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November 20, 2018
File No. 20.0153084.64

NOV 21 2018

Mr. Eric Amadi, Hydrogeologist
Ms. Michelle Norman, Natural Resource Region Program Manager
Wisconsin Department of Natural Resources
2300 North Dr. Martin Luther King, Jr. Drive
Milwaukee, Wisconsin 53212

rwd
NOV 21 2018

Re: Supplemental Vapor Intrusion Sampling and Amendment to Case Closure Package
Caterpillar Global Mining LLC West Forge Shop - Former Bucyrus International Inc.
1100 Milwaukee Avenue
South Milwaukee, Wisconsin
BRRTS Nos. 02-41-577015 and 02-41-256986
FID#: 241008130

Dear Mr. Amadi and Ms. Norman:

As a follow-up to our recent communications and our telephone conversation on September 27, 2018, GZA GeoEnvironmental, Inc. (GZA) is pleased to provide you the following supplemental documentation to support regulatory case closure for the Caterpillar Global Mining LLC (Caterpillar) West Forge Shop ("Shop") located at 1100 Milwaukee Avenue in the City of South Milwaukee, Wisconsin ("Site"). As we have discussed, this response confirms that the additional vapor intrusion (VI) investigation at the Site has been conducted in accordance with the requirements in Wis. Stat.ch. 292 and Wisconsin Administrative Code (WAC) Chapter NR 700 that relate to VI. This document provides the results of the supplemental VI sampling conducted by GZA at the Site in October 2018, as well as supplemental documentation and attachments as requested during telephone and electronic communications that followed the submittal of the comprehensive case closure package to the Wisconsin Department of Natural Resources (WDNR) on March 8, 2018. The review fee has previously been submitted to the WDNR.

BACKGROUND

Based on email communications and discussions with Mr. Amadi and Ms. Norman, three areas of interest were identified following review of the Site closure request, including:

1. Additional VI sampling to more confidently rule out the vapor pathway;
2. Confirmation that industrial closure standards remain applicable for the Site in light of possible redevelopment; and
3. Clarifications of existing figures or additional figures that may assist the WDNR's understanding of Site conditions.

Each of these three items are described in the subsections below.

2018 SUPPLEMENTAL VI SAMPLING ACTIVITIES

Although previous sub-slab VI sampling was conducted to ascertain vapor-phase conditions underlying the Shop, the WDNR requested supplemental VI sampling to target two areas where elevated naphthalene concentrations were previously detected in shallow soil. Prior to conducting the VI sampling, GZA provided a work plan to the WDNR proposing the approach described below, which was verbally approved in a telephone conversation on October 17, 2018.

The Shop is a large industrial building consisting of approximately 25,000 square feet of open floor space with open connections to another large adjacent structure to the east and north. Regular air turnover occurs through the operation of its ventilation and air handling systems. While under typical operating conditions of the ventilation system, GZA performed indoor air sampling under the following protocol:

- Caterpillar recently removed its operations from the Shop, as such, containerized chemicals, oils, and other materials that could interfere with the sampling were removed as part of Caterpillar's relocation to other areas of its adjacent South Milwaukee Campus. Prior to sampling, GZA requested of Caterpillar that the windows be kept closed at least 24 hours prior to sampling and during sampling to minimize contribution from outdoor air.
- Two indoor air samples (WFS-North IA and WFS-South IA) were collected in 6-liter batch-certified SUMMA® canisters over an approximate 8-hour period on October 19, 2018. The WFS-North IA SUMMA® canister was located in the north quadrant and the WFS-South IA SUMMA® canister was located in the south quadrant of the Shop, with the intake approximately 3 feet above floor level.
- One 8-hour background sample (WFS-Background IA) was also collected to obtain outside air concurrent with the indoor air samples. The approximate locations of the three samples are provided on the revised figure B.4.a.
- GZA retrieved the three SUMMA® canisters upon completion of the sample period, confirmed residual pressures, and completed chain-of-custody documentation before shipping to the laboratory for analysis of naphthalene in accordance with United States Environmental Protection Agency (USEPA) Method TO-15. Laboratory analytical reports for the indoor air samples are provided as Attachment C.6.a and the analytical results are summarized on the revised table A.4.

GZA installed three additional sub-slab vapor probes in the Shop in locations where sub-slab sampling had not previously been conducted and the highest concentrations of naphthalene were detected in soil beneath the Shop floor slab. The sub-slab vapor probes were installed as follows:

- A 1½-inch-diameter hole was drilled at least 1¾ inches into the floor slab to facilitate the desired flush-mount vapor probe installations followed by a ⅝-inch diameter hole drilled through the remainder of the floor slab and approximately 1 inch into the underlying soil.
- The hole was cleaned by brushing with a bottle brush to remove loose cuttings from the drill hole and the cuttings removed with a vacuum cleaner.
- A Vapor Pin™ assembly was tapped into the drilled hole using an installation/extraction tool to protect the Vapor Pin™. During installation, the silicone sleeve portion of the Vapor Pin™ assembly forms a slight bulge between the floor slab and the upper threaded portion of the Vapor Pin™. Upon installation of the Vapor Pin™ assembly in the floor slab, a protective cap was placed on the Vapor Pin™ to prevent vapor loss prior to sampling.
- To complete the flush-mount installations, a secure cover was threaded onto the Vapor Pin™. The approximate locations of the three vapor probes (SS-4, SS-5, and SS-6) are provided on revised figure B.4.a.

The sub-slab vapor probes were purged and sampled on October 22, 2018, as follows:

- The protective cap on the sub-slab probes were removed and Teflon tubing was placed on the barb with Swagelok® fitting of the probe and joined to the Teflon sample tubing at the sub-slab probe.
- Prior to sampling, at least five sample train volumes of air were purged from each sub-slab probe using a calibrated MiniRae 3000 photoionization detector (PID) with a 10.6 eV lamp and calibrated to 100 parts per million (ppm) isobutylene. The maximum PID readings were recorded during purging the sub-slab vapor probes.
- After purging with the PID, GZA evaluated for vapor probe leaks using ultra-pure helium as a tracer gas to evaluate the potential for diluting the sub-slab vapor samples with air from above the floor slab. Vapor probe purge air was

pre-screened with a gas meter capable of detecting helium at very low levels (less than 100 parts per million by volume [ppmv]) to evaluate background helium conditions in sub-slab air. A shroud was placed over the sub-slab probe and helium gas was introduced into the shroud until a helium concentration of approximately 100% (1,000,000 ppmv) by volume was achieved in the shroud. Purge air was then screened for helium with the helium-filled shroud in place to evaluate if leakage through the soil-gas probe and fittings was occurring. Significant increases in helium concentrations (greater than 5% of shroud concentration) during purging with the helium-filled shroud in place were not observed.

- A shut-in test was performed to ensure no or minimal leakage through connection in the portion of the sample train outside of the shroud. The shut-in test was conducted by using a vacuum pump to exert a vacuum of at least 5 pounds per square inch (psi) on the sample train. The sample train was considered tight and suitable for sampling if it could maintain the 5-psi vacuum for at least one minute. If the sample train could not maintain a vacuum of at least 5 psi for at least one minute, the sampling train was re-set (tightened fittings, re-set/replace sub-slab probe, etc.) until the shut-in test passed.
- Following purging and system leak testing, sub-slab vapor samples were collected over a period of approximately 15 to 20 minutes using 1-liter SUMMA® canister sampling at a rate of less than 200 milliliters per minute (ml/min). The initial and final canister vacuums were measured and recorded on the chain-of-custody form. If the initial canister pressure was less than 25 psi, the canister was replaced and not used for sampling.
- Sub-slab air samples were analyzed by TestAmerica of Knoxville, Tennessee for analysis of naphthalene in accordance with United States Environmental Protection Agency (USEPA) Method TO-15 (same as the indoor air samples). The laboratory's method detection limit (MDL) for the sub-slab samples was 4.7 micrograms per cubic meter ($\mu g/m^3$). Laboratory analytical reports for the sub-slab vapor samples are provided as Attachment C.6.b. and the analytical results are summarized on the revised table A.4.

Summary of Supplemental VI Sampling Results

The indoor air, background outdoor ambient air, and sub-slab vapor results for naphthalene analysis are below the laboratory MDL and the Vapor Action Level (VAL) or Vapor Risk Screening Level (VRSL) at each of the six sampling locations. The laboratory analytical reports and chain-of-custody forms are provided as Attachment C.6 and the summarized analytical results are presented on the revised table A.4. Based on these findings, no further evaluation of the vapor pathway is warranted.

APPLICABILITY OF INDUSTRIAL CLOSURE STANDARDS

Following its review of the closure request for the Shop, the WDNR expressed concern that Caterpillar's vacancy of the Shop could facilitate a change in land use by the present owner of the South Milwaukee campus resulting in industrial standards not being fully protective of future occupants. As was expressed in telephone conversations with WDNR staff, Caterpillar, in its lease obligations with the owner of the Site, is bound by obtaining closure of environmental conditions under an industrial use scenario, which is consistent with the current zoning of the Site. While Caterpillar has agreed to investigate and close out environmental impacts related to its operations, the terms of its lease with the owner provide the conditions which shall be followed. The following excerpt confirms Caterpillar's obligations under the lease, which it assumed when acquiring Bucyrus in 2010:

> (ii) Scope. The scope of the Tenant's indemnity obligation includes: (A) the cost of any repair, cleanup or detoxification of the Premises to the full extent required by Environmental Laws as such laws are applied to industrial property, except to the extent more specifically limited in this section 5.03(c), (B) the costs incurred by any government entity or third party in responding to the Indemnified Matter, and (C) liability for personal injury or property damage arising under a statutory or common law tort theory. For purposes of this Section 5.03(c), the full extent required by Environmental Laws as such laws are applied to industrial property shall be determined by a court of competent jurisdiction or the governmental agency(ies) having jurisdiction of the Premises and the Indemnified Matter, and the full extent required by Environmental Laws as such laws are applied to industrial property shall be deemed to include industrial uses and such related office or other uses as Bucyrus may engage in on the Premises. Tenant shall be entitled to exercise all rights normally afforded a responsible party, including but not limited to challenging any governmental agency's regulatory interpretation or order.

Under the terms of this lease, should the owner of the property seek redevelopment or a change in use other than under industrial use conditions, it would be obligated to resume communications with the WDNR and ensure there was a commensurate consideration of exposure pathways and cleanup levels that would be consistent with its planned end use. Therefore, further consideration of non-industrial closure standards by Caterpillar does not appear relevant.

UPDATED CLOSURE PACKAGE FIGURES

To document the additional VI sampling and to provide the WDNR with additional perspective on the subsurface physical and chemical conditions underlying the Site, several figures were updated or added to the closure package. The following figures are intended to replace those in the original case closure submittal. Based on the comments received by the WDNR, GZA revised several of the previously submitted case closure figures. The following is a list of the revised figures, which are provided with this letter:

- Attachment B.1.b - Detailed Site Map;
- Attachment B.2.a - Soil Contamination;
- Attachment B.2.a.1 - Total VOC Soil Iso-Con Map (0-4 ft);
- Attachment B.2.a.1 - Total VOC Soil Iso-Con Map (4-20 ft);
- Attachment B.2.a.3 - Total PAH Soil Iso-Con Map (0-4 ft)
- Attachment B.2.a.4 - Total PAH Soil Iso-Con Map (4-20 ft);
- Attachment B.3.a.1 - Geologic Cross-Section (North A to South A');
- Attachment B.3.a.2 - Geologic Cross-Section (Southwest B to Northeast B'); and
- Attachment B.4.a - Vapor Intrusion Map.

Additionally, one figure displaying the naphthalene distribution in shallow soils was created to guide the placement of the sub-slab sampling points and is included as Attachment B.2.a.5. For additional clarification, please also note the following:

1. The direct contact Residual Contaminant Level (RCL) contours depicted on several of the closure figures only include the respective exceedances detected in unsaturated soil between 0 and 4 feet below ground surface (bgs) at the Site.
2. The extent of the proposed cap maintenance area corresponds to the combined limits of detectable free product encountered and the soil RCL exceedances detected in soil during Site investigation activities.
3. The 4400 closure forms previously submitted to the WDNR were updated to include references to the recent sampling data and results. The revised closure forms are attached to this letter.

CONCLUSIONS AND RECOMMENDATIONS

The results of the supplemental VI investigation indicate that the naphthalene for indoor air and sub-slab vapor samples collected within the Shop footprint are below the laboratory MDL, and significantly below the WDNR VAL and VRSL. Based on the results of the October 2018 supplemental VI investigation and the previous sub-slab vapor analytical data collected at the Site, it is GZA's opinion that further assessment or mitigation efforts related to VI at the Site do not appear necessary. With the clarification of Caterpillar's lease obligation to address environmental impacts under an industrial use scenario, we believe the recent requests made by the WDNR have been met with the submission of this case closure amendment document and regulatory case closure of BRRTS Nos. 02-41-577015 and 02-41-256986 is appropriate.

Thank you for your review and consideration of this supplemental documentation and the attachments. Should you have any questions regarding the information contained herein, please feel free to call (262) 424-2042 at your convenience.

Very truly yours,

GZA Geo Environmental, Inc.

Janeé J.L. Pederson, EIT
Environmental Engineer

David G. Bauer, P.G.
Senior Hydrogeologist

John C. Osborne, P.G.
Principal Hydrogeologist

J:\153000to153099\153084 Caterpillar\64 West Forge SI & RAO_2018 Closure Documents_Amendment to Closure Submittal 11-20-2018\
BRRTS 02-41-256986 and 02-41-577015 Closure Amendment Letter_West Forge 11-20-18.docx

Attachments:
Revised Case Closure Forms 4400-202
Revised Attachment A.4 - Vapor Analytical Table
Revised Attachment B Table of Contents
Revised Attachment B.1.b - Detailed Site Map
Revised Attachment B.2.a - Soil Contamination
Revised Attachment B.2.a.1 - Total VOC Soil Iso-Con Map (0-4 ft)
Revised Attachment B.2.a.2 - Total VOC Soil Iso-Con Map (4-20 ft)
Revised Attachment B.2.a.3 - Total PAH Soil Iso-Con Map (0-4 ft)
Revised Attachment B.2.a.4 - Total PAH Soil Iso-Con Map (4-20 ft)
Attachment B.2.a.5 - Naphthalene Isoconcentration Map
Revised Attachment B.3.a.1 - Geologic Cross-Section (North A to South A')
Revised Attachment B.3.a.2 - Geologic Cross-Section (Southwest B to Northeast B')
Revised Attachment B.4.a - Vapor Intrusion Map
Revised Attachment C Table of Contents
Attachment C.6.a - 2018 Indoor Air Laboratory Analytical Report
Attachment C.6.b - 2018 Sub-Slab Vapor Laboratory Analytical Report

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State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

Case Closure - GIS Registry

SUBMIT AS UNBOUND PACKAGE IN THE ORDER SHOWN

Notice: Pursuant to ch. 292, Wis. Stats., and chs. NR 726 and 746, Wis. Adm. Code, this form is required to be completed for case closure requests. The closure of a case means that the Department of Natural Resources (DNR) has determined that no further response is required at that time based on the information that has been submitted to the DNR. All sections of this form must be completed unless otherwise directed by the Department. DNR will consider your request administratively complete when the form and all sections are completed, all attachments are included, and the applicable fees required under ch. NR 749, Wis. Adm. Code, are included, and sent to the proper destinations. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31 - 19.39, Wis. Stats.). Incomplete forms will be considered "administratively incomplete" and processing of the request will stop until required information is provided.

