Lead Abatement Oversight, Confirmatory Investigation, and Reporting

1213 South High Street
Bloomington, Indiana 47401

Prepared for:
Fire Chief Jason Moore
Bloomington Fire Department
300 East Fourth Street
Bloomington, Indiana 47408

Prepared by:
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Date:
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Project Number:
21-83

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December 10, 2021

Mr. Jason Moore, Fire Chief
Bloomington Fire Department
300 East Fourth Street
Bloomington, Indiana 47408

RE: **Lead Abatement Oversight, Confirmatory Investigation, and Reporting**
1213 South High Street
Bloomington, Indiana 47401
VET Project No. 21-83

Dear Mr. Moore:

VET Environmental Engineering, LLC (VET) was retained by Fire Chief Jason Moore on behalf of the Bloomington Fire Department (BFD) to provide Lead Abatement Oversight, Confirmatory Investigation, and Reporting in response to impacts created by a controlled burn event at 1213 South High Street, Bloomington, Indiana (Site) conducted by BFD from November 2 through 5, 2021. VET provided lead abatement oversight and confirmatory investigation for lead abatement services provided by Environmental Assurance Company, Inc. (EACI). VET coordinated abatement activities with EACI and conducted confirmatory sampling of exterior surfaces, air, soil, and leaves to verify adequacy of abatement activities at the Site and in the neighborhood west of the Site (Neighborhood).

The following report details EACI and VET's methodologies and discusses analytical results and recommendations. This report documents all work performed at the Site to date. All deliverables, analytical reports, and other pertinent documentation generated are included as attachments to this report. Data tables and exhibits are provided to aide in understanding of work performed to date and are referenced in the body of the narrative.

Respectfully,

Sara R. Hamidovic, MS, PE, CHMM
President/CEO

Lead Abatement Oversight, Confirmatory Investigation, and Reporting

1213 South High Street
Bloomington, Indiana 47401

VET ENVIRONMENTAL ENGINEERING, LLC PROJECT NO. 21-83

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1.0 EXECUTIVE SUMMARY

VET was retained by Fire Chief Jason Moore on behalf of the BFD to provide Lead Abatement Oversight, Confirmatory Investigation, and Reporting in response to impacts created by a controlled burn event at 1213 South High Street, Bloomington, Monroe County, Indiana (Site) conducted by BFD from November 2 through 5, 2021. A controlled burn is an intentional demolition of a structure through use of fire. Fire departments use controlled burns as live training opportunities to ensure firefighters are prepared and qualified for emergency fire response. The Site owners donated existing structures on-Site to the BFD to utilize in a live training session for BFD personnel. It was determined by BFD that a barn on-Site was too close to property lines to utilize safely as a training tool. BFD focused training solely on the residential household on-Site. BFD conducted multiple iterations of intentional burns inside the structure to simulate different response scenarios. The training exercise culminated on November 5, 2021 when the entire structure was set ablaze.

In accordance with Title 326 of the Indiana Administrative Code (IAC) Article 4-1 (326 IAC 4-1), Indiana's Open Burning Law, BFD submitted an application to the Indiana Department of Environmental Management (IDEM) to request a variance from 326 IAC 4-1 for fire training. IDEM approved BFD's request for variance on September 17, 2021. IDEM's approval for the variance is included in **Attachment 1**. IDEM inspected the structure on August 31, 2021 pursuant to the approval and provided a checklist of items to remove prior to the planned exercise. These items included asphalt roofing, vinyl siding, floor coverings, and other materials deemed inappropriate for open burning. Lead-based paint (LBP) was not included on the checklist provided. According to 326 IAC 4-1, the open burning of LBP is not prohibited. BFD removed materials with the potential to contaminate the environment that were specified in the IDEM approval, such as asbestos-containing and mercury-containing materials, and disposed of them in accordance with 329 IAC 10 and 329 IAC 11.

The fire training exercise at the Site occurred from November 2, 2021 to November 5, 2021. Small intentional fires were set within the structure and extinguished as part of the training. The training culminated on November 5, 2021 when the entire structure was set on fire. As the fire burned, ash and other debris, including visible paint chips, were transported to the residential neighborhood west of the burn site (Neighborhood) due to prevailing wind conditions. In response to a complaint of potential contamination from the ash and other debris from the fire, BFD administration immediately contacted IDEM and the Monroe County Emergency Management Office (MCEM) to report the issue. IDEM conducted a visual inspection of the Neighborhood, noting the areas with visible paint chips on a map. Mr. Scott Frosch, IDEM's representative, utilized a portable x-ray fluorescence (XRF) analyzer to confirm the presence of LBP. IDEM determined the boundaries of the potentially affected properties with a walkthrough of the Neighborhood, taking note of visible debris and plotting corresponding GPS points. The City of Bloomington Housing and Neighborhood Development Department (HAND) conducted confirmatory wipe sampling utilizing Pro-Lab brand surface lead test kits to assist in delineating potentially affected properties in the area, results for which are included in **Attachment 2**. BFD created a map of impacted properties and proceeded to initiate a contract to complete abatement on the properties delineated by IDEM and HAND. The map included an immediate zone, secondary zone, and outlying zone. According to the map, 110 properties were impacted by the fire. Nine of these properties were in the immediate zone, 38 properties were in the secondary zone, and the remaining 63 properties were in the outlying zone. Zones were delineated based on visible density of paint chips on surfaces.

