map  
Appendix B - Geophysical Survey Photograph Log  
Appendix C - Grumman Geophysical Survey Letter Report  
Appendix D - Soil Boring Logs (EB-1 to EB-9)  
Appendix E - Equipment Calibration Records  
Appendix F - Table 1 - Soil Analytical Results  
Table 2 - Groundwater Analytical Results  
Table 3 - Soil-Gas Analytical Results  
Appendix G - ESC Analytical Report and Chain of Custody Forms