Site Information

BRRTS No.	VPLE No.		
02-41-256986			
Parcel ID No.			
77-09-999000			
FID No.	WTM Coordinates X	WTM Coordinates Y	
241008130	694414	273241	
BRRTS Activity (Site) Name	WTM Coordinates Represent: ☒ Source Area ☐ Parcel Center		
BUCYRUS INTERNATIONAL INC			
Site Address	City	State	ZIP Code
1100 MILWAUKEE AVENUE	SOUTH MILWAUKEE	WI	53172
Acres Ready For Use			
32.04			

Responsible Party (RP) Name			
CATERPILLAR GLOBAL MINING LLC			
Company Name			
CATERPILLAR INC			
Mailing Address	City	State	ZIP Code
1100 MILWAUKEE AVENUE	SOUTH MILWAUKEE	WI	53172
Phone Number	Email		
(414) 768-4766	stannis_marita_l@cat.com		

☐ Check here if the RP is the owner of the source property.

Environmental Consultant Name			
DAVE BAUER, P.G.			
Consulting Firm			
GZA GEOENVIRONMENTAL, INC			
Mailing Address	City	State	ZIP Code
20900 SWENSON DRIVE, SUITE 150	WAUKESHA	WI	53186
Phone Number	Email		
(262) 754-2580	david.bauer@gza.com		

Fees and Mailing of Closure Request

1. **Send a copy of page one** of this form and the applicable ch. NR 749, Wis. Adm. Code, fee(s) to the DNR Regional EPA (Environmental Program Associate) at **http://dnr.wi.gov/topic/Brownfields/Contact.html#tabx3**. Check all fees that apply:

   ☐ $1,050 Closure Fee

   ☐ $350 Database Fee for Groundwater or Monitoring Wells (Not Abandoned)

   ☒ $300 Database Fee for Soil

   Total Amount of Payment $ $300.00

   ☐ Resubmittal, Fees Previously Paid

2. **Send one paper copy and one e-copy on compact disk of the entire closure package** to the Regional Project Manager assigned to your site. Submit as *unbound, separate documents* in the order and with the titles prescribed by this form. For electronic document submittal requirements, see **http://dnr.wi.gov/files/PDF/pubs/rr/RR690.pdf.**

Site Summary

If any portion of the Site Summary Section is not relevant to the case closure request, you must fully explain the reasons why in the relevant section of the form. All information submitted shall be legible. Providing illegible information will result in a submittal being considered incomplete until corrected.

1. General Site Information and Site History

A. Site Location: Describe the physical location of the site, both generally and specific to its immediate surroundings.
The Site is located at 1100 Milwaukee Avenue in the northeast 1/4 of the northwest 1/4 of Section 11, Township 5 North, Range 22 East, in South Milwaukee, Wisconsin. The Site is bounded on the west by an active Union Pacific Railroad line easement, beyond which is mixed industrial and residential land; on the south by Milwaukee Avenue, beyond which is mixed commercial and industrial land; on the east by 10th Avenue, beyond which is mixed commercial and residential land; and on the north by East Rawson Avenue, beyond which is industrial land owned by Caterpillar Inc. (Caterpillar).

B. Prior and current site usage: Specifically describe the current and historic occupancy and types of use.
Caterpillar's West Forge Shop's history spans a period of more than 100 years of manufacturing. In its earlier days, especially prior to the 1940s, the Site was used for hot forging, a manufacturing process involving the super heating of metal in a furnace, shaping of the hot metal utilizing localized compressive forces, followed by rapid cooling of the steel in quench fluids to harden the steel. The historical forging process within the footprint of the West Forge Shop was reportedly conducted on earthen floors by Caterpillar's predecessor, Bucyrus-Erie Company (Bucyrus). Caterpillar acquired Bucyrus in 2011, and currently leases the Site from OLP JV Milwaukee LLC c/o One Liberty Prop Inc. Caterpillar vacated the West Forge Shop over the past year. Prior to vacating the West Forge Shop, Caterpillar's computer numerical control (CNC) machine tools, lathes, and milling machines that were operating are self-contained machinery that is not serviced by underground piping, oil reservoirs, or other ancillary equipment, and are installed within shallow depressions within the West Forge Shop slab floor ranging in depth from approximately 0.15 to 0.5 feet. Caterpillar only utilized synthetic-, mineral oil- and water soluble-based metal working fluids and coolants in its machining/manufacturing processes in the West Forge Shop. The West Forge Shop is currently vacant.

C. Current zoning (e.g., industrial, commercial, residential) for the site and for neighboring properties, and how verified (Provide documentation in Attachment G).
The Site is currently zoned as manufacturing (G2) according to the Milwaukee County Land Information Office GIS database. Reference Attachment F.3 for Verification of Zoning. The adjacent properties are mainly zoned either manufacturing or commercial.

D. Describe how and when site contamination was discovered.
During Fall 2015, Caterpillar personnel identified residual oil and oily water within a water valve pit located beneath the West Forge Shop floor. The pit was not utilized as part of ongoing manufacturing operations conducted at the Site and the presence of oil and oily water within the pit were likely a result of historical operations prior to Caterpillar's occupancy in approximately late 2011. Proactively, Caterpillar proceeded with subcontracting the recovery and disposal of the oil and oily water and had the water valve pit pressure-washed to remove residual oil and grime from the concrete surfaces of the structure. Site investigation work was subsequently conducted by GZA to delineate and manage soil and potential groundwater impacts related to historical releases of petroleum hydrocarbon oils.

E. Describe the type(s) and source(s) or suspected source(s) of contamination.
Petroleum hydrocarbon impacts and free-phase residual product in soils primarily under the footprint of the West Forge Shop remain on-Site. Few petroleum volatile organic compounds (PVOCs) and several semi-VOC (SVOC)/polyaromatic hydrocarbon (PAH) compounds were detected in soil beneath the West Forge Shop, which are likely a result of historical releases of fuel oil (previously used for heating) and lubricating/quench oil-related hydrocarbons (previously used for historical forge operations and/or machining). Residual free-phase petroleum hydrocarbon impacts in the subsurface appear to not represent the presence of an ongoing discharge from the current machining/manufacturing operations at the Site. The historical forging process within the footprint of the West Forge Shop was reportedly conducted in predominantly unpaved floor space, which is likely the source and pathway of the soil contamination and free-phase petroleum beneath the West Forge Shop. Additionally, the occurrence of de minimis concentrations of tetrachloroethene (PCE) and 1,1,2,2-tetrachloroethane (1,1,2,2-PCA) in the subsurface are viewed as historical in occurrence and are not representative of an on-going release.

F. Other relevant site description information (or enter Not Applicable).
The portion of the Site addressed in the investigation activities and this case closure is specifically the "West Forge Shop." Also, this closure package pertains to both Environmental Repair Programs (ERPs) associated with the Site (02-41-577015 CATERPILLAR GLOBAL MINING LLC W FORGE SHOP [Open ERP] and 02-41-256986 BUCYRUS INTERNATIONAL INC [Open ERP]).

G. List BRRTS activity/site name and number for BRRTS activities at this source property, including closed cases.
The following 25 Bureau for Remediation and Redevelopment Tracking System (BRRTS) cases are associated with the Site address of 1100 Milwaukee Avenue, South Milwaukee, Wisconsin: 02-41-577015 CATERPILLAR GLOBAL MINING LLC W FORGE SHOP (Open ERP); 02-41-256986 BUCYRUS INTERNATIONAL INC (Open ERP); 03-41-001339 BUCYRUS-ERIE CO #1 (Closed Leaking Underground Storage Tank [LUST]); 03-41-001903 BUCYRUS-ERIE CO #2 (Closed LUST); 03-41-004305 BUCYRUS-ERIE CO #3 (Closed LUST); 03-41-201820 BUCYRUS INTERNATIONAL INC (Closed LUST); 03-41-551053 BUCYRUS INTERNATIONAL INC [Former] (Closed LUST); 04-41-049265 1100 MILWAUKEE AVE (Closed SPILL); 04-41-049811 1100 MILWAUKEE AVE (Closed SPILL); 04-41-189825 1100

MILWAUKEE AVE (Closed SPILL); 04-41-228214 BUCYRUS INTERNATIONAL INC (Closed SPILL); 04-41-534484 BUCYRUS INTERNATIONAL INC (Closed SPILL); 04-41-542792 BUCYRUS INTERNATIONAL INC (Closed SPILL); 04-41-546775 BUCYRUS INTERNATIONAL INC (Closed SPILL); 04-41-549738 BUCYRUS INTERNATIONAL INC (Closed SPILL); 04-41-553888 BUCYRUS INTERNATIONAL SPILL (Closed SPILL); 04-41-551258 BUCYRUS INTERNATIONAL INC SPILL (Closed SPILL); 04-41-552645 BUCYRUS INTERNATIONAL - BEHIND PLANT (Closed SPILL); 04-41-552658 IRONMAN TRUCKING SPILL (Closed SPILL); 04-41-558291 CATERPILLAR GLOBAL MINING LLC SPILL (Closed SPILL); 04-41-558725 CATERPILLAR BUCYRUS SPILL (Closed SPILL); 04-41-558726 CATERPILLAR BUCYRUS SPILL (Closed SPILL); 04-41-558398 CATERPILLAR MINING SPILL (Closed SPILL); 04-41-577086 CATERPILLAR GLOBAL MINING SPILL (Closed SPILL); and 04-41-052640 1100 MILWAUKEE AVE (Historic SPILL).

H. List BRRTS activity/site name(s) and number(s) for all properties immediately adjacent to (abutting) this source property.
The following BRRTS cases immediately abut the Site parcel: 02-41-562213 S&M RECYCLING (Closed ERP; west of the Site parcel beyond the railroad); 03-41-002472 LAST, ERMA PROPERTY (Closed LUST; south of the Site parcel); 02-41-552211 SUNBRITE CLEANERS (Open ERP; south of the Site parcel); 03-41-003444 BUCYRUS ERIE EMPLOYEE PARKING LOT (Closed LUST; west of the Site parcel beyond the railroad); 03-41-097189 READ, DON PROPERTY (Closed LUST; northwest of the Site parcel beyond the railroad and Rawson Avenue); 03-41-005266 SUNSHINE GAS (Closed LUST; east of the Site parcel beyond Chicago Avenue); 02-41-530874 VACANT PROPERTY (Open ERP; east of the Site parcel beyond Chicago Avenue); 02-41-531540 BUCYRUS-ERIE CO (Open ERP; north of the Site parcel beyond Rawson Avenue); and 02-41-556481 PUBLIK PARKING, INC (Closed ERP; east of the Site parcel beyond Chicago Avenue).

2. General Site Conditions

A. Soil/Geology

i. Describe soil type(s) and relevant physical properties, thickness of soil column across the site, vertical and lateral variations in soil types.

Generally, the Site is underlain by up to 28 feet of unconsolidated, lean clay with interbedded and discontinuous layers of fine sand and gravel. Well-graded, fine to coarse sand was encountered to approximately 40 feet below ground surface (bgs). The surface of the Site is overlain by a concrete slab floor varying in thickness from approximately 6 to 24 inches. Some areas of the slab floor where previous machining equipment was located were historically filled in with concrete and, in some cases, had thicknesses of greater than 3 feet. Approximately 6 to 19 inches of base course sand and gravel fill underlie the concrete slab floor and an approximately 6-inch thick area of asphalt south of the building. In exterior areas along the west side of the Site, an organic topsoil layer is present overlying approximately 6 to 12 inches of fill materials consisting of gravel and concrete fragments. Beneath the fill layers, unconsolidated, lean clay with trace sand and gravel inclusions, and few interbedded and discontinuous lenses of silt and well- to poorly-graded sand were observed to approximately 18 feet bgs. An interbedded and discontinuous, poorly-graded, silty sand was observed at depths of approximately 18 to 20 feet bgs at the Site. Unconsolidated silt and lean clay were encountered from depths of approximately 20 to 28 feet bgs. Samples collected from approximately 28 to 30 feet bgs contained a more permeable, well-graded sand extending to a depth of 40 feet bgs (greatest depth explored during the Site investigation [SI] and Supplemental SI [SSI]).

ii. Describe the composition, location and lateral extent, and depth of fill or waste deposits on the site.
Approximately 6 to 19 inches of base course sand and gravel fill underlie the concrete slab floor and an approximately 6-inch thick area of asphalt south of the building. In exterior areas along the west side of the Site, an organic topsoil layer is present overlying approximately 6 to 12 inches of fill materials consisting of gravel and concrete fragments.

iii. Describe the depth to bedrock, bedrock type, competency and whether or not it was encountered during the investigation.
Bedrock was not encountered during subsurface explorations and is anticipated to exist at a depth of more than 90 feet bgs, based on a review of historic well construction reports maintained by the Wisconsin Geological and Natural History Survey (WGNHS).

iv. Describe the nature and locations of current surface cover(s) across the site (e.g., natural vegetation, landscaped areas, gravel, hard surfaces, and buildings).
The current surface cover across the Site consists of buildings, grass (mainly along the western Site boundary), or hard surfaces (concrete or asphalt).

B. Groundwater

i. Discuss depth to groundwater and piezometric elevations. Describe and explain depth variations, including high and low water table elevation and whether free product affects measurement of water table elevation. Describe the stratigraphic unit(s) where water table was found or which were measured for piezometric levels.