EACI was contracted on November 9, 2021, to perform abatement activities. EACI is a United States Environmental Protection Agency (USEPA) certified lead abatement company (#LBP-113361-2).

VET was contracted on November 9, 2021 to provide lead abatement oversight, confirmatory investigations, and reporting. VET's oversight included coordination of abatement activities with EACI, area air sampling during abatement activities, and confirmatory soil sampling following abatement. VET provided two Indiana licensed lead inspectors, Mr. Justin Kohl (#IND001972) and Ms. Rene Lloyd, MS, MPA (#IND001985) to perform contracted services. VET collected 13 area air samples, 33 XRF samples, 56 confirmatory soil samples, and two leaf litter samples during the ten-day abatement period.

During VET's initial visit to the Site on November 9, 2021, VET observed visible paint chips in the Neighborhood ranging in color from white to off-white and ranging in size from less than one eighth of an inch to three inches. VET utilized a Vanta ® x-ray fluorescence (XRF) analyzer to conduct initial screening for LBP on visible paint chips throughout the abatement process. XRF results were later utilized as a tool to determine the presence or absence of LBP on surfaces abated by EACI. VET utilized these results to guide further abatement as needed. Personal and area air monitoring were used to ensure safety was maintained for workers and residents throughout the abatement process. Soil sampling locations were biased toward the investigative areas representing the worst-case scenario. Soil sampling was conducted to ensure deposited LBP chips did not contribute to concentrations of lead in soil exceeding applicable published regulatory screening criteria. During abatement activities, paint chips were intermingled with leaf litter due to considerable leaf fall caused by rain and wind on November 11 and 12, 2021. VET subsequently sampled leaf litter to guide further abatement, handling, and disposal methodologies.

Samples were biased toward the worst-case scenario with regard to human exposure where possible. VET considered the likelihood of soil ingestion primarily by children in outdoor play areas and dermal exposure as in vegetable and flower gardens, possible duration of exposure, and the presence of bare soil when selecting sample locations. Therefore, VET biased samples toward locations such as vegetable gardens, playgrounds, and walking paths where exposure was more likely.

Paint chips deposited in the Neighborhood as a result of the controlled burn were confirmed to be LBP. EACI removed visible paint chips from impacted properties and cleaned horizontal surfaces where lead dust may have accumulated. Abatement activities conducted by EACI were adequate to ensure that, at the time of sampling, no lead was detected in air samples in the vicinity of abatement activities. VET confirmed that, following abatement and at the time of sampling, lead detections in soil did not exceed the applicable regulatory screening criteria. Following abatement by EACI, VET's analysis of frequently touched exterior surfaces did not exhibit levels of lead that constitute LBP. Leaf litter collected in the Neighborhood did not exhibit detections of lead. All lead abatement and confirmatory sampling was conducted in accordance with applicable published guidelines. The analytical testing performed is considered a snapshot of the particular surfaces and materials tested at the time the sampling was performed. It is VET's professional opinion that further investigation of lead contamination at the Site is not warranted.

2.0 LEAD CONTAMINATION BACKGROUND

Lead is a naturally occurring, bluish-gray metallic element. It is reported that the amount of lead in the environment today is over 100 times greater than in prehistoric times. Humans have extracted lead from the Earth's crust for thousands of years and for countless anthropogenic applications increasing the amount of lead in the surficial environment. The increased presence of lead in the environment has increased human exposures to lead through time. The United States uses about 50 percent of the world's lead. Lead has a number of modern commercial and industrial uses to include the production of chemicals, paints, glazes, dyes, insecticides, solder, plumbing, ammunition, explosives, match heads, fishing sinkers, divers' suits and shoes, radioactive shielding, pewter products, and gasoline (Leonard, 2009). Lead was

historically used as an additive in paint to accelerate drying, improve durability, and add moisture resistance. However, use of LBP was outlawed and largely ceased in the United States in 1978 due to its harmful effects. The USEPA and the U.S. Department of Housing and Urban Development (HUD) define LBP as paint exhibiting more than one milligram per square centimeter (mg/cm^2) lead in paint coating an analyzed surface, and lead-containing paint (LCP) as surfaces exhibiting less than 1 mg/cm^2.

In IDEM's 2017 Technical Guidance Document, *Background Lead and Arsenic in Surface Soils*, the background lead concentration surveyed ranged between 12 and 260 milligrams of lead per kilogram of soil (mg/kg), with a median of 32.5 mg/kg (IDEM, 2017). Background concentrations of metals in soils are caused by naturally occurring metals and anthropogenic sources. Historical anthropogenic sources of lead in soils include LBP paints and stains used on older homes before the Consumer Product Safety Commission (CPSC) banned the use of LBP in 1978, residual contamination from leaded gasoline along roadsides, industrial activity, or other historic lead containing household products.

3.0 NEIGHBORHOOD LEAD BACKGROUND

Within the affected Neighborhood delineated by BFD, 98% of the 110 households were constructed before 1978 according to Monroe County Geographic Information System (GIS) records. VET personnel observed several homes in the Neighborhood with exterior paint in deteriorated conditions exhibiting both flaking and peeling and, in some cases, observed paint chips falling to the surrounding ground and other surfaces (**Attachment 3**, **Photos 10** – **11**). Due to the age of the affected households, there is a likelihood of historic LBP or LCP use on the exterior of the homes. The presence of lead in soil in the Neighborhood prior to the controlled burn event cannot be ruled out.