The water table occurs within the regional clay till in the range of approximately 11.23 to 13.99 feet bgs (elevation range of approximately 657.2 to 660.3 feet). Similarly, groundwater depths measured in the piezometric monitoring well (PZ-1) were in the range of approximately 12.81 and 13.64 feet below top of casing measuring point during the SI activities between March and September 2017 (elevation range of approximately 657.9 to 658.7 feet).

ii. Discuss groundwater flow direction(s), shallow and deep. Describe and explain flow variations, including fracture flow if present.
A groundwater elevation flow map prepared from September 18, 2017 groundwater elevation data is provided as

Attachment B.3.c. The water table maps indicate shallow groundwater flow is easterly under a horizontal hydraulic gradient of an approximate magnitude of 0.03 to 0.04 feet per foot (ft/ft) during the 2017 SI activities. Based on the groundwater level measurements obtained from monitoring well/piezometer nest MW-1/PZ-1, vertical hydraulic gradients are downward in the range of approximately 0.02 to 0.06 ft/ft during the 2017 SI activities.

iii. Discuss groundwater flow characteristics: hydraulic conductivity, flow rate and permeability, or state why this information was not obtained.

In-situ aquifer testing for the tested monitoring wells (MW-1 through MW-4) indicated a hydraulic conductivity range of approximately 1.8E-02 feet per day (ft/d) (6.6E-06 centimeters per second [cm/scc]) to 2.2E-00 ft/d (7.7E-04 cm/sec) and a geometric mean of approximately 0.54 ft/d (1.9E-4 cm/sec). Piezometer PZ-1, which was screened across a well-graded sand deposit, was also tested for hydraulic conductivity and rendered a geometric mean of 4.3E-02 cm/sec. Based on the measured gradient, average hydraulic conductivity and estimated porosity of the shallow deposits, the average linear horizontal groundwater flow velocity is estimated at 0.3 ft/d or approximately 110 feet per year (ft/yr). The glacial clayey deposits that exist beneath the Site are low-permeability soils.

iv. Identify and describe locations/distance of potable and/or municipal wells within 1200 feet of the site. Include general summary of well construction (geology, depth of casing, depth of screened or open interval).

There are no potable and/or municipal wells within 1,200 feet of the Site listed on the Wisconsin Department of Natural Resources (WDNR) Drinking Water System Well Construction Reports online database. The City of South Milwaukee receives potable water from the South Milwaukee Water Utility, which is supplied by surface water from Lake Michigan.

3. Site Investigation Summary

A. General

i. Provide a brief summary of the site investigation history. Reference previous submittals by name and date. Describe site investigation activities undertaken since the last submittal for this project and attach the appropriate documentation in Attachment C, if not previously provided.

Upon discovery of the oil and oily water accumulation in the water valve pit of the West Forge Shop, a SI and a SSI were conducted at the Site from approximately November 2015 through August 2017, to determine the nature and extent of historical petroleum hydrocarbon releases to the subsurface beneath the West Forge Shop floor. The SI and SSI activities conducted included a focused free-phase product investigation and recoverability evaluation followed by soil, groundwater, and sub-slab vapor investigations. The SI and SSI results, historical petroleum hydrocarbon source and migration pathway risk evaluations, conclusion and recommended next steps were provided in GZA's companion SI and SSI reports, which were submitted to the WDNR for review and comment. Review comments to both the SI and SSI were provided by the WDNR in respective letters dated July 27, 2017 and December 7, 2017. GZA also submitted a Remedial Action Options Report (RAOR), dated February 12, 2018, to the WDNR.

ii. Identify whether contamination extends beyond the source property boundary, and if so describe the media affected (e.g., soil, groundwater, vapors and/or sediment, etc.), and the vertical and horizontal extent of impacts.

Based on the analytical results of the soil and groundwater collected at the Site, it is not likely that the subsurface petroleum impacts extend beyond the source property boundary. The soil contaminant plume has been delineated and exists beneath the West Forge Shop floor and portions of the adjacent building and alleyway/driveway, as depicted on the figures included in Attachment B.

Petroleum hydrocarbon impacts primarily remain under the footprint of the West Forge Shop due to the presence of low-permeability glacial deposits, surface cover from the West Forge Shop slab floor and adjacent building and pavements that reduce infiltration of surface water and minimize the potential for direct contact with underlying soil impacts. Groundwater elevations measured in MW-1 and MW-2 are approximately 660.25 to 657.92 and are below the adjacent storm water and sanitary sewer laterals with invert elevations of 665.69 and 663.79, respectively. Based on the sub-slab vapor testing results immediately beneath the West Forge Shop floor collected in 2017 and 2018 and the indoor air sample results from 2018, no evidence of vapor intrusion (VI) concern is associated with the range of hydrocarbon compounds underlying the Site.

iii. Identify any structural impediments to the completion of site investigation and/or remediation and whether these impediments are on the source property or off the source property. Identify the type and location of any structural impediment (e.g., structure) that also serves as the performance standard barrier for protection of the direct contact or the groundwater pathway.

The West Forge Shop building and the large machinery within it are features considered to be structural impediment which precluded SI or remediation in select areas of the Site. The exterior walls and floors of buildings adjacent east of the West Forge Shop also restricted the location of subsurface investigation and remedial action. However, the surface cover from the West Forge Shop slab floor and adjacent building and pavements reduce infiltration of surface water and minimize the potential for direct contact with underlying soil impacts serving as a performance barrier for protection of the direct-contact and groundwater pathway. The approximate Site building footprints and locations of former manufacturing machinery within the West Forge Shop are depicted on Attachment B.1.b. (Detailed Site Map). GZA was able to complete a comprehensive SI to delineate the extent of subsurface petroleum hydrocarbon impacts without interference of structural impediments on-Site. Soil borings and monitoring wells were advanced through the asphalt or concrete at the Site.

B. Soil

i. Describe degree and extent of soil contamination. Relate this to known or suspected sources and known or potential receptors/migration pathways.

Few PVOCs and several SVOC/PAH compounds were detected in soil beneath the West Forge Shop, which are likely a result of historical releases of fuel oil- (previously used for heating) and lubricating/quench oil-related hydrocarbons (previously used for historical forge operations and/or machining). Caterpillar currently utilizes synthetic-, mineral oil-, and water soluble-based metal working fluids and coolants in its machining/manufacturing processes. Concentrations of several PAHs were detected in approximately 67% of soil samples submitted for laboratory analysis during the SI and SSI. Of those, soil from approximately 19% of soil samples submitted for PAH analysis contained detectable concentrations of several PAHs either exceeding the respective soil to groundwater Residual Contaminant Level (RCL) or industrial direct-contact RCL pathways. Soil analytical results are presented as Attachment A.2 and A.3.

The PVOC 1,2,4-trimethylbenzene (TMB), initially detected in soil from SB-4(1.5'-2.5') at a concentration of 1,700 micrograms per kilogram (µg/kg), was not detected in soil above the laboratory Reporting Limit (RL) in soil from SB-16(1'-2.5') or SB-17(3'-5'), however, was detected in soil from SB-18(3'-5') and SB-20(5'-7') at concentrations of 3,700 µg/kg and 1,500 µg/kg, respectively. In addition, the PVOC benzene was detected in soil from SB-17(3'-5') at an estimated concentration of 19J µg/kg. 1,2,4-TMB and benzene detected in soil exceeded the respective soil to groundwater RCLs, but are located beneath the Site buildings.

PCE, initially detected during the SI in soil from SB-2(3'-5') at a concentration of 240 µg/kg, was further investigated to understand the magnitude and approximate extent of PCE in soil. PCE was not detected in soil above the laboratory RL from SB-15(3'-5'), but was detected in soil from MW-7(5'-7') at an estimated concentration of 63J µg/kg. PCE detected in soil exceeds the soil to groundwater RCL. The concentration at SB-2 remains the highest levels encountered and the additional data confirms PCE's limited extent and magnitude.

1,1,2,2-PCA, initially detected during the SI in soil from SB-7(8'-10') at a concentration of 84 µg/kg, was not detected in soil above the laboratory RL for soil from MW-8(8'-10') or SB-14(10'-12'). The additional data confirms that the occurrence of 1,1,2,2-PCA is limited in both extent and magnitude.

ii. Describe the concentration(s) and types of soil contaminants found in the upper four feet of the soil column.

Soil samples collected from borings SB-4 and SB-17 exceed the industrial direct-contact RCL within the upper 4 feet of the soil column for select PAH constituents. Soil samples collected from borings GP-9, GP-10, SB-4, SB-17, and SB-18 exceed the non-industrial direct-contact RCL within the upper 4 feet of the soil column for select PAH constituents and/or lead. The soil samples that exceeded direct-contact RCLs are located beneath the suspected source of the residual contamination within the footprint of the West Forge Shop. Soil samples submitted for PVOC analysis resulted in concentrations detected below direct contact RCLs or below laboratory detection limits.

iii. Identify the ch. NR 720, Wis. Adm. Code, method used to establish the soil cleanup standards for this site. This includes a soil performance standard established in accordance with s. NR 720.08, a Residual Contaminant Level (RCL) established in accordance with s. NR 720.10 that is protective of groundwater quality, or an RCL established in accordance with s. NR 720.12 that is protective of human health from direct contact with contaminated soil. Identify the land use classification that was used to establish cleanup standards. Provide a copy of the supporting calculations/ information in Attachment C.

Soil industrial direct-contact and soil-to-groundwater RCLs for the primary constituents of concern detected in soil at the Site were obtained from the RCL spreadsheet (updated March 2017) available through a link on the WDNR website: http://dnr.wi.gov/topic/Brownfields/Professionals.html, for which to compare constituents of concern detected in the soil. The spreadsheet was prepared by WDNR staff using the United States Environmental Protection Agency's (USEPA) Regional Screening Level (RSL) Web-Calculator. A summary of Site-specific soil analytical data obtained during the SI and SSI is presented in Attachments A.2 and A.3. The laboratory analytical data reports for soil obtained during execution of the SI and SSI were provided in the previous submittals to the WDNR, as indicated in Attachment C.

C. Groundwater

i. Describe degree and extent of groundwater contamination. Relate this to known or suspected sources and known or potential receptors/migration pathways. Specifically address any potential or existing impacts to water supply wells or interception with building foundation drain systems.

VOCs and PAHs were not detected above the Preventive Action Limit (PAL) or Enforcement Standard (ES) in the groundwater samples collected from monitoring wells installed during the SI and SSI activities, except for a single ES exceedance of 2,6-dinitrotoluene in the groundwater sample collected from MW-1 in March 2017. The SVOC 2,6-dinitrotoluene was detected at a concentration less than the laboratory RL, but greater than or equal to the laboratory method detection limit (MDL) and, therefore, the concentration of 0.072J micrograms per liter (µg/l) in groundwater from MW-1 is an approximate value that nominally exceeded the Wisconsin Administrative Code (WAC) Chapter NR 140 ES. Additionally, the concentration of 2,6-dinitrotoluene was below the MDL in the subsequent groundwater sample collected from MW-1 in June 2017, and concentrations of 2,6-dinitrotoluene were not detected above the MDL in any of the other groundwater samples collected on-Site. No other SVOCs or PAHs were detected above the laboratory RL. Dissolved lead was not detected in the groundwater samples submitted for lead analysis.

VOCs and PAHs were not detected above the laboratory reporting limit in the groundwater samples collected from monitoring wells MW-7 and MW-8 that were installed to assess the detection of PCE at SB-2, and 1,1,2,2-PCA at SB-7. In addition, the first quarterly groundwater sampling round after the SI conducted on June 22, 2017, did not indicate detected concentrations of VOCs or PAHs in groundwater above the laboratory RLs. Groundwater analytical results are presented as Attachment A.1.

No detection of impacts in groundwater were present in downgradient monitoring wells MW-1 and M-2 located adjacent to and in the downstream direction of flow within the sanitary and storm sewer laterals. The groundwater elevations measured in MW-1 and MW-2 are approximately 660.25 to 657.92 and are below the adjacent storm water and sanitary sewer laterals with invert elevations of 665.69 and 663.79, respectively. Based on these conditions, the adjacent sewer laterals and associated backfill do not appear to be providing a preferential pathway for impact migration beneath and away from the West Forge Shop. Groundwater monitoring wells adjacent to the Site on the west exterior, north interior, east interior and exterior, and south exterior, do not indicate evidence of off-Site contaminant migration via the groundwater flow pathway.

Additionally, the Site and vicinity commercial, industrial, and residential properties are serviced by a municipal water supply distribution system that obtains potable water from Lake Michigan. As such, it is unlikely that the groundwater resources in the Site vicinity are or will be used for human consumption.

ii. Describe the presence of free product at the site, including the thickness, depth, and locations. Identify the depth and location of the smear zone.

The free-phase oil present beneath the West Forge Shop is found generally in droplets throughout the clayey soils and based on chromatographic analysis, appears to be a heavy fuel oil, such as a #6 fuel oil according to the laboratory, and is comingled with a greater amount of unidentified heavier petroleum hydrocarbon compounds, potentially lubricating oils. The carbon range in oil samples range from approximately C11 to above C30. Based on general review of soil boring logs, free product and/or staining were observed in the soil matrix from approximately 1 to 18 feet beneath the floor slab of the West Forge Shop. The estimated free product thickness measurements collected between February 2016 and February 2017, which are presented in Attachment A.7.c., were observed up to 48 inches in the product accumulation point of GP-2. The approximate lateral extent and estimated thickness of free product observed during SI activities are depicted on Attachment B.4.c.

Attempts to collect and recover the free product were made, but did not show that recovery of the oil is practicable due to the limited volume of oil occurring in lower permeability, clayey deposits and its relatively high viscosity. Residual free-phase petroleum hydrocarbon impacts in the subsurface appear to not represent the presence of an ongoing discharge from the current machining/manufacturing operations at the Site. Caterpillar's CNC machine tools, lathes, and milling machines are self-contained machinery that are not serviced by underground oil piping or other ancillary equipment and are installed within shallow depressions within the West Forge Shop slab floor ranging in depth from approximately 0.15 feet to 0.5 feet. Therefore, residual free-phase petroleum hydrocarbon impacts in the subsurface appear to not represent the presence of an ongoing discharge from the current machining/manufacturing operations at the Site. Additionally, the area of residual free product does not show evidence of partitioning to the dissolved phase and is not resulting in NR 140 groundwater ES exceedances on the Site.

D. Vapor

i. Describe how the vapor migration pathway was assessed, including locations where vapor, soil gas, or indoor air samples were collected. If the vapor pathway was not assessed, explain reasons why.

Three sub-slab vapor monitoring points were installed and sampled within the footprint of the West Forge Shop in 2017. Sub-slab air testing conducted during the SI indicated generally low concentrations of VOCs were detected in the air space beneath the West Forge Shop slab and were several orders of magnitude below the industrial sub-slab vapor risk screening levels (VRSLs). As requested by the WDNR, additional VI investigation was performed in October 2018 to target sub-slab conditions in two areas of the Shop where elevated naphthalene concentrations in shallow soil were previously encountered. The supplemental vapor testing included three additional sub-slab vapor samples and two indoor air samples within the West Forge Shop. Based on the analytical results, the Site and the private residences east and west of the Site are not anticipated to be affected by VI from residual impacts remaining beneath the Site floor slab. Based on the sub-slab vapor testing results, as summarized in GZA's SI Report and closure amendment letter, no evidence of VI concerns are associated with the range of hydrocarbon compounds underlying the Site. The vapor analytical results are presented as Attachment A.4. The locations of the sub-slab vapor monitoring points are depicted on Attachment B.4.a.

ii. Identify the applicable DNR action levels and the land use classification used to establish them. Describe where the DNR action levels were reached or exceeded (e.g., sub slab, indoor air or both).