The Association for State and Territorial Health Officials (ASHTO) Indiana Lead Census Tract Risk Map is a resource that rates census tracts based on a tiered risk level for Child Lead Exposure (Meade, 2016). Demographics such as "Black Population" and "Percent of Children Under Age 6 in Poverty", and age of homes such as those "Pre-1940 Built Homes" and "Homes Built 1940-1949" are factored into IDEM's ratings. The levels of risk are Lowest, Low, Moderate, High, and Highest. Examples of Highest Risk include historic neighborhoods in Indianapolis, Fort Wayne, and Evansville where older homes and young children living in impoverished conditions coexist. With 37.7% of homes in the Neighborhood built before 1949, IDEM rates this census tract as a Low Risk of Child Lead exposure. The data indicates that 12.5% of "Children Under Age 6 in Poverty" reside in the Neighborhood which is included in the lowest category for "Percent of Children Under Age 6 in Poverty" in the study. The levels of risk consider the "Percent of Children Under Age 6 in Poverty", "Pre-1940 Built Homes", and "Homes Built 1940-1949". The relatively low percentage of children living in poverty in the Neighborhood suggests that the Neighborhood is considered "Low Risk" and not "Lowest Risk" primarily due to the age of the homes and the likelihood of existing LBP.

There are no known studies or stand-alone analytical data specific to background concentrations of soil lead levels in the Neighborhood. VET's confirmatory sampling approach therefore was intended to assess for the presence or absence of abnormal concentrations of lead in soil on properties that may have been caused by impacts from the controlled burn. Analytical results are compared to both the documented range of background soil lead levels in Indiana (IDEM, 2017) and applicable published regulatory screening criteria.

4.0 REGULATORY FRAMEWORK

Lead is regulated by state and federal agencies to reduce human exposure from LBP in housing, contaminated commercial and industrial sites, and workplace exposures. Due to the atypical and acute nature of the potential lead exposure from the November 2021 controlled burn, VET incorporated a wide range of screening criteria to be as representative and conservative as possible in the investigation on the residential properties in the Neighborhood as requested by BFD.

The USEPA promulgated Hazard Standards and Clearance Levels for Lead in Paint, Dust, and Soil in 40 CFR Part 745 under authority of the Toxic Substances Control Act (TSCA) section 402 (USEPA, 2001). Lead abatement is an activity designed to permanently eliminate LBP hazards in target housing and child occupied facilities. The manner in which LBP chips were deposited from the controlled burn on November 5, 2021 in the Neighborhood was not from a targeted lead abatement activity, such as scraping or removing LBP from the interior or exterior of a structure. Still, the USEPA Hazard Levels provide a regulatory framework for this atypical abatement situation. However, since there were no measurements of lead dust on surfaces or lead in soil prior to the controlled burn event, sampling of these media can only provide confirmation of presence or absence of lead at certain concentrations. No comparison can be made to conditions prior to the controlled burn event as preexisting lead concentrations were not quantified and are unknown.

The Occupational Safety and Health Administration (OSHA) regulates safe work practices to reduce worker exposure to lead in their *Occupational Safety and Health Standards* for lead (OSHA, 2020). EACI personnel donned appropriate PPE including Tyvek suits, booties, respirators, rubber gloves, and eye protection. EACI utilized personal air monitors to ensure workers were not exposed to lead particulates at levels exceeding OSHA standards. VET area air sampling was intended to rule out the possibility of residents' exposure to lead containing particulates in the air resulting from disturbance during abatement activities, and to inform recommendations for resident safety. Analytical results from EACI and VET's air samples are compared to the OSHA Action Level and Permissible Exposure Limit (PEL). An OSHA Action Level is a concentration designated in 29 CFR 1910 for a specific substance, calculated as an eight-hour time weighted average, which when reached initiates required protections for workers. The OSHA PEL is an occupational exposure limit that indicates the maximum exposure, as an eight-hour time weighted average, that a worker can be exposed to a certain substance as indicated in 29 CFR 1910.1025 (OSHA, 2020). These screening criteria are not directly applicable for residents, primarily the elderly and children, as the criteria apply to OSHA regulated workplaces. However, these criteria are the only readily available published guidelines for comparison to analytical results observed in the Neighborhood.

XRF readings collected by VET are compared to the standard definition of LBP as utilized by the USEPA and HUD (2012). There is no USEPA hazard level for exterior surfaces such as those that were cleaned by EACI for the purpose of removing lead dust. The XRF analyzer utilized by VET can detect lead in paint at levels as low as 0.0001 mg/cm^2 with a detection confidence of 99.7%. The XRF analyzer readings are in units of mg/cm^2. The results for various paints can then be classified as LBP or LCP. In context of the Site, the XRF was utilized as a rapid, accurate, non-destructive, inexpensive screening tool to establish relative lead concentrations from location to location. The XRF provided real-time analytical results that guided further abatement activities and additional sampling as warranted.

The IDEM Remediation Closure Guide (RCG) is IDEM's system for describing selected approaches to investigation and risk-based closure of contaminated or potentially contaminated sites as prescribed in Indiana Code (IC) 13-12-3-2 and IC 13-25-5-8.5 (IDEM, 2012). IDEM RCG Screening Levels (SLs) are concentrations of chemicals in soil or groundwater that the IDEM Office of Land Quality

(OLQ) has determined are acceptable under specific conditions. The SLs for each pollutant are developed to be protective of certain processes on or uses of a property, such as Residential Migration to Groundwater (MTG), Direct Contact Commercial/Industrial, Direct Contact Excavation, and Direct Contact Residential scenarios. Analytical results from VET's soil samples are compared to the most stringent USEPA Hazard Levels for bare soils and IDEM's 2021 RCG SLs. The City of Bloomington provides water to the properties in the Neighborhood. Groundwater is therefore not expected to be used nor is the Residential MTG SL applicable to the Neighborhood. VET included the Residential MTG SL solely to provide comparison to the most conservative available SL.