The property is zoned as manufacturing, as indicated above in 1.C. Based on the sub-slab vapor and indoor air testing results immediately beneath the West Forge Shop floor, no evidence of VI concerns is associated with the range of hydrocarbon compounds underlying the Site. Constituents detected are generally several orders of magnitude lower than residential, small commercial, and/or industrial sub-slab VRSLs.

E. Surface Water and Sediment

i. Identify whether surface water and/or sediment was assessed and describe the impacts found. If this pathway was not assessed, explain why.

Surface water and sediment were not assessed, as the Site was fully developed, covered with asphalt/concrete, and no sediment was present. The nearest water bodies to the Site are Oak Creek (approximately 0.3-mile east) and Lake Michigan (approximately 1.2 miles east). Oak Creek flows southeasterly before discharging at its confluence with Lake Michigan. Based on Site conditions and relatively shallow and lateral extent of impact, there is no evidence of Site impacts affecting the nearest surface water bodies.

ii. Identify any surface water and/or sediment action levels used to assess the impacts for this pathway and how these were derived. Describe where the DNR action levels were reached or exceeded.

As discussed above, surface water and sediment were not assessed, as the Site was fully developed, covered with asphalt/concrete, and no sediment was present. Therefore, this pathway consideration is not required.

4. Remedial Actions Implemented and Residual Levels at Closure

A. General: Provide a brief summary of the remedial action history. List previous remedial action report submittals by name and date. Identify remedial actions undertaken since the last submittal for this project and provide the appropriate documentation in Attachment C.

Attempts to collect and recover the free product were conducted for a period of approximately one year; however, efforts did not indicate that recovery of the oil is practicable due to the limited volume of recoverable oil occurring in lower permeability, clayey deposits and the oil's high viscosity. Between February 2016 and February 2017, less than 2 gallons of oil were recovered from the Geoprobe(r) wells and Sump 1 installed to evaluate product level measurements and assess oil recoverability.

On December 19, 2017, Caterpillar contracted the services of Future Environmental to pump approximately 55 gallons of oily water from the water valve pit located beneath the West Forge Shop floor. The water valve pit was then abandoned by filling the space with a flowable concrete slurry that was allowed to cure for approximately 24 hours. The surface was then finished with approximately 12 inches of concrete to slab grade. No other utility laterals have been physically observed or identified from available drawings reviewed in preparation of the SI and SSI Reports. No machine pits are present within the West Forge Shop that are deeper than approximately 0.5-foot bgs and, therefore, would likely not function as conduit for migration of impacts to other utility laterals, if present.

Based on the subsurface conditions, existing improvements, and paved surfaces, further exploration and/or remediation are not warranted. As previously mentioned, GZA submitted a RAOR to the WDNR on February 12, 2018. An engineering/ institutional control (i.e. cap) was recommended in the RAOR as the most environmentally and economic cost effective remedial action approach that will support future use of the Site while protecting public health and the environment.

B. Describe any immediate or interim actions taken at the site under ch NR 708, Wis. Adm. Code.

As previously indicated in 4.A., further exploration and/or remediation are not warranted based on the subsurface conditions, existing improvements, and paved surfaces. No immediate or interim actions were completed at the Site under WAC NR 708.

C. Describe the *active* remedial actions taken at the source property, including: type of remedial system(s) used for each media affected; the size and location of any excavation or in-situ treatment; the effectiveness of the systems to address the contaminated media and substances; operational history of the systems; and summarize the performance of the active remedial actions. Provide any system performance documentation in Attachment A.7.

As previously indicated in 4.A., further exploration and/or active remediation are not warranted based on the subsurface conditions, existing improvements, and paved surfaces.

D. Describe the alternatives considered during the Green and Sustainable Remediation evaluation in accordance with NR 722.09 and any practices implemented as a result of the evaluation.

The decision to cap the contaminated soils instead of excavating and transporting the affected soils off-Site saves landfill space and carbon emissions that would have been generated from excavation and trucking activities.

E. Describe the nature, degree and extent of residual contamination that will remain at the source property or on other affected properties after case closure.

Petroleum hydrocarbon impacts in soil and free-phase hydrocarbon compounds primarily remain under the footprint of the West Forge Shop on-Site due to the presence of low-permeability glacial deposits, surface cover/cap from the West Forge Shop slab floor and adjacent building and pavements that reduce infiltration of surface water and minimize the potential for direct contact with underlying soil impacts. The approximate unsaturated horizontal extent of impacted soil in exceedance of RCLs is depicted on Attachments B.2.a. and D.2. The impacted soils and free product remaining on-Site do not appear to be a risk to human health or the environment due to the presence beneath impervious cover to be maintained as a cap, and the absence of constituent partitioning to groundwater.

F. Describe the residual soil contamination within four feet of ground surface (direct contact zone) that attains or exceeds RCLs established under s. NR 720.12, Wis. Adm. Code, for protection of human health from direct contact.

The soil samples which exceeded direct contact RCLs of select SVOC/PAH constituents and/or lead (borings SB-4 and

SB-17 exceed the industrial direct-contact RCL; borings GP-9, GP-10, SB-4, SB-17, and SB-18 exceed the non-industrial direct-contact RCL) are located beneath the suspected source of the residual contamination within the footprint of the West Forge Shop. The approximate unsaturated horizontal extent of impacted soil in exceedance of direct-contact RCLs is depicted on Attachments B.2.a. and D.2. The direct-contact of the impacted soil does not appear to be a risk to human health or the environment due to its presence beneath impervious cover to be maintained as a cap, and the absence of constituent partitioning to groundwater.

G. Describe the residual soil contamination that is above the observed low water table that attains or exceeds the soil standard(s) for the groundwater pathway.

The soil samples which exceeded the soil-to-groundwater pathway RCLs of select VOC, SVOC/PAH constituents and/or lead above the observed low water table (GP-9, GP-10, GP-11, SB-2, SB-4, SB-7, SB-16, SB-17, SB-18, SB-19, SB-20, MW-1, MW-2, and MW-7) are located beneath the suspected source of the residual contamination within the footprint of the West Forge Shop, and beneath portions of the adjacent building and pavements. The approximate unsaturated horizontal extent of impacted soil in exceedance of groundwater pathway RCLs is depicted on Attachments B.2.a. and D.2. The impacted soil does not appear to be a risk to human health or the environment due to its presence beneath impervious cover to be maintained as a cap, and the absence of constituent partitioning to groundwater.

H. Describe how the residual contamination will be addressed, including but not limited to details concerning: covers, engineering controls or other barrier features; use of natural attenuation of groundwater; and vapor mitigation systems or measures.

The area of impact occurs beneath the current concrete slab and asphalt-paved surfaces and roof of the Site, which effectively function as an engineering control that prevents precipitation and surface water from infiltrating the area and has demonstrated to be highly effective in containing the residual hydrocarbons. Based on the sub-slab vapor and indoor air testing results, as summarized in GZA's SI, SSI, RAOR and closure amendment letter, no evidence of VI concerns is associated with the range of hydrocarbon compounds underlying the Site. Also, note that there are no groundwater users within the extent of soil, groundwater, and/or free-phase product impact. Given the combination of findings of the SI and SSI, additional investigations or remedial actions do not appear to be warranted at the Site. The Site is zoned M2 for Industrial use and will remain for the foreseeable future. As such, GZA recommends that a No Further Action determination be made for the Site with the condition that the existing concrete surfaces remain in place as engineering controls (i.e. cap) and that the engineered barrier/cap maintenance plan presented as Attachment D be implemented at the Site.

I. If using natural attenuation as a groundwater remedy, describe how the data collected supports the conclusion that natural attenuation is effective in reducing contaminant mass and concentration (e.g., stable or receding groundwater plume).

Natural attenuation is not utilized as a groundwater remedy on-Site because the low-level dissolved VOCs detected in the groundwater and little to no contaminant partitioning have occurred from the adsorbed to dissolved phases.

J. Identify how all exposure pathways (soil, groundwater, vapor) were removed and/or adequately addressed by immediate, interim and/or remedial action(s).

Exposure pathways are adequately addressed through the implementation of a cap maintenance plan for the recommended engineered control remedial action. The area of impact occurs beneath the current concrete slab and asphalt-paved surfaces and roof of the Site, which effectively function as an engineering control that prevents precipitation and surface water from infiltrating the area and has demonstrated to be highly effective in containing the residual hydrocarbons. Based on the sub-slab vapor and indoor air testing results, as summarized in GZA's SI, SSI, RAOR and closure amendment letter, no evidence of VI concerns is associated with the range of hydrocarbon compounds underlying the Site. Also, note that there are no groundwater users within the extent of soil, groundwater, and/or free-phase product impact.

K. Identify any system hardware anticipated to be left in place after site closure, and explain the reasons why it will remain.

As previously indicated in 4.A., further exploration and/or active remediation are not warranted based on the subsurface conditions, existing improvements, and paved surfaces. Therefore, there is no system hardware that is to be left in place after Site closure because no hardware was installed for remedial purposes.

L. Identify the need for a ch. NR 140, Wis. Adm. Code, groundwater Preventive Action Limit (PAL) or Enforcement Standard (ES) exemption, and identify the affected monitoring points and applicable substances.

PVOCs, SVOCs/PAHs, and lead were not detected above the PAL or ES standards in the groundwater samples collected from monitoring wells installed during the SI and SSI activities, except for a single ES exceedance of 2,6-dinitrotoluene in the groundwater sample collected from MW-1 in March 2017. The SVOC 2,6-dinitrotoluene was detected at a concentration less than the laboratory RL, but greater than or equal to the laboratory MDL and, therefore, the concentration of 0.072J µg/l in groundwater from MW-1 is an approximate value that nominally exceeded the WAC Chapter NR 140 ES. Additionally, the concentration of 2,6-dinitrotoluene was below the MDL in the subsequent groundwater sample collected from MW-1 in June 2017, and concentrations of 2,6-dinitrotoluene were not detected above the MDL in any of the other groundwater samples collected on-Site. Otherwise, SVOC/PAH constituents were identified at low to non-detectable concentrations in groundwater at the Site.

M. If a DNR action level for vapor intrusion was exceeded (for indoor air, sub slab, or both) describe where it was exceeded and how the pathway was addressed.

Based on the sub-slab vapor and indoor air testing results, as summarized in GZA's SI, SSI, RAOR and closure amendment letter, no evidence of VI concerns is associated with the range of hydrocarbon compounds underlying the Site. Constituents detected did not exceed residential, small commercial, and/or industrial sub-slab VRSLs.

N. Describe the surface water and/or sediment contaminant concentrations and areas after remediation. If a DNR action level was exceeded, describe where it was exceeded and how the pathway was addressed.

Surface water and sediment were not assessed because the entire Site is covered with buildings or asphalt/concrete and there is no sediment present. Therefore, this pathway consideration is not required.

5. Continuing Obligations: Situations where sites, including all affected properties and rights-of-way (ROWs), are included on the DNR's GIS Registry. In certain situations, maintenance plans are also required, and must be included in Attachment D.

Directions: For each of the 3 property types below, check all situations that apply to this closure request.

(NOTE: Monitoring wells to be transferred to another site are addressed in Attachment E.)

	This situation applies to the following property or Right of Way (ROW):			Case Closure Situation - Continuing Obligation Inclusion on the GIS Registry is Required (ii. - xiv.)	Maintenance Plan Required
	Property Type:				
	Source Property	Affected Property (Off-Source)	ROW		
i.	☐	☒	☒	None of the following situations apply to this case closure request.	NA
ii.	☐	☐	☐	Residual groundwater contamination exceeds ch. NR 140 ESs.	NA
iii.	☒	☐	☐	Residual soil contamination exceeds ch. NR 720 RCLs.	NA
iv.				Monitoring Wells Remain:	
	☐	☐	☐	• Not Abandoned (filled and sealed)	NA
	☐	☐	☐	• Continued Monitoring (requested or required)	Yes
v.	☒	☐	☐	Cover/Barrier/Engineered Cover or Control for (soil) direct contact pathways (includes vapor barriers)	Yes
vi.	☒	☐	☐	Cover/Barrier/Engineered Cover or Control for (soil) groundwater infiltration pathway	Yes
vii.	☒	☐	☐	Structural Impediment: impedes completion of investigation or remedial action (not as a performance standard cover)	NA
viii.	☒	☐	☐	Residual soil contamination meets NR 720 industrial soil RCLs, land use is classified as industrial	NA
ix.	☐	☐	NA	Vapor Mitigation System (VMS) required due to exceedances of vapor risk screening levels or other health based concern	Yes
x.	☐	☐	NA	Vapor: Dewatering System needed for VMS to work effectively	Yes
xi.	☐	☐	NA	Vapor: Compounds of Concern in use: full vapor assessment could not be completed	NA
xii	☐	☐	NA	Vapor: Commercial/industrial exposure assumptions used.	NA
xiii.	☐	☐	☐	Vapor: Residual volatile contamination poses future risk of vapor intrusion	NA
xiv.	☐	☐	☐	Site-specific situation: (e. g., fencing, methane monitoring, other) (*discuss with project manager before submitting the closure request*)	Site specific

6. Underground Storage Tanks

A. Were any tanks, piping or other associated tank system components removed as part of the investigation or remedial action? ○ Yes ◉ No

B. Do any upgraded tanks meeting the requirements of ch. ATCP 93, Wis. Adm. Code, exist on the property? ○ Yes ◉ No

C. If the answer to question 6.B. is yes, is the leak detection system currently being monitored? ○ Yes ○ No

General Instructions

All information shall be legible. Providing illegible information will result in a submittal being considered incomplete until corrected. For each attachment (A-G), provide a Table of Contents page, listing all 'applicable' and 'not applicable' items by Closure Form titles (e.g., A.1. Groundwater Analytical Table, A.2. Soil Analytical Results Table, etc.). If any item is 'not applicable' to the case closure request, you must fully explain the reasons why.