The Resource Conservation and Recovery Act (RCRA) Toxicity Characteristic (TC) Rule applies to hazardous waste management. RCRA requires a Toxicity Characteristic Leaching Procedure (TCLP) analytical test be performed on waste materials to determine whether materials must be handled and disposed as hazardous waste (USEPA, 1980). TCLP analysis was required by the landfill anticipated to accept the collected leaf litter to determine whether it would constitute hazardous waste once aggregated for disposal as part of normal seasonal cleanup in the Neighborhood. The TCLP analysis was conducted for leaf litter to inform handling, containerizing, and disposal methodologies, if required based on analytical results.

4.1 SELECTED SAMPLING APPROACH

VET's selected sampling approach was informed by the map of affected properties provided by BFD and the pathways for lead exposure that pose the greatest risk to residents in the Neighborhood. VET focused investigations on children's play areas, vegetable gardens, footpaths, and flower beds where human exposure to lead in soil would be most likely due to a combination of bare soil and likelihood of human contact. HAND conducted confirmatory wipe sampling utilizing Pro-Lab brand surface lead test kits and did not detect lead dust on any of the locations sampled, as displayed in **Attachment 2**. VET investigated exterior surfaces on porches, children's toys in yards, and seating areas as they would be likely sources of exposure to settled lead dust. Based on the regulatory screening criteria and the observed conditions on the properties where EACI conducted abatement, VET incorporated air, exterior surface, soil, and leaf litter analyses into the confirmatory investigation.

VET provided two Indiana licensed lead inspectors, Mr. Justin Kohl (#IND001972) and Ms. Rene Lloyd, MS, MPA (#IND001985) to conduct oversight and sampling activities. Copies of Mr. Kohl's and Ms. Lloyd's certifications are included as **Attachment 6**. Licensed Lead Inspectors are authorized by the Indiana Department of Health (IDOH) to conduct surface-by-surface investigations to determine the presence of LBP, and to sample for the presence of lead in dust in soil for the purposes of abatement clearance testing.

EACI conducted personal air sampling utilizing pumps for selected abatement workers to monitor worker exposure to lead particulates in the air per OSHA requirements. To gauge the effectiveness of EACI's abatement effort, VET incorporated the regulatory framework outlined in **Section 4.0** of this report into a sampling approach that included air, soil, surface dust, and leaf sampling.

VET conducted area air sampling to determine, at the time of sampling, if lead was present in the air at levels exceeding OSHA standards in the vicinity of abatement activities. VET area air sampling was intended to rule out the possibility of residents' exposure to lead containing particulates in the air resulting from disturbance during abatement activities, and to inform recommendations for resident safety. VET collected air samples in accordance with the requirements for analysis by NIOSH Method 7082. VET collected a total of 13 area air samples throughout the ten-day abatement period.

VET conducted XRF analysis of frequently touched exterior surfaces to determine the loading levels of lead dust. VET biased XRF reading locations away from painted or stained surfaces that could have LBP. VET utilized a portable XRF analyzer to collect readings on exterior surfaces on several properties subsequent to completion of EACI's abatement activities. XRF analysis was utilized due to its speed, accuracy, and non-destructive attributes to determine if lead-based paint (LBP; ≥1 mg/cm^2) or lead-containing paint (LCP; <1 mg/cm^2) was present on surfaces cleaned by EACI. XRF instruments are frequently used to determine the presence or absence of LBP on painted or stained substrates. The XRF can also detect the presence of dust on soft surfaces such as carpets, furniture, and draperies (Bero, 1993). VET utilized the XRF to assess for the presence or absence of lead dust at the XRF's detection level of 0.0001 mg/cm^2. The XRF was used as a screening tool to assess lead area concentrations as loading in units of mg/cm^2. VET collected 33 XRF readings throughout the ten-day abatement period.

VET conducted soil sampling to determine, at the time of sampling, if lead was present at concentrations exceeding USEPA and IDEM criteria in surface soils where humans would have direct contact. VET biased soil samples toward areas of highest observed potential for human lead exposure from surface soil, such as vegetable gardens and children's play areas. If neither of these representative areas were present on a property, VET biased soil samples toward foot paths or bare soil. VET biased soil samples away from the foundations of houses and away from driplines of roofs, to the extent possible, in order to reduce the potential for detection of background lead contamination from historic preexisting LBP contamination. VET collected soil samples from the yards surrounding all homes where permission was granted in the immediate and secondary areas of BFD's map in order to determine the extent of possible lead contamination. Soil sampling was suspended at the secondary area's limit pending receipt of analytical results to determine if further testing was warranted. Visible inspection of the immediate and secondary zones showed a larger concentration of paint chips than that observed in the outlying zone. VET observed paint chips ranging in size from less than one eighth of an inch to three inches in the immediate and secondary zones. In the outlying zone, VET observed sparse distribution of paint chips ranging in size from less than one eighth of an inch to one inch. As such, if analytical results in the immediate and secondary zones did not exceed applicable screening criteria, the outlying zone would not reasonably be expected to exhibit lead concentrations in excess of applicable screening criteria. VET collected a total of 56 grab soil samples, including four duplicate samples, from 47 separate properties in the immediate and secondary zones. VET soil sampling procedures included strict adherence to sampling requirements for metals analysis by USEPA SW-846 Method 6010C.

Due to the considerable leaf fall, VET collected leaf samples for lead concentration and TCLP analyses to inform the City of Bloomington's decisions on leaf disposal in the Neighborhood. VET collected leaf samples in accordance with proper disposal requirements as communicated by Republic Services to facilitate disposal as solid waste. VET collected one leaf sample for analysis by USEPA SW-846 Method 6010C and one leaf sample for TCLP analysis.

The role of Lead Inspectors in the context of the lead abatement, oversight, and reporting services VET was contracted to provide is limited to sampling for the presence of lead in dust and soil. VET conducted area air sampling and a TCLP analysis on leaf litter to rule out the possibility of additional human exposure to levels of lead that exceed applicable screening criteria. VET did not conduct a comprehensive Lead Risk Assessment to determine the existence, nature, severity, and location of all LBP hazards. Abatement and oversight efforts focused on minimizing the potential impact of LBP chips from the controlled burn and assessing for the presence of lead in air, exterior surfaces, soil, and leaves in excess of published regulatory guidelines.

5.0 FIELD METHODOLOGIES

EACI conducted abatement activities from November 9, 2021 to November 19, 2021. EACI and VET conducted abatement and oversight activities only on properties where permission was granted by the property owner. Permission for EACI and VET to conduct abatement and oversight activities on each property was granted by the property owner via an online form submitted to BFD or a wet signature on a BFD-provided form. EACI personnel used HEPA vacuums to collect and remove visible paint chips and wiped down horizontal surfaces with shop towels to remove any dust that may have settled from the fire. EACI personnel wore Tyvek suits, respirators, rubber gloves, and eye protection. EACI utilized the aforementioned abatement methods and appropriate PPE throughout the ten-day abatement period. VET conducted visual inspections and confirmatory sampling of air, exterior surfaces, soil, and leaves to measure the adequacy of EACI's abatement.

Analytical results for air, surface dust, soil, and leaf samples are tabulated in **Tables 1 – 6**, respectively, and are displayed on **Exhibit 4**. Sample identification and corresponding locations are included in the air, soil, and leaf sampling logs in **Attachment 4**. Analytical results of air, soil and leaf sampling are included in **Attachment 5**.

On November 9, 2021, VET and EACI met with Fire Chief Moore in the Neighborhood to conduct a Scope of Work meeting. VET representatives Mr. Justin Kohl and Ms. Rene Lloyd, MS, MPA attended the meeting with Mike Kirkman and Jon Adams of EACI. BFD provided a map with three remediation zones based on determinations made by IDEM and HAND. The map included an immediate zone, secondary zone, and outlying zone. According to the map, approximately 110 properties were impacted by the fire. Nine of these properties were in the immediate zone, 38 properties were in the secondary zone, and the remaining 63 properties were in the outlying zone. EACI commenced abatement activities in the immediate zone on November 9, 2021. The household at 1015 South Covenanter was selected to start abatement services based on visual inspection of the property. VET personnel performed one area air sample (1015C) at the perimeter of abatement activities at 1015 South Covenanter Drive, utilizing a Buck Libra™ (L-4) pump with a 0.8 micrometer (μm) filter cassette.

On November 10, 2021, VET utilized a portable Vanta ® XRF analyzer (S/N 080195) to confirm that a paint chip on the ground surface on East Ruby Lane in the Neighborhood contained LBP (XRF 001). After confirming the presence of LBP through XRF analysis, VET employed the most conservative approach, and determined that further testing of debris from the fire or paint chips in the Neighborhood was unnecessary and proceeded with the assumption that all paint chips on the ground surface constituted LBP. EACI conducted abatement activities at 1015 South Covenanter Drive, 1104 South Covenanter Drive, 1213 South High Street, and 1928 East Ruby Lane targeting paint chips on the ground surface and wiping down horizontal surfaces. VET collected two area air samples at the perimeter of abatement activities at 1104 South Covenanter Drive (A001) and 1015 South Covenanter Drive (A002). VET collected three soil samples from properties within the immediate zone at 1015 South Covenanter Drive (S001), 1104 South Covenanter Drive (S002), and 1212 South High Street (S003).Visitors to the vicinity of abatement activities on November 10, 2021 included Fire Chief Jason Moore at approximately 0900 and a representative from the Monroe County Health Department at approximately 1000.

On November 11, 2021, EACI targeted abatement activities in the immediate and secondary zones, moving west along East Ruby Lane. VET collected three area air samples at the perimeter of abatement activities at 1916 East Ruby Lane (A003), 1918 East Ruby Lane (A004), and 1804 East Ruby Lane (A005). A rain event commencing at approximately 1000 impeded EACI's use of HEPA vacuums until approximately 1520. VET utilized the XRF analyzer on horizontal surfaces at 1928 East Ruby Lane (XRF

002 – XRF 003), 1212 South High Street (XRF 004 – XRF 005), 1015 South Covenanter Drive (XRF 006), 1901 East Ruby Lane (XRF 007) and 1917 East Ruby Lane (XRF 008) to assess for the presence or absence of LBP following completion of EACI abatement. VET walked through the secondary and outlying zones of impacted properties to visually inspect for LBP chips and observed a more sparse distribution of LBP chips in the outlying zone.