Data Tables (Attachment A)

Directions for Data Tables:

- Use **bold** and italics font for information of importance on tables and figures. Use **bold** font for ch. NR 140, Wis. Adm. Code ES attainments or exceedances, and *italicized font* for ch. NR 140, Wis. Adm. Code, PAL attainments or exceedances.
- Use **bold** font to identify individual ch. NR 720 Wis. Adm. Code RCL exceedances. Tables should also include the corresponding groundwater pathway and direct contact pathway RCLs for comparison purposes. Cumulative hazard index and cumulative cancer risk exceedances should also be tabulated and identified on Tables A.2 and A.3.
- Do not use shading or highlighting on the analytical tables.
- Include on Data Tables the level of detection for results which are below the detection level (i.e., do not just list as no detect (ND)).
- Include the units on data tables.
- Summaries of all data must include information collected by previous consultants.
- Do not submit lab data sheets unless these have not been submitted in a previous report. Tabulate all data required in s. NR 716.15 (3)(c), Wis. Adm. Code, in the format required in s. NR 716.15(4)(e), Wis. Adm. Code.
- Include in Attachment A all of the following tables, in the order prescribed below, with the specific Closure Form titles noted on the separate attachments (e.g., Title: A.1. Groundwater Analytical Table; A.2. Soil Analytical Results Table, etc.).
- For required documents, each table (e.g., A.1., A.2., etc.) should be a separate Portable Document Format (PDF).

A. Data Tables

A.1. **Groundwater Analytical Table(s):** Table(s) showing the analytical results and collection dates for all groundwater sampling points (e.g., monitoring wells, temporary wells, sumps, extraction wells, potable wells) for which samples have been collected.

A.2. **Soil Analytical Results Table(s):** Table(s) showing **all** soil analytical results and collection dates. Indicate if sample was collected above or below the observed low water table (unsaturated versus saturated).

A.3. **Residual Soil Contamination Table(s):** Table(s) showing the analytical results of only the residual soil contamination at the time of closure. This table shall be a subset of table A.2 and should include only the soil sample locations that exceed an RCL. Indicate if sample was collected above or below the observed low water table (unsaturated versus saturated). Table A.3 is optional only if a total of fewer than 15 soil samples have been collected at the site.

A.4. **Vapor Analytical Table(s):** Table(s) showing type(s) of samples, sample collection methods, analytical method, sample results, date of sample collection, time period for sample collection, method and results of leak detection, and date, method and results of communication testing.

A.5. **Other Media of Concern (e.g., sediment or surface water):** Table(s) showing type(s) of sample, sample collection method, analytical method, sample results, date of sample collection, and time period for sample collection.

A.6. **Water Level Elevations:** Table(s) showing all water level elevation measurements and dates from all monitoring wells. If present, free product should be noted on the table.

A.7. **Other:** This attachment should include: 1) any available tabulated natural attenuation data; 2) data tables pertaining to engineered remedial systems that document operational history, demonstrate system performance and effectiveness, and display emissions data; and (3) any other data tables relevant to case closure not otherwise noted above. If this section is not applicable, please explain the reasons why.

Maps, Figures and Photos (Attachment B)

Directions for Maps, Figures and Photos:

- Provide on paper no larger than 11 x 17 inches, unless otherwise directed by the Department. Maps and figures may be submitted in a larger electronic size than 11 x 17 inches, in a PDF readable by the Adobe Acrobat Reader. However, those larger-size documents must be legible when printed.
- Prepare visual aids, including maps, plans, drawings, fence diagrams, tables and photographs according to the applicable portions of ss. NR 716.15(4), 726.09(2) and 726.11(3), (5) and (6), Wis. Adm. Code.
- Include all sample locations.
- Contour lines should be clearly labeled and defined.
- Include in Attachment B all of the following maps and figures, in the order prescribed below, with the specific Closure Form titles noted on the separate attachments (e.g., Title: B.1. Location Map; B.2. Detailed Site Map, etc).
- For the electronic copies that are required, each map (e.g., B.1.a., B.2.a, etc.,) should be a separate PDF.
- Maps, figures and photos should be dated to reflect the most recent revision.

B.1. Location Maps

B.1.a. **Location Map:** A map outlining all properties within the contaminated site boundaries on a United States Geological Survey (U.S.G.S.) topographic map or plat map in sufficient detail to permit easy location of all affected and/or adjacent parcels. If groundwater standards are exceeded, include the location of all potable wells, including municipal wells, within 1200 feet of the area of contamination.

B.1.b. **Detailed Site Map:** A map that shows all relevant features (buildings, roads, current ground surface cover, individual property boundaries for all affected properties, contaminant sources, utility lines, monitoring wells and potable wells) within the contaminated area. This map is to show the location of all contaminated public streets, and highway and railroad rights-of-way in relation to the source property and in relation to the boundaries of groundwater contamination attaining or exceeding a ch. NR 140 ES, and/or in relation to the boundaries of soil contamination attaining or exceeding a RCL. Provide parcel identification numbers for all affected properties.

B.1.c. **RR Sites Map:** From RR Sites Map (http://dnrmaps.wi.gov/sl/?Viewer=RR Sites) attach a map depicting the source property, and all open and closed BRRTS sites within a half-mile radius or less of the property.

B.2. Soil Figures

B.2.a. **Soil Contamination:** Figure(s) showing the location of **all** identified unsaturated soil contamination. Use a single contour to show the horizontal extent of each area of contiguous soil contamination that exceeds a soil to groundwater pathway RCL as determined under ch. NR 720.Wis. Adm. Code. A separate contour line should be used to indicate the horizontal extent of each area of contiguous soil contamination that exceeds a direct contact RCL exceedances (0-4 foot depth).

B.2.b. **Residual Soil Contamination:** Figure(s) showing only the locations of soil samples where unsaturated soil contamination remains at the time of closure (locations represented in Table A.3). Use a single contour to show the horizontal extent of each area of contiguous soil contamination that exceeds a soil to groundwater pathway RCL as determined under ch. NR 720 Wis. Adm. Code. A separate contour line should be used to indicate the horizontal extent of each area of contiguous soil contamination that exceeds a direct contact RCL exceedence (0-4 foot depth).

B.3. Groundwater Figures

B.3.a. **Geologic Cross-Section Figure(s):** One or more cross-section diagrams showing soil types and correlations across the site, water table and piezometric elevations, and locations and elevations of geologic rock units, if encountered. Display on one or more figures all of the following:

- Source location(s) and vertical extent of residual soil contamination exceeding an RCL. Distinguish between direct contact and the groundwater pathway RCLs.
- Source location(s) and lateral and vertical extent if groundwater contamination exceeds ch. NR 140 ES.
- Surface features, including buildings and basements, and show surface elevation changes.
- Any areas of active remediation within the cross section path, such as excavations or treatment zones.
- Include a map displaying the cross-section location(s), if they are not displayed on the Detailed Site Map (Map B.1.b.)

B.3.b. **Groundwater Isoconcentration:** Figure(s) showing the horizontal extent of the post-remedial groundwater contamination exceeding a ch. NR 140, Wis. Adm. Code, PAL and/or an ES. Indicate the date and direction of groundwater flow based on the most recent sampling data.

B.3.c. **Groundwater Flow Direction:** Figure(s) representing groundwater movement at the site. If the flow direction varies by more than 20° over the history of the site, submit two groundwater flow maps showing the maximum variation in flow direction.

B.3.d. **Monitoring Wells:** Figure(s) showing all monitoring wells, with well identification number. Clearly designate any wells that: (1) are proposed to be abandoned; (2) cannot be located; (3) are being transferred; (4) will be retained for further sampling, or (5) have been abandoned.

B.4. Vapor Maps and Other Media

B.4.a. **Vapor Intrusion Map:** Map(s) showing all locations and results for samples taken to investigate the vapor intrusion pathway in relation to residual soil and groundwater contamination, including sub-slab, indoor air, soil vapor, soil gas, ambient air, and communication testing. Show locations and footprints of affected structures and utility corridors, and/or where residual contamination poses a future risk of vapor intrusion.

B.4.b. **Other media of concern (e.g., sediment or surface water):** Map(s) showing all sampling locations and results for other media investigation. Include the date of sample collection and identify where any standards are exceeded.

B.4.c. **Other:** Include any other relevant maps and figures not otherwise noted above. (This section may remain blank).

B.5. Structural Impediment Photos: One or more photographs documenting the structural impediment feature(s) which precluded a complete site investigation or remediation at the time of the closure request. The photographs should document the area that could not be investigated or remediated due to a structural impediment. The structural impediment should be indicated on Figures B.2.a and B.2.b.

Documentation of Remedial Action (Attachment C)

Directions for Documentation of Remedial Action:

- Include in Attachment C all of the following documentation, in the order prescribed below, with the specific Closure Form titles noted on the separate attachments (e.g., Title: C.1. Site Investigation Documentation; C.2. Investigative Waste, etc.).
- If the documentation requested below has already been submitted to the DNR, please note the title and date of the report for that particular document requested.

C.1. **Site investigation documentation**, that has not otherwise been submitted with the Site Investigation Report.

C.2. **Investigative waste** disposal documentation.

C.3. Provide a **description of the methodology** used along with all supporting documentation if the RCLs are different than those contained in the Department's RCL Spreadsheet available at: http://dnr.wi.gov/topic/Brownfields/Professionals.html.

C.4. **Construction documentation** or as-built report for any constructed remedial action or portion of, or interim action specified in s. NR 724.02(1), Wis. Adm. Code.

C.5. **Decommissioning of Remedial Systems.** Include plans to properly abandon any systems or equipment.

C.6. **Other**. Include any other relevant documentation not otherwise noted above (This section may remain blank).

Maintenance Plan(s) and Photographs (Attachment D)

Directions for Maintenance Plans and Photographs:

Attach a maintenance plan for each affected property (source property, each off-source affected property) with continuing obligations requiring future maintenance (e.g., direct contact, groundwater protection, vapor intrusion). See Site Summary section 5 for all affected property(s) requiring a maintenance plan. Maintenance plan guidance and/or templates for: 1) Cover/barrier systems; 2) Vapor intrusion; and 3) Monitoring wells, can be found at: http://dnr.wi.gov/topic/Brownfields/Professionals.html#tabx3

D.1. **Descriptions of maintenance action(s) required for maximizing effectiveness of the engineered control, vapor mitigation system, feature or other action for which maintenance is required:**

- Provide brief descriptions of the type, depth and location of residual contamination.

- Provide a description of the system/cover/barrier/monitoring well(s) to be maintained.
- Provide a description of the maintenance actions required for maximizing effectiveness of the engineered control, vapor mitigation system, feature or other action for which maintenance is required.
- Provide contact information, including the name, address and phone number of the individual or facility who will be conducting the maintenance.

D.2. **Location map(s) which show(s):** (1) the feature that requires maintenance; (2) the location of the feature(s) that require(s) maintenance - on and off the source property; (3) the extent of the structure or feature(s) to be maintained, in relation to other structures or features on the site; (4) the extent and type of residual contamination; and (5) all property boundaries.

D.3. **Photographs** for site or facilities with a cover or other performance standard, a structural impediment or a vapor mitigation system, include one or more photographs documenting the condition and extent of the feature at the time of the closure request. Pertinent features shall be visible and discernible. Photographs shall be submitted with a title related to the site name and location, and the date on which it was taken.

D.4. **Inspection log**, to be maintained on site, or at a location specified in the maintenance plan or approval letter. The inspection and maintenance log is found at: http://dnr.wi.gov/files/PDF/forms/4400/4400-305.pdf.

Monitoring Well Information (Attachment E)

Directions for Monitoring Well Information:
For all wells that will remain in use, be transferred to another party, or that could not be located; attach monitoring well construction and development forms (DNR Form 4400-113 A and B: http://dnr.wi.gov/topic/groundwater/documents/forms/4400_113_1_2.pdf)

Select One:

◯ No monitoring wells were installed as part of this response action.

◉ All monitoring wells have been located and will be properly abandoned upon the DNR granting conditional closure to the site

◯ ***Select One or More:***

☐ Not all monitoring wells can be located, despite good faith efforts. Attachment E must include a description of efforts made to locate the wells.

☐ One or more wells will remain in use at the site after this closure. Attachment E must include documentation as to the reason (s) the well(s) will remain in use. When one or more monitoring wells will remain in use this is considered a continuing obligation and a maintenance plan will be required and must be included in Attachment D.

☐ One or more monitoring wells will be transferred to another owner upon case closure being granted. Attachment E should include documentation identifying the name, address and email for the new owner(s). Provide documentation from the party accepting future responsibility for monitoring well(s).

Source Legal Documents (Attachment F)

Directions for Source Legal Documents:
Label documents with the specific closure form titles (e.g., F.1. Deed, F.2. Certified Survey Map, etc.). Include all of the following documents, in the order listed:

F.1. **Deed:** The most recent deed with legal description clearly listed.

Note: *If a property has been purchased with a land contract and the purchaser has not yet received a deed, a copy of the land contract which includes the legal description shall be submitted instead of the most recent deed. If the property has been inherited, written documentation of the property transfer should be submitted along with the most recent deed.*

F.2. **Certified Survey Map:** A copy of the certified survey map or the relevant section of the recorded plat map for those properties where the legal description in the most recent deed refers to a certified survey map or a recorded plat map. In cases where the certified survey map or recorded plat map are not legible or are unavailable, a copy of a parcel map from a county land information office may be substituted. A copy of a parcel map from a county land information office shall be legible, and the parcels identified in the legal description shall be clearly identified and labeled with the applicable parcel identification number.

F.3. **Verification of Zoning**: Documentation (e.g., official zoning map or letter from municipality) of the property's or properties' current zoning status.

F.4. **Signed Statement:** A statement signed by the Responsible Party (RP), which states that he or she believes that the attached legal description(s) accurately describe(s) the correct contaminated property or properties. This section applies to the source property only. Signed statements for Other Affected Properties should be included in Attachment G.

Notifications to Owners of Affected Properties (Attachment G)

Directions for Notifications to Owners of Affected Properties:
Complete the table on the following page for sites which require notification to owners of affected properties pursuant to ch. 292, Wis. Stats. and ch. NR 725 and 726, Wis. Adm. Code. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records law [ss. 19.31- 19.39,Wis. Stats.]. The DNR's "Guidance on Case Closure and the Requirements for Managing Continuing Obligations" (PUB-RR-606) lists specific notification requirements http://dnr.wi.gov/files/PDF/pubs/rr/RR606.pdf.

State law requires that the responsible party provide a 30-day, written advance notification to certain persons prior to applying for case closure. This requirement applies if: (1) the person conducting the response action does not own the source property; (2) the contamination has migrated onto another property; and/or (3) one or more monitoring wells will not be abandoned. Use form 4400-286, Notification of Continuing Obligations and Residual Contamination, at http://dnr.wi.gov/files/PDF/forms/4400/4400-286 pdf

Include a copy of each notification sent and accompanying proof of delivery, i.e., return receipt or signature confirmation. (These items will not be placed on the GIS Registry.)