On November 12, 2021, EACI targeted abatement activities on properties along East Ruby Lane, South Nancy Street, and East Circle Lane. VET collected two area air samples at the perimeter of abatement activities at 1717 East Circle Drive (A006) and 1601 East Ruby Lane (A007). VET collected soil samples from nine properties in the immediate and secondary zones where EACI abatement was complete. VET collected soil samples from 1212 South High Street (SS-001), 1104 South Covenanter Drive (SS-002), 1015 South Covenanter Drive (SS-003), 1928 East Ruby Lane (SS-004), 1917 East Ruby Lane (SS-005), 1918 East Ruby Lane (SS-006), 1916 East Ruby Lane (SS-007), 1900 East Ruby Lane (SS-008), and 1821 East Ruby Lane (SS-009 and DUP-1). VET utilized the XRF analyzer on horizontal surfaces at 1704 East Ruby Lane (XRF 009 – XRF 012) where EACI abatement was complete. Fire Chief Jason Moore visited the Site at approximately 1200 to discuss the status of the abatement activities.

On November 15, 2021, EACI targeted abatement activities in the immediate and secondary zones on properties along East Marilyn Drive, South Covenanter Drive, and South High Street. VET collected two area air samples at the perimeter of abatement activities at 2001 East Marilyn Drive (A008) and 1904 East Southdowns Drive (A009). VET utilized the XRF analyzer at 2001 East Marilyn Drive (XRF 025 – XRF 028) following abatement completion. VET collected soil samples from 17 properties where EACI abatement was complete. VET collected soil samples from 1901 East Ruby Lane (SS-010), 1100 South Nancy Street (SS-011), 1804 East Ruby Lane (SS-012), 1717 East Ruby Lane (SS-013), 1716 East Ruby Lane (SS-014), 1717 Circle Drive (SS-015), 1712 East Ruby Lane (SS-016), 1708 East Ruby Lane (SS-017), 2017 East Marilyn Drive (SS-018), 2015 East Marilyn Drive (SS-019), 2001 East Marilyn Drive (SS-020), 1925 East Marilyn Drive (SS-021), 1917 East Marilyn Drive (SS-022), 1909 East Marilyn Drive (SS-023), 1901 East Marilyn Drive (SS-024 and DUP-2), 1114 South Nancy Street (SS-025), and 1108 South Nancy Street (SS-026). The City of Bloomington Public Works Department requested by phone that VET collect leaf litter for analysis to determine the proper disposal method for leaves aggregated in the Neighborhood. VET collected a leaf sample (LS-01) for lead analysis within the immediate zone to represent a worst-case scenario of potential lead contamination. Fire Chief Jason Moore visited the Site at approximately 1200 to discuss the initial air sampling results from EACI and VET and to grant permission for abatement activities to commence at the Site.

On November 16, 2021, EACI personnel targeted abatement activities toward properties along East Southdowns Drive and at the Site. VET collected two area air samples at the perimeter of abatement activities at 1904 East Southdowns Drive (A010) and at the Site (A011). VET utilized the XRF analyzer at 1709 Circle Drive (XRF 029 – XRF 033) following abatement completion. VET collected soil samples from 11 properties where EACI abatement was complete. VET collected soil samples from 1005 South Covenanter Drive (SS-027 and DUP-3), 1100 South High Street (SS-028), 1108 South High Street (SS-029), 1006 South Covenanter Drive (SS-030 and SS-031), 1904 East Southdowns Drive (SS-032), 1820 East Southdowns Drive (SS-033), 1814 East Southdowns Drive (SS-034), 1810 East Southdowns Drive (SS-035), 1715 Circle Drive (SS-036), 1709 Circle Drive (SS-037), and 1213 South High Street (SS-038). VET collected a second leaf litter sample (LS-02) to submit for TCLP analysis to determine whether the leaf litter in the Neighborhood would be accepted by Republic Services for disposal.

On November 17, 2021, EACI personnel targeted abatement activities at the Site and on properties in the secondary zone along East Devon Lane, South Longwood Drive, and properties in the outlying area along South Mitchell Street, South Jordan Avenue, and East Southdowns Drive. VET collected one area air sample at the perimeter of abatement activities at the Site (A012). VET collected soil samples from 11 properties where EACI abatement was complete. VET collected soil samples from 1929 East Southdowns Drive (SS-039), 1919 East Southdowns Drive (SS-040), 1821 East Southdowns Drive (SS-041), 1815 East Southdowns Drive (SS-042), 1809 East Southdowns Drive (SS-43), 1805 East Southdowns Drive (SS-044), 1213 South High Street (SS-045), 1109 South Longwood Drive (SS-046 and DUP-4), 1757 East Devon Lane (SS-047), 1200 South Longwood Drive (SS-048), and 1115 South Longwood Drive (SS-049). As of November 17, 2021, soil samples were collected from all remediated properties in the immediate and secondary zones. When EACI began working in the outlying zone, fewer paint chips were visualized relative to the properties in the immediate and secondary zones.

On November 18, 2021, EACI personnel targeted abatement activities on properties in the outlying zone. Visitors to the vicinity of abatement activities on November 18, 2021 included representatives from Indiana University Purdue University Indianapolis (IUPUI) at approximately 1300.

On November 19, 2021, EACI personnel targeted abatement activities on properties in the outlying zone as well as individual properties outside the mapped zones that had reported paint chips on their properties.