Include the following documents for each property, keeping each property's documents grouped together and labeled with the letter G and the corresponding ID number from the table on the following page. (Source Property documents should only be included in Attachment F):

- **Deed:** The most recent deed with legal descriptions clearly listed for all affected properties.
  Note: If a property has been purchased with a land contract and the purchaser has not yet received a deed, a copy of the land contract which includes the legal description shall be submitted instead of the most recent deed. If the property has been inherited, written documentation of the property transfer should be submitted along with the most recent deed.
- **Certified Survey Map:** A copy of the certified survey map or the relevant section of the recorded plat map for those properties where the legal description in the most recent deed refers to a certified survey map or a recorded plat map. In cases where the certified survey map or recorded plat map are not legible or are unavailable, a copy of a parcel map from a county land information office may be substituted. A copy of a parcel map from a county land information office shall be legible, and the parcels identified in the legal description shall be clearly identified and labeled with the applicable parcel identification number.
- **Verification of Zoning:** Documentation (e.g., official zoning map or letter from municipality) of the property's or properties' current zoning status.
- **Signed Statement:** A statement signed by the Responsible Party (RP), which states that he or she believes the attached legal description(s) accurately describe(s) the correct contaminated property or properties.

Notifications to Owners of Affected Properties (Attachment G)

							Reasons Notification Letter Sent:													
ID	Address of Affected Property	Parcel ID No.	Date of Receipt of Letter	Type of Property Owner	WTMX	WTMY	Residual Groundwater Contamination = or > ES	Residual Soil Contamination Exceeds RCLs	Monitoring Wells: Not Abandoned	Monitoring Wells: Continued Monitoring	Cover/Barrier/Engineered Control	Structural Impediment	Industrial RCLs Met/Applied	Vapor Mitigation System(VMS)	Dewatering System Needed for VMS	Compounds of Concern in Use	Commercial/Industrial Vapor Exposure Assumptions Applied	Residual Volatile Contamination Poses Future Risk of Vapor Intrusion	Site Specification Situation
A	1100 MILWAUKEE AVENUE SOUTH MILWAUKEE, WI	77-09-999000	02/15/2018	SPO	694414	273241		X			X	X	X						

Signatures and Findings for Closure Determination

Check the correct box for this case closure request, and have either a professional engineer or a hydrogeologist, as defined in ch. NR 712, Wis. Adm. Code, sign this document.

☐ A response action(s) for this site addresses groundwater contamination (including natural attenuation remedies).

☒ The response action(s) for this site addresses media other than groundwater.

Engineering Certification

I _____ hereby certify that I am a registered professional engineer in the State of Wisconsin, registered in accordance with the requirements of ch. A-E 4, Wis. Adm. Code; that this case closure request has been prepared by me or prepared under my supervision in accordance with the Rules of Professional Conduct in ch. A-E 8, Wis. Adm. Code; and that, to the best of my knowledge, all information contained in this case closure request is correct and the document was prepared in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code. Specifically, with respect to compliance with the rules, in my professional opinion a site investigation has been conducted in accordance with ch. NR 716, Wis. Adm. Code, and all necessary remedial actions have been completed in accordance with chs. NR 140, NR 718, NR 720, NR 722, NR 724 and NR 726, Wis. Adm. Codes."

Printed Name	Title
Signature	Date / P.E. Stamp and Number

Hydrogeologist Certification

I David G. Bauer, P.G. hereby certify that I am a hydrogeologist as that term is defined in s. NR 712.03 (1), Wis. Adm. Code, and that, to the best of my knowledge, all of the information contained in this case closure request is correct and the document was prepared by me or prepared by me or prepared under my supervision and, in compliance with all applicable requirements in chs. NR 700 to 726, Wis. Adm. Code. Specifically, with respect to compliance with the rules, in my professional opinion a site investigation has been conducted in accordance with ch. NR 716, Wis. Adm. Code, and all necessary remedial actions have been completed in accordance with chs. NR 140, NR 718, NR 720, NR 722, NR 724 and NR 726, Wis. Adm. Codes."

David Bauer	Professional Geologist/Senior Project Manager at GZA
Printed Name	Title
Signature	November 20, 2018
	Date

ATTACHMENT A.4
VAPOR ANALYTICAL TABLE
Caterpillar West Forge Shop
1100 Milwaukee Avenue
South Milwaukee, Wisconsin

SUB-SLAB SAMPLING RESULTS:

Sub-Slab Sample ID	Date of Sample Collection	1,1,1-TCA	1,1-DCA	1,1-DCE	1,2,4-TMB	1,3,5-TMB	2-Butanone	MIBK	Acetone	Benzene	Carbon Disulfide	Ethylbenzene	Cyclohexane
Residential Sub-Slab Vapor Risk Screening Level (µg/m^3)		170,000	600	7,000	2,100	2,100	173,333	103,333	1,066,667	120	24,333	370	210,000
Sm. Commercial Sub-Slab Vapor Risk Screening Level (µg/m^3)		730,000	2,600	29,000	8,700	8,700	733,333	433,333	4,666,667	530	103,333	1,600	866,667
Industrial Sub-Slab Vapor Risk Screening Level (µg/m^3)		2,200,000	7,700	88,000	26,000	26,000	2,200,000	1,300,000	14,000,000	1,600	310,000	4,900	2,600,000
SS-1	4/10/17	11	3.6 J	<1.3	15	5.1 J	130	13 J	2,100	5.3 J	6.7 J	5.3 J	31
SS-2	4/10/17	<1.6	2.9 J	<1.3	7.2 J	<3.2	32	<8	490	8.9	40	6.1 J	11 J
SS-3	4/10/17	61	16	2.5 J	5.9 J	<3.2	19 J	<8	230	6.9	17	6.5 J	13 J
SS-4	10/22/18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-5	10/22/18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SS-6	10/22/18	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Sub-Slab Sample ID	Date of Sample Collection	Hexane	Isopropyl Alcohol	Methylene Chloride	Total Xylenes	Naphthalene	Styrene	PCE	Tetrahydrofuran	Toluene	TCE	TFM
Residential Sub-Slab Vapor Risk Screening Level (µg/m^3)		24,333	7,000	21,000	3,300	28	33,333	1,400	70,000	170,000	70	NS
Sm. Commercial Sub-Slab Vapor Risk Screening Level (µg/m^3)		103,333	29,333	87,000	15,000	120	146,667	6,000	293,333	730,000	290	NS
Industrial Sub-Slab Vapor Risk Screening Level (µg/m^3)		310,000	88,000	260,000	44,000	360	440,000	18,000	880,000	2,200,000	880	NS
SS-1	4/10/17	7.1 J	81 J	8.7 J,B	23	6.9 J	16	<2.7	6.9 J	12	<1.9	1.5 J
SS-2	4/10/17	16 J	46 J	8.7 J,B	17 J	<4.7	7.1 J	6.5 J	<1.9	15	<1.9	<1.3
SS-3	4/10/17	21 J	14 J	9.2 J,B	18	<4.7	7.8 J	260	3.4 J	16	2.4 J	1.5 J
SS-4	10/22/18	NA	NA	NA	NA	<0.47	NA	NA	NA	NA	NA	NA
SS-5	10/22/18	NA	NA	NA	NA	<0.47	NA	NA	NA	NA	NA	NA
SS-6	10/22/18	NA	NA	NA	NA	<0.47	NA	NA	NA	NA	NA	NA

INDOOR AIR SAMPLING RESULTS:

Indoor Air Sample ID	Date of Sample Collection	Naphthalene
Residential Indoor Air Vapor Action Level (µg/m^3)		0.83
Sm. Commercial Indoor Air Vapor Action Level (µg/m^3)		3.6
Industrial Sub-Slab Indoor Air Vapor Action Level (µg/m^3)		3.6
West Forge Shop - North IA	10/19/18	<0.47
West Forge Shop - South IA	10/19/18	<0.47
West Forge Shop - Background IA	10/19/18	<0.47

NOTES:

1. Samples collected by GZA GeoEnvironmental, Inc. of Waukesha, Wisconsin were analyzed by TestAmerica Laboratories, Inc. of Knoxville, Tennessee for the listed volatile organic compounds (VOCs) in accordance with United States Environmental Protection Agency (USEPA) Method TO-15. Results are reported to the Reporting Limit (RL) or Limit of Quantification (LOQ).
2. Analytical results are provided in units of micrograms per cubic meters (µg/m^3). Only detected constituents with Industrial sub-slab vapor risk screening levels (VRSLs) were included in the table.
3. The sub-slab VRSLs and indoor air vapor action levels (VALs) were obtained from the *Wisconsin Vapor Quick Look-Up Table Indoor Air Vapor Action Levels and Vapor Risk Screening Levels (based on November 2017 USEPA Regional Screening Levels).* If a constituent was not listed on the WI Quick Look-up Table, then the VALs found on the USEPA Regional Screening Levels tables (updated May 2018) were used with a 0.03 attenuation factor for residential or small commerical building and a 0.01 attenuation factor for large commercial or industrial (building slab).
4. Constituent abbreviations are used as follows: 1,1,1-TCA denotes 1,1,1-trichloroethane; 1,1-DCA denotes 1,1-dichloroethane; 1,1-DCE denotes 1,1-dichloroethene; 1,2,4-TMB denotes 1,2,4-trimethylbenzene; 1,3,5-TMB denotes 1,3,5-trimethylbenzene; PCE denotes tetrachloroethene; MIBK denotes 4-methyl-2-pentanone; TCE denotes trichloroethene; and TFM denotes trichlorofluoromethane.
5. "NS" indicates that a vapor standard has not been established by the USEPA.
6. "NA" indicates that the sample was not analyzed for the constituent.
7. "J"= Result is less than the RL but greater than or equal to the MDL, therfore the concentration is an approximate value.
8. "B" = Compound was found in the blank and sample.
9. Sub-slab vapor samples were collected in general accordance with WDNR guidance (December 201 PUB-RR-800). After conducting the probe purging activities, confirming that pre- and post-shroud helium concentrations were similar, and conducting the shut-in test, each vapor sample was collected into a laboratory-prepared (25 to 30 pounds per square inch [psi] vacuum), 1-liter SUMMA® Canister. A flow controller was used to limit the vapor flow to approximately 20 ml/min resulting in a canister fill time of approximately 60 minutes.

ATTACHMENT B
TABLE OF CONTENTS
Caterpillar West Forge Shop
Former Bucyrus International Inc.
1100 Milwaukee Avenue
South Milwaukee, Wisconsin
WDNR BRRTS # 02-41-577015 & 02-41-256986

B.4. VAPOR MAPS AND OTHER MEDIA

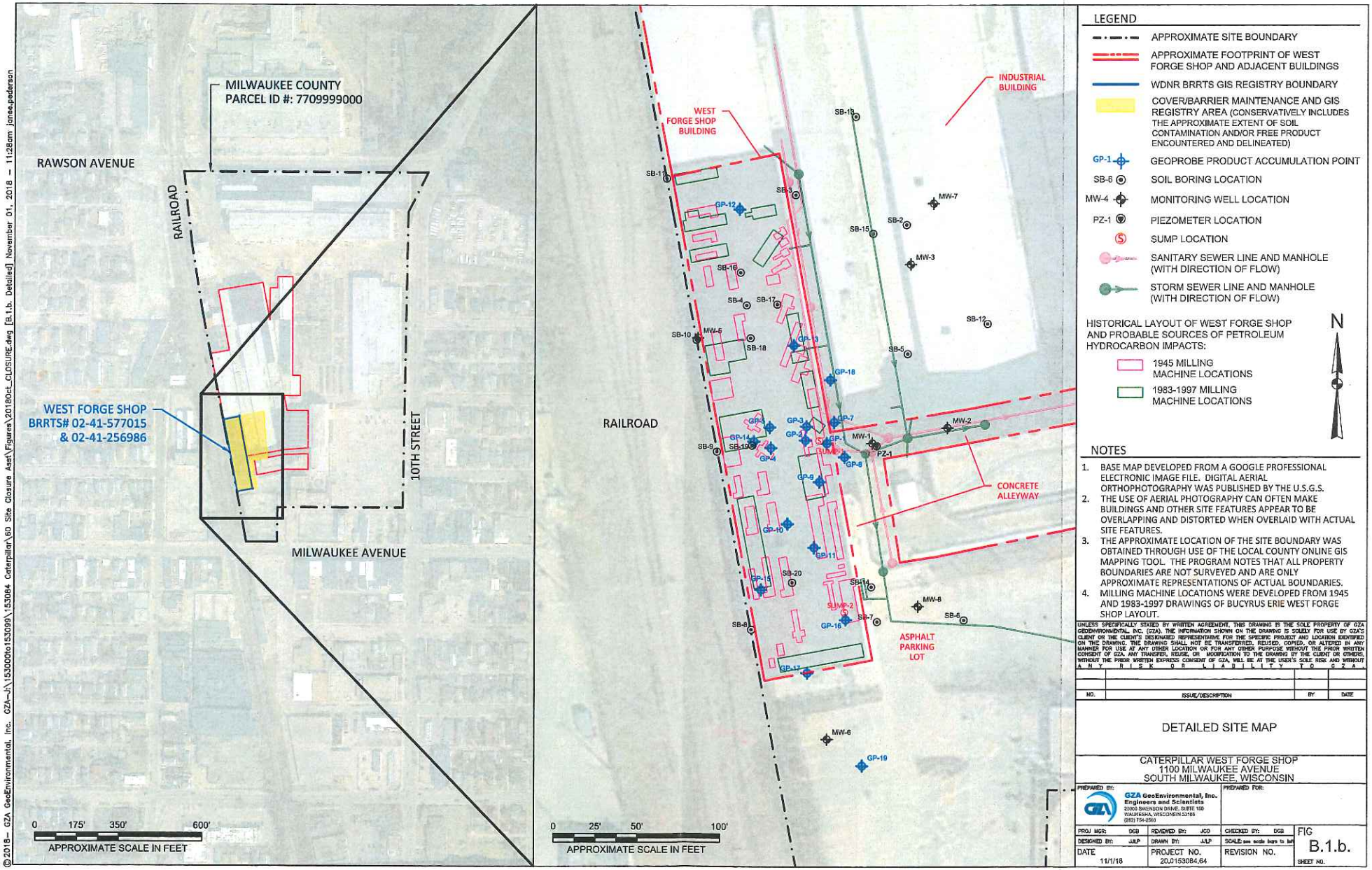
B.4.a. Vapor Intrusion Map

B.4.b. Other Media of Concern

- Additional media of concern (sediment, surface water, etc.) was not identified during investigation activities at the Site. As such, Attachment B.4.b is not included.