A total of 105 properties were evaluated and remediated by EACI during the ten-day abatement period, including the burn Site. There were five properties on the map provided by BFD that did not grant permission for EACI and VET to enter the property. Precipitation events occurred on November 11, 12, 13, 14, 17 and 18, 2021. Precipitation and predominant wind direction data starting on the date of the controlled burn are included in **Attachment 1**. Paint chips were still visible at the Site and throughout the Neighborhood following rain events. Rainfall inhibited abatement activities for EACI and likely washed LBP chips and dust which may have fallen on roofs, gutters, cars, and other outdoor surfaces onto the ground surface. Wind during the abatement activities encouraged considerable leaf fall. The accumulation of leaf litter on the ground surface obscured the LBP chips adding a layer of complexity to abatement activities.

EACI placed all used PPE, disposable equipment, and aggregated LBP chips in bags and deposited them in dedicated containers provided by BFD. The of Bloomington Public Works Department was ultimately tasked with proper disposal of these items.

6.0 SAMPLING METHODS

VET conducted soil and air sampling in accordance with requirements for each analytical method. Air samples were collected in accordance with requirements for Flame Atomic Absorption by the NIOSH Method 7082. NIOSH Method 7082 requires the use of a 0.8 µm filter to collect between 200 L and 1,500 L of ambient air at a flow rate of one to four L/min. VET utilized 0.8 µm filter cassettes and Buck Libra Air Pumps working at two L/min to collect a sufficient volume of air for the samples. Air testing was conducted at the perimeter of EACI's work in the immediate and secondary zones. VET maintained strict COC for each sample from VET's custody to the EMSL Analytical, Inc. (EMSL) laboratory in Indianapolis, Indiana. Blanks were submitted with each sample set for QA/QC purposes. VET collected 13 area air samples during abatement activities. Samples must be shipped within seven weeks of collection and two to ten field blanks must be submitted with each shipment. VET air samples were submitted within two days of sample collection to EMSL Analytical, Inc. (EMSL) in Indianapolis, Indiana. VET maintained strict

COC and prepared accompanying documentation for each sample collected. VET collected air samples in accordance with the sampling requirements for NIOSH Method 7082 analysis and submitted field blanks with the collected samples as prescribed by NIOSH.

VET utilized a portable XRF analyzer to quickly, accurately, and non-destructively measure the area concentration of lead dust on surfaces cleaned by EACI. VET utilized a NIST standard of known concentration and a blank sample during XRF sampling activities to ensure proper analyzer operation and calibration. Once a surface was identified for sampling, the measurement window of the XRF analyzer was applied against the surface and the analyzer was activated for a period of 30 seconds. Sample locations were biased toward unpainted surfaces to prevent interference and high-risk surfaces such as handrails, children's toys or play areas, tables, and benches, as practicable.

Soil samples were collected in accordance with requirements for metals analysis by USEPA SW-846 Method 6010C. VET collected surface soil samples at approximately 0-4 inches below ground surface (bgs). VET collected duplicate samples as a QA/QC measure. Each soil sample was placed into a decontaminated stainless steel bowl and homogenized, then transferred to a four-ounce certified cleaned glass jar. VET collected one leaf sample for analysis by USEPA SW-846 Method 6010C and one leaf sample for TCLP analysis. Leaf litter was collected from the Neighborhood and placed into certified clean glass jars. All leaf and soil samples were placed into iced coolers to maintain appropriate temperature for sample preservation pending analysis. VET maintained strict COC and appropriate documentation for all samples.

Three soil samples were submitted to EMSL, and the remaining soil and leaf samples were submitted to Eurofins Test America Laboratory (Eurofins) in University Park, Illinois. EMSL is a National Voluntary Laboratory Accreditation Program (NVLAP) accredited laboratory. Eurofins is a National Environmental Laboratory Accreditation Program (NELAP) accredited laboratory. VET's sampling protocol minimizes the potential for cross-contamination between samples through use of dedicated equipment and sample bottles, donning new nitrile gloves between samples, decontamination of reusable sampling equipment between samples, and minimizing disturbance of the soil matrix to ensure that soil samples collected were representative of surface conditions. VET's soil sampling was limited to the immediate and secondary zones.

A unique identifier was assigned, and GPS coordinates were recorded for each air, XRF, soil, and leaf sample location utilizing a Trimble GPS Geo7X. Sample locations and other relevant sample data for soil and air samples were recorded in sampling logs (**Attachment 3**). All sample locations, including air, XRF, soil, and leaf on remediated properties are included in **Exhibit 4**.

7.0 ANALYTICAL RESULTS

Air analytical results are compared to the OSHA Action Level and Permissible Exposure Limit for lead in the air. XRF readings are classified as "passing" or "failing" the USEPA and HUD LBP screening level of 1 mg/cm^2. Soil analytical results are compared to USEPA Hazard Levels, as well as IDEM RCG SLs. The current and expected future use of the Neighborhood is for residential purposes. It is VET's professional opinion that the soil direct contact exposure scenario and a residential context are the most applicable of readily available regulatory screening criteria. A leaf sample was collected for TCLP analysis to determine whether leaf litter in the Neighborhood requires classification and management as hazardous waste to inform decisions for proper disposal.

Investigative results generated to date for air, surface dust, surface soil, and leaf samples collected are detailed in the following sections. Analytical results exhibited no lead contamination in excess of OSHA

standards, USEPA Hazard Levels, IDEM RCG SLs, or the published maximum background concentration for Indiana soils. The leaf litter sample did not exhibit hazardous characteristics as determined by TCLP analysis.