B.4.c. Other Additional Figure – Aerial Extent of Petroleum Hydrocarbon Impacts Observed in Soil and Measurable Free-Phase Petroleum Hydrocarbon Product

B.5. STRUCTURAL IMPEDIMENT PHOTOS



LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE FOOTPRINT OF WEST FORGE SHOP AND ADJACENT BUILDINGS
- WDNR BRRTS GIS REGISTRY BOUNDARY
- COVER/BARRIER MAINTENANCE AND GIS REGISTRY AREA (CONSERVATIVELY INCLUDES THE APPROXIMATE EXTENT OF SOIL CONTAMINATION AND/OR FREE PRODUCT ENCOUNTERED AND DELINEATED)
- GP-1 GEOPROBE PRODUCT ACCUMULATION POINT
- SB-6 SOIL BORING LOCATION
- MW-4 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- (S) SUMP LOCATION
- SANITARY SEWER LINE AND MANHOLE (WITH DIRECTION OF FLOW)
- STORM SEWER LINE AND MANHOLE (WITH DIRECTION OF FLOW)

HISTORICAL LAYOUT OF WEST FORGE SHOP AND PROBABLE SOURCES OF PETROLEUM HYDROCARBON IMPACTS:

- 1945 MILLING MACHINE LOCATIONS
- 1983-1997 MILLING MACHINE LOCATIONS

N

NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.G.S.
2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. MILLING MACHINE LOCATIONS WERE DEVELOPED FROM 1945 AND 1983-1997 DRAWINGS OF BUCYRUS ERIE WEST FORGE SHOP LAYOUT.

NO.	ISSUE/DESCRIPTION	BY	DATE

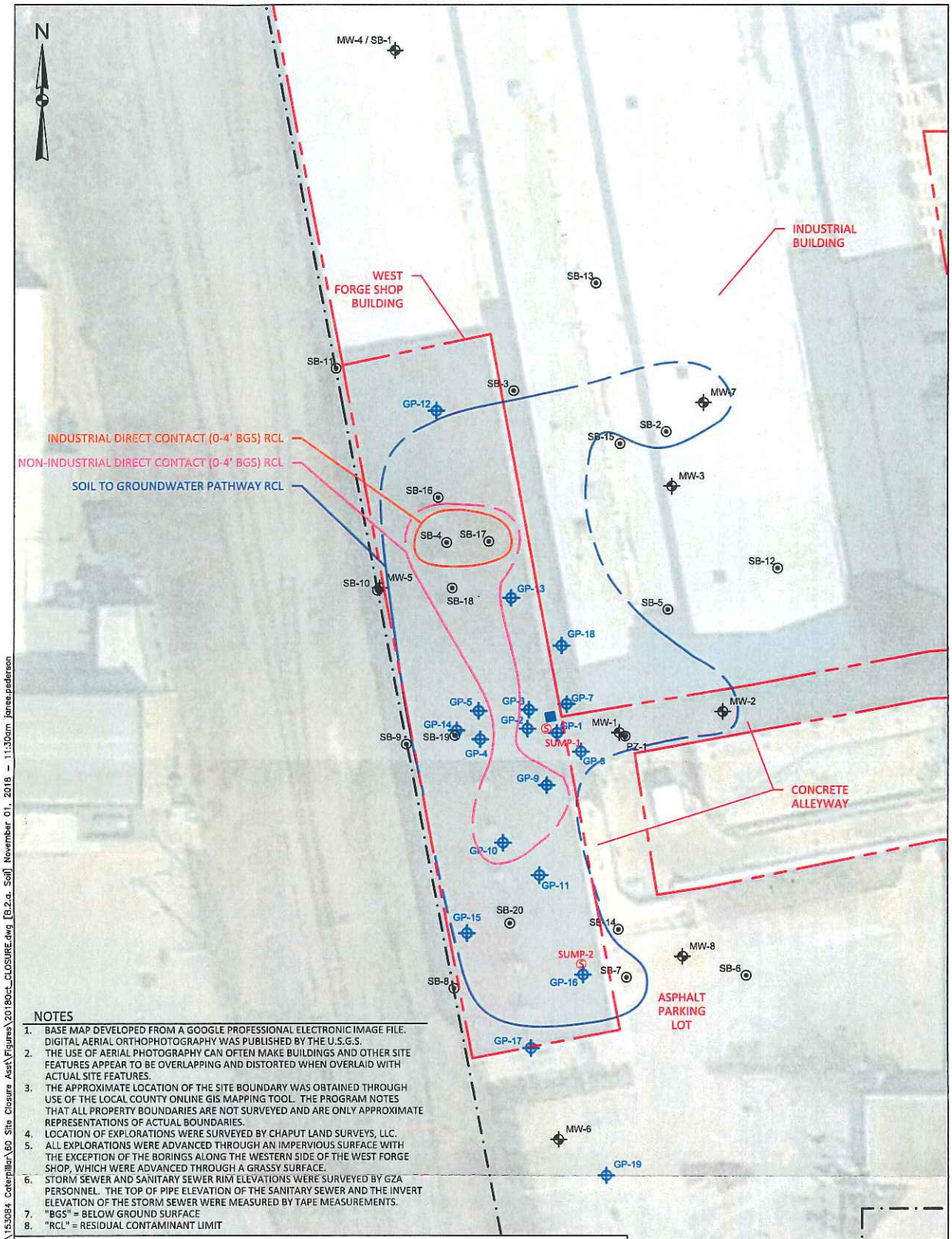
DETAILED SITE MAP

CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY:
GZA GeoEnvironmental, Inc.
Engineers and Scientists
20300 SWENSON DRIVE, SUITE 100
WAUKESHA, WISCONSIN 53186
(262) 754-2500

PREPARED FOR:

PROJ MGR: DGB	REVIEWED BY: JCO	CHECKED BY: DGB	FIG	B.1.b.
DESIGNED BY: JJLP	DRAWN BY: JJLP	SCALE: see scale bars to left		
DATE: 11/1/18	PROJECT NO. 20.0153084.64	REVISION NO.	SHEET NO.	



NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.G.S.
2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. LOCATION OF EXPLORATIONS WERE SURVEYED BY CHAPUT LAND SURVEYS, LLC.
5. ALL EXPLORATIONS WERE ADVANCED THROUGH AN IMPERVIOUS SURFACE WITH THE EXCEPTION OF THE BORINGS ALONG THE WESTERN SIDE OF THE WEST FORGE SHOP, WHICH WERE ADVANCED THROUGH A GRASSY SURFACE.
6. STORM SEWER AND SANITARY SEWER RIM ELEVATIONS WERE SURVEYED BY GZA PERSONNEL. THE TOP OF PIPE ELEVATION OF THE SANITARY SEWER AND THE INVERT ELEVATION OF THE STORM SEWER WERE MEASURED BY TAPE MEASUREMENTS.
7. "BGS" = BELOW GROUND SURFACE
8. "RCL" = RESIDUAL CONTAMINANT LIMIT

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BUILDING FOOTPRINT (EXTERIOR BUILDING WALLS CONSIDERED STRUCTURAL IMPEDIMENTS)
- GP-1 GEOPROBE PRODUCT ACCUMULATION POINT
- SB-6 SOIL BORING LOCATION
- MW-4 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- WATER VALVE PIT MANHOLE (ABANDONED)
- SUMP LOCATION
- APPROXIMATE UNSATURATED HORIZONTAL EXTENT OF IMPACTED SOIL IN EXCEEDANCE OF AN INDUSTRIAL DIRECT CONTACT RCL
- APPROXIMATE UNSATURATED HORIZONTAL EXTENT OF IMPACTED SOIL IN EXCEEDANCE OF A NON-INDUSTRIAL DIRECT CONTACT RCL (DASHED WHERE INFERRED)
- APPROXIMATE UNSATURATED HORIZONTAL EXTENT OF IMPACTED SOIL IN EXCEEDANCE OF A SOIL TO GROUNDWATER PATHWAY RCL (DASHED WHERE INFERRED)

0 20' 40' 80'
APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

SOIL CONTAMINATION

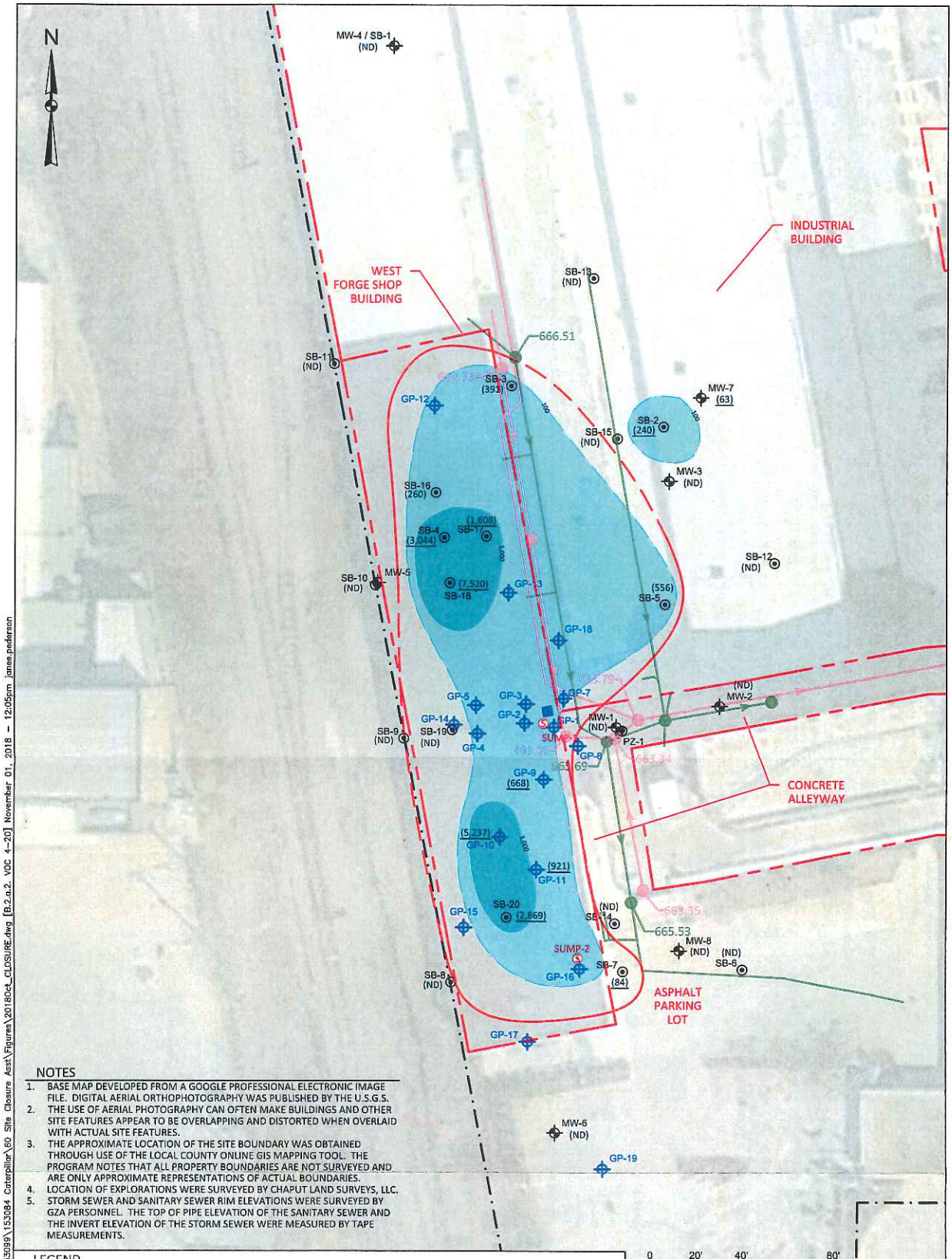
CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2500

PREPARED FOR:

PROJ MGR:	DGB	REVIEWED BY:	JCO	CHECKED BY:	DGB
DESIGNED BY:	DGB	DRAWN BY:	JJLP	SCALE:	see above
DATE	11/1/18	PROJECT NO.	20.0153084.64	REVISION NO.	

FIGURE B.2.a.
SHEET NO.



NOTES

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2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. LOCATION OF EXPLORATIONS WERE SURVEYED BY CHAPUT LAND SURVEYS, LLC.
5. STORM SEWER AND SANITARY SEWER RIM ELEVATIONS WERE SURVEYED BY GZA PERSONNEL. THE TOP OF PIPE ELEVATION OF THE SANITARY SEWER AND THE INVERT ELEVATION OF THE STORM SEWER WERE MEASURED BY TAPE MEASUREMENTS.