7.1 EACI AIR ANALYTICAL RESULTS

No air samples submitted by EACI exhibited exceedances of applicable OSHA limits for lead particulates in the air. As such, no further investigation of lead contamination in air is warranted at the Site. EACI air analytical results are presented in **Table 1**.

7.2 VET AIR ANALYTICAL RESULTS

VET collected a total of 13 area air samples for lead analysis according to requirements for NIOSH Method 7082 metals analysis. No air samples submitted by VET exhibited detections of lead in the air. As such, no further investigation of lead contamination in the air is warranted at the Site. VET air analytical results are tabulated in **Table 2**.

VET collected sample 1015C on November 9, 2021 in the vicinity of abatement activities at 1015 South Covenanter Drive. Sample 1015C did not exhibit a detection, but the detection limit exceeded the OSHA Action Level of 30 µg/m^3. Sample 1015C was collected during the first evening of abatement activities on November 9, 2021. Abatement activities on this date did not extend long enough for collection of a sufficient volume of air to meet the minimum volume required for NIOSH Method 7082 analysis. The laboratory detection limit therefore exceeded the OSHA Action Level.

Analytical results from samples A001-A012 indicate that lead was not present in the air at detectable levels at the time of sampling. The detection limits for the analysis of samples A001-A012 were all below the OSHA Action Level, the more stringent of the two OSHA screening levels.

VET collected area air samples in the vicinity of abatement activities conducted on properties within the immediate and secondary zones in the Neighborhood. Visual inspection of these properties indicated greater impact with visible paint chips. VET collected area air samples to ensure no lead dust above applicable screening criteria was mobilized into the air during abatement activities to ensure worker and resident safety. Based on analytical results from area air samples collected in the immediate and secondary zones, VET concluded that continued monitoring of lead in the air in the remaining sections of the immediate and secondary zones and air monitoring within the outlying zone was not warranted.

7.3 XRF RESULTS

At the onset of the project, sample XRF 001 was collected from a visible paint chip within the immediate zone on November 10, 2021. Sample XRF 001 exhibited a reading of 2.14 mg/cm^2, and thus "failed" the screening for LBP. This reading was used to inform the decision to treat all visible paint chips as LBP.

VET utilized a portable XRF analyzer to quickly, accurately, and non-destructively measure the area concentration of lead on surfaces cleaned by EACI to verify that abatement activities were adequate. All XRF readings collected from locations cleaned by EACI "passed" the 1 mg/cm^2 screening for LBP. As such, no further investigation of lead dust contamination on frequently touched surfaces is warranted. XRF readings are tabulated in **Table 3**.

Three of the XRF readings (XRF 004, XRF 009, and XRF 025) exhibited concentrations of lead that constitute LCP. These samples were collected from a painted mailbox (XRF 004), a boat tarp (XRF 009), and a painted shelf in a carport (XRF 025). The XRF analyzer penetrates multiple layers of paint to

detect lead. It is VET's professional opinion that the lead detections in these three samples represent lead impregnated in the actual substrates or coatings as opposed to settled lead dust.

During abatement activities on November 16, 2021, EACI and VET personnel observed paint chips that differed in appearance from those resulting from the controlled burn. VET observed degraded paint on the soffit and fascia of the house on the property that appeared to be the source of the observed paint chips. VET took an XRF reading on the exterior of the house (XRF 032) and confirmed that the area of paint on the house that was analyzed contained LBP. EACI proceeded with the removal of the observed paint chips following the conservative approach that all visible paint chips in the Neighborhood were to be collected and removed.

7.4 SOIL ANALYTICAL RESULTS

VET collected a total of 56 soil samples including four duplicate samples. All samples were within the published background range of lead in soils according to IDEM's TGD (IDEM, 2017). All samples were below the most stringent IDEM RCG SL (Residential MTG). As such, no further investigation of lead contamination in soil is warranted. Soil analytical results are tabulated in **Table 4**.

7.5 TCLP ANALYTICAL RESULTS

The TCLP analysis performed on the leaf litter in sample LS-02 exhibited no detection of lead, indicating that leachable lead was not present in detectable quantities. As no leachable lead was detected, the leaf litter collected and aggregated for disposal does not constitute hazardous waste. VET provided the analytical results to Republic Services on December 7, 2021.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Paint chips deposited in the Neighborhood as a result of the controlled burn were confirmed to be LBP. EACI removed visible paint chips from impacted properties and cleaned horizontal surfaces where lead dust may have accumulated. Abatement activities conducted by EACI were adequate to ensure that, at the time of sampling, no lead was detected in air samples in the vicinity of abatement activities. VET confirmed that, following abatement and at the time of sampling, lead detections in soil did not exceed the applicable regulatory screening criteria. Following abatement by EACI, VET's analysis of frequently touched exterior surfaces did not exhibit levels of lead that constitute LBP. Leaf litter collected in the Neighborhood did not exhibit detections of lead. All lead abatement and confirmatory sampling was conducted in accordance with applicable published guidelines. The analytical testing performed is considered a snapshot of the particular surfaces and materials tested at the time the sampling was performed. It is VET's professional opinion that further investigation of lead contamination at the Site is not warranted.

VET appreciates the opportunity to provide this report on behalf of BFD. Please do not hesitate to contact us at (812) 822-0400 with any questions or comments.

Respectfully submitted,

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President/CEO

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