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BUILDING FOOTPRINT
- GP-1 GEOPROBE PRODUCT ACCUMULATION POINT
- SB-6 SOIL BORING LOCATION
- MW-4 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- WATER VALVE PIT MANHOLE
- SUMP LOCATION
- 663.35 SANITARY SEWER LINE AND MANHOLE (WITH TOP OF SEWER PIPE ELEVATION AND DIRECTION OF FLOW)
- 665.53 STORM SEWER LINE AND MANHOLE (WITH SEWER INVERT PIPE ELEVATION AND DIRECTION OF FLOW)
- APPROXIMATE TOTAL VOC ISO-CONCENTRATION CONTOURS
- APPROXIMATE EXTENT OF RESIDUAL PETROLEUM HYDROCARBON IMPACTS OBSERVED WITHIN SOIL SAMPLE PARTINGS IN 2016 (DASHED WHERE INFERRED)
- (260) TOTAL VOC CONCENTRATION (UNITS IN ug/kg)
- (240) CONCENTRATION OF SELECT CONSTITUENTS WHICH EXCEED A SOIL TO GROUNDWATER PATHWAY RCL
- (ND) CONSTITUENTS NOT DETECTED ABOVE LABORATORY REPORTING LIMIT

0 20' 40' 80'
APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

TOTAL VOC SOIL ISO-CONCENTRATION MAP 4-20' BELOW GROUND SURFACE

(SOIL TO GROUNDWATER RCL PATHWAY EXCEEDANCES)

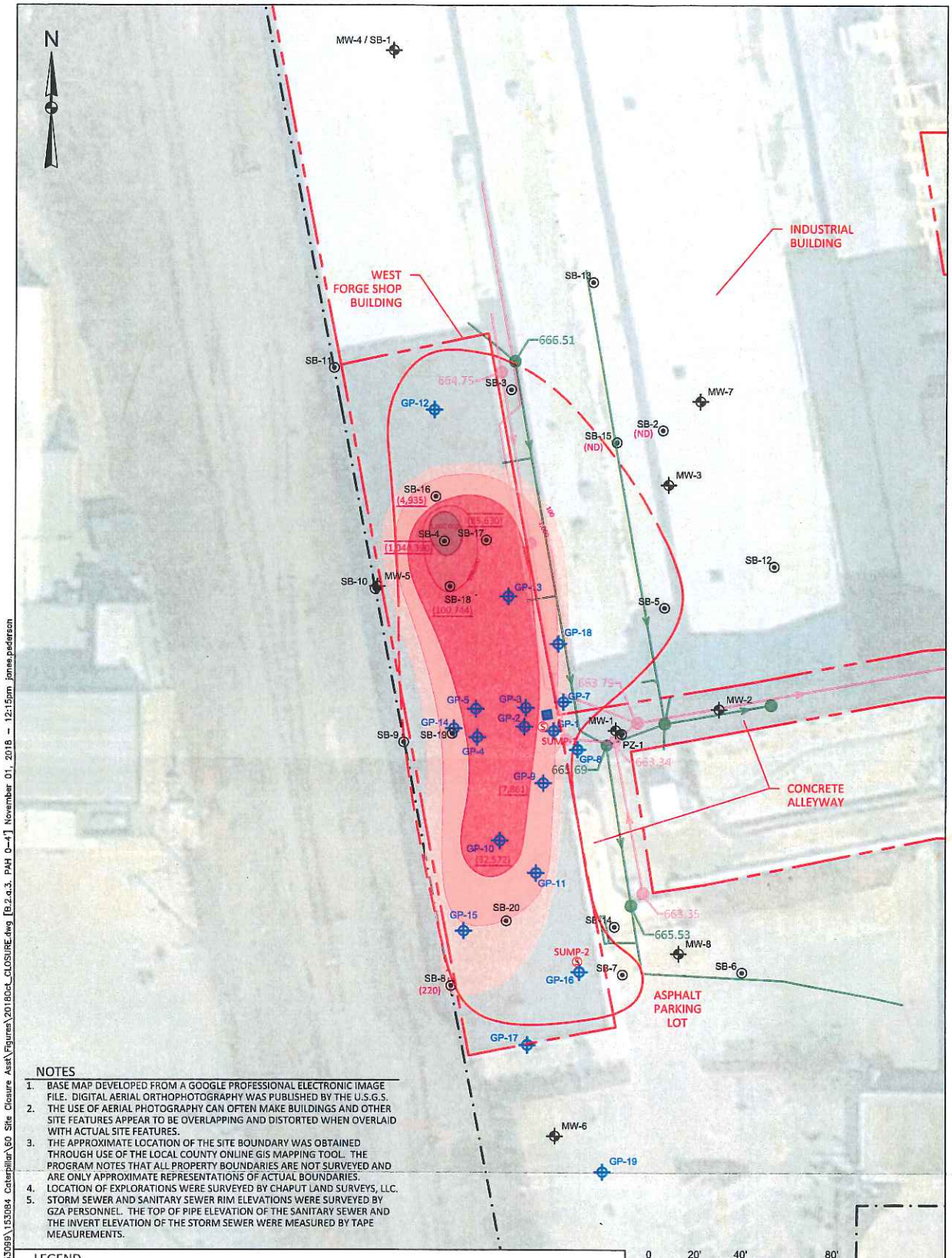
CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists
2300 SWANSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53189
(262) 754-2360

PREPARED FOR:

PROJ MGR:	DGB	REVIEWED BY:	DGB	CHECKED BY:	DGB
DESIGNED BY:	DGB	DRAWN BY:	JJLP	SCALE:	see above
DATE	11/1/18	PROJECT NO.	20.0153084.64	REVISION NO.	

FIGURE B.2.a.2.
SHEET NO.



NOTES

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2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. LOCATION OF EXPLORATIONS WERE SURVEYED BY CHAPUT LAND SURVEYS, LLC.
5. STORM SEWER AND SANITARY SEWER RIM ELEVATIONS WERE SURVEYED BY GZA PERSONNEL. THE TOP OF PIPE ELEVATION OF THE SANITARY SEWER AND THE INVERT ELEVATION OF THE STORM SEWER WERE MEASURED BY TAPE MEASUREMENTS.

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BUILDING FOOTPRINT
- GP-1 GEOPROBE PRODUCT ACCUMULATION POINT
- SB-6 SOIL BORING LOCATION
- MW-4 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- WATER VALVE PIT MANHOLE
- (S) SUMP LOCATION
- 663.35 SANITARY SEWER LINE AND MANHOLE (WITH TOP OF SEWER PIPE ELEVATION AND DIRECTION OF FLOW)
- 665.53 STORM SEWER LINE AND MANHOLE (WITH SEWER INVERT PIPE ELEVATION AND DIRECTION OF FLOW)
- APPROXIMATE TOTAL PAH ISO-CONCENTRATION CONTOURS
- APPROXIMATE EXTENT OF RESIDUAL PETROLEUM HYDROCARBON IMPACTS OBSERVED WITHIN SOIL SAMPLE PARTINGS IN 2016 (DASHED WHERE INFERRED)
- (85,630) CONCENTRATION OF SELECT CONSTITUENTS WHICH EXCEED INDUSTRIAL DIRECT CONTACT AND SOIL TO GROUNDWATER PATHWAY RCLs
- (85,630) CONCENTRATION OF SELECT CONSTITUENTS WHICH EXCEED A SOIL TO GROUNDWATER PATHWAY RCL BUT ARE BELOW INDUSTRIAL DIRECT CONTACT RCL
- (220) TOTAL PAH CONCENTRATION (UNITS IN ug/kg)
- (ND) CONSTITUENTS NOT DETECTED ABOVE LABORATORY REPORTING LIMIT

0 20' 40' 80'
APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

TOTAL PAH SOIL ISO-CONCENTRATION MAP 0-4' BELOW GROUND SURFACE

(INDUSTRIAL DIRECT CONTACT AND SOIL TO GROUNDWATER RCL PATHWAY EXCEEDANCES)

CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists, 20900 SWENSON DRIVE, SUITE 150, WAUKESHA, WISCONSIN 53186, (262) 754-2960

PREPARED FOR:

PROJ MGR: DGB	REVIEWED BY: DGB	CHECKED BY: DGB	FIGURE
DESIGNED BY: DGB	DRAWN BY: JJLP	SCALE: see above	B.2.a.3.
DATE 11/1/18	PROJECT NO. 20.0153084.64	REVISION NO.	SHEET NO.

NOTES

1. BASE MAP DEVELOPED FROM A GOOGLE PROFESSIONAL ELECTRONIC IMAGE FILE. DIGITAL AERIAL ORTHOPHOTOGRAPHY WAS PUBLISHED BY THE U.S.G.S.
2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. LOCATION OF EXPLORATIONS WERE SURVEYED BY CHAPUT LAND SURVEYS, LLC.
5. STORM SEWER AND SANITARY SEWER RIM ELEVATIONS WERE SURVEYED BY GZA PERSONNEL. THE TOP OF PIPE ELEVATION OF THE SANITARY SEWER AND THE INVERT ELEVATION OF THE STORM SEWER WERE MEASURED BY TAPE MEASUREMENTS.

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BUILDING FOOTPRINT
- GP-1 GEOPROBE PRODUCT ACCUMULATION POINT
- SB-6 SOIL BORING LOCATION
- MW-4 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- WATER VALVE PIT MANHOLE
- S SUMP LOCATION
- SANITARY SEWER LINE AND MANHOLE (663.35 WITH TOP OF SEWER PIPE ELEVATION AND DIRECTION OF FLOW)
- STORM SEWER LINE AND MANHOLE (665.53 WITH SEWER INVERT PIPE ELEVATION AND DIRECTION OF FLOW)
- APPROXIMATE EXTENT OF RESIDUAL PETROLEUM HYDROCARBON IMPACTS OBSERVED WITHIN SOIL SAMPLE PARTINGS IN 2016 (DASHED WHERE INFERRED)
- APPROXIMATE TOTAL PAH ISO-CONCENTRATION CONTOURS
- (41,000) CONCENTRATION OF SELECT CONSTITUENTS WHICH EXCEED A SOIL TO GROUNDWATER PATHWAY RCL
- (554) TOTAL PAH CONCENTRATION (UNITS IN ug/kg)
- (ND) CONSTITUENTS NOT DETECTED ABOVE LABORATORY REPORTING LIMIT

NO.	ISSUE/DESCRIPTION	BY	DATE

TOTAL PAH SOIL ISO-CONCENTRATION MAP 4'-20' BELOW GROUND SURFACE

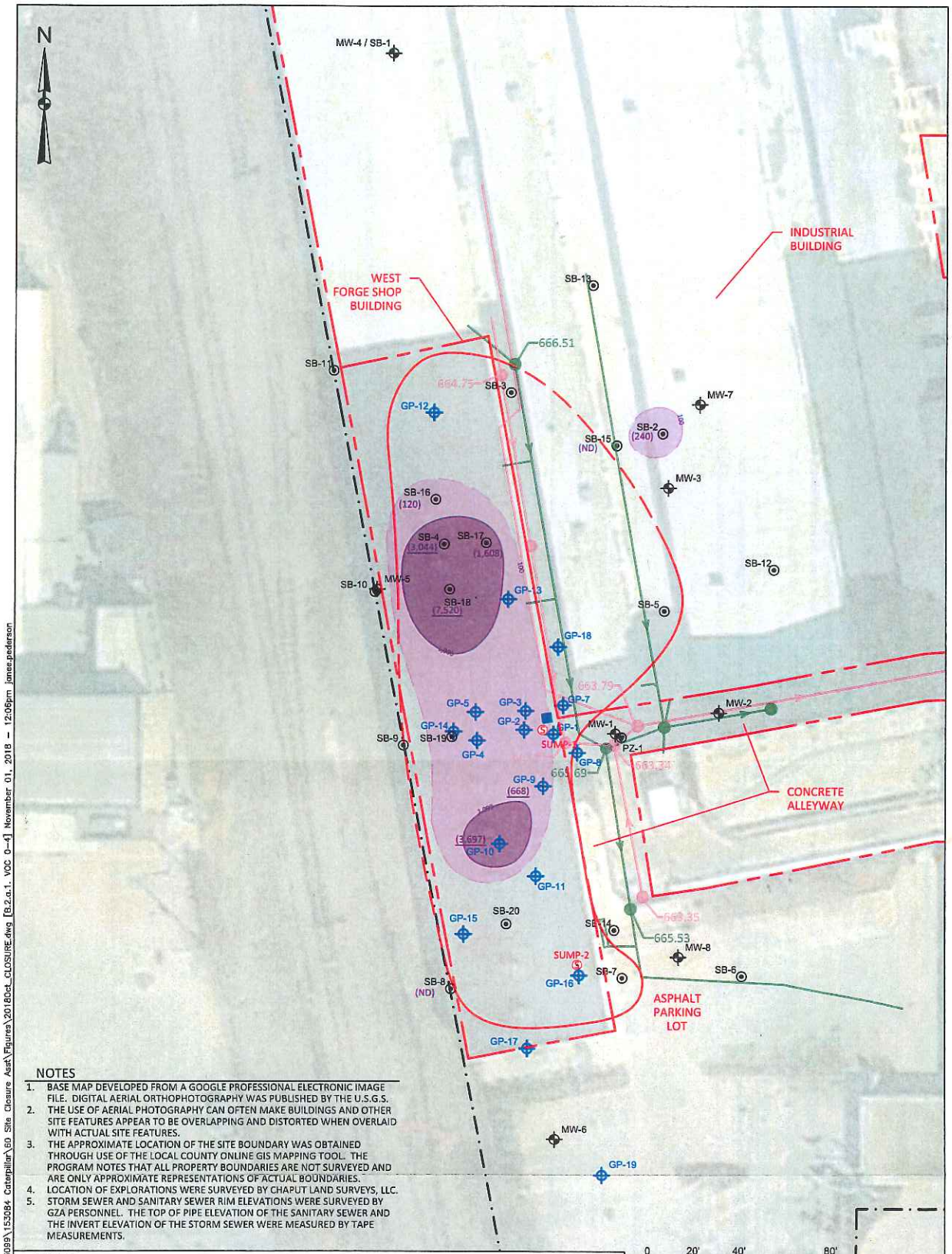
(INDUSTRIAL DIRECT CONTACT AND SOIL TO GROUNDWATER RCL PATHWAY EXCEEDANCES)

CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists, 20000 SWENSON DRIVE, SUITE 150, WAUKESHA, WISCONSIN 53186, (262) 754-2500

PREPARED FOR:

PROJ MGR: DGB	REVIEWED BY: DGB	CHECKED BY: DGB	FIGURE B.2.a.4.
DESIGNED BY: DGB	DRAWN BY: JJLP	SCALE: see above	
DATE 11/1/18	PROJECT NO. 20.0153084.64	REVISION NO.	SHEET NO.



NOTES

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2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. LOCATION OF EXPLORATIONS WERE SURVEYED BY CHAPUT LAND SURVEYS, LLC.
5. STORM SEWER AND SANITARY SEWER RIM ELEVATIONS WERE SURVEYED BY GZA PERSONNEL. THE TOP OF PIPE ELEVATION OF THE SANITARY SEWER AND THE INVERT ELEVATION OF THE STORM SEWER WERE MEASURED BY TAPE MEASUREMENTS.

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BUILDING FOOTPRINT
- GP-1 GEOPROBE PRODUCT ACCUMULATION POINT
- SB-6 SOIL BORING LOCATION
- MW-4 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- WATER VALVE PIT MANHOLE
- (S) SUMP LOCATION
- 663.35 SANITARY SEWER LINE AND MANHOLE (WITH TOP OF SEWER PIPE ELEVATION AND DIRECTION OF FLOW)
- 665.53 STORM SEWER LINE AND MANHOLE (WITH SEWER INVERT PIPE ELEVATION AND DIRECTION OF FLOW)
- APPROXIMATE TOTAL VOC ISO-CONCENTRATION CONTOURS
- APPROXIMATE EXTENT OF RESIDUAL PETROLEUM HYDROCARBON IMPACTS OBSERVED WITHIN SOIL SAMPLE PARTINGS IN 2016 (DASHED WHERE INFERRED)
- (220) TOTAL VOC CONCENTRATION (UNITS IN ug/kg)
- (85,630) CONCENTRATION OF SELECT CONSTITUENTS WHICH EXCEED A SOIL TO GROUNDWATER PATHWAY RCL
- (ND) CONSTITUENTS NOT DETECTED ABOVE LABORATORY REPORTING LIMIT

NO.	ISSUE/DESCRIPTION	BY	DATE

TOTAL VOC SOIL ISO-CONCENTRATION MAP
0-4' BELOW GROUND SURFACE
(SOIL TO GROUNDWATER RCL PATHWAY EXCEEDANCES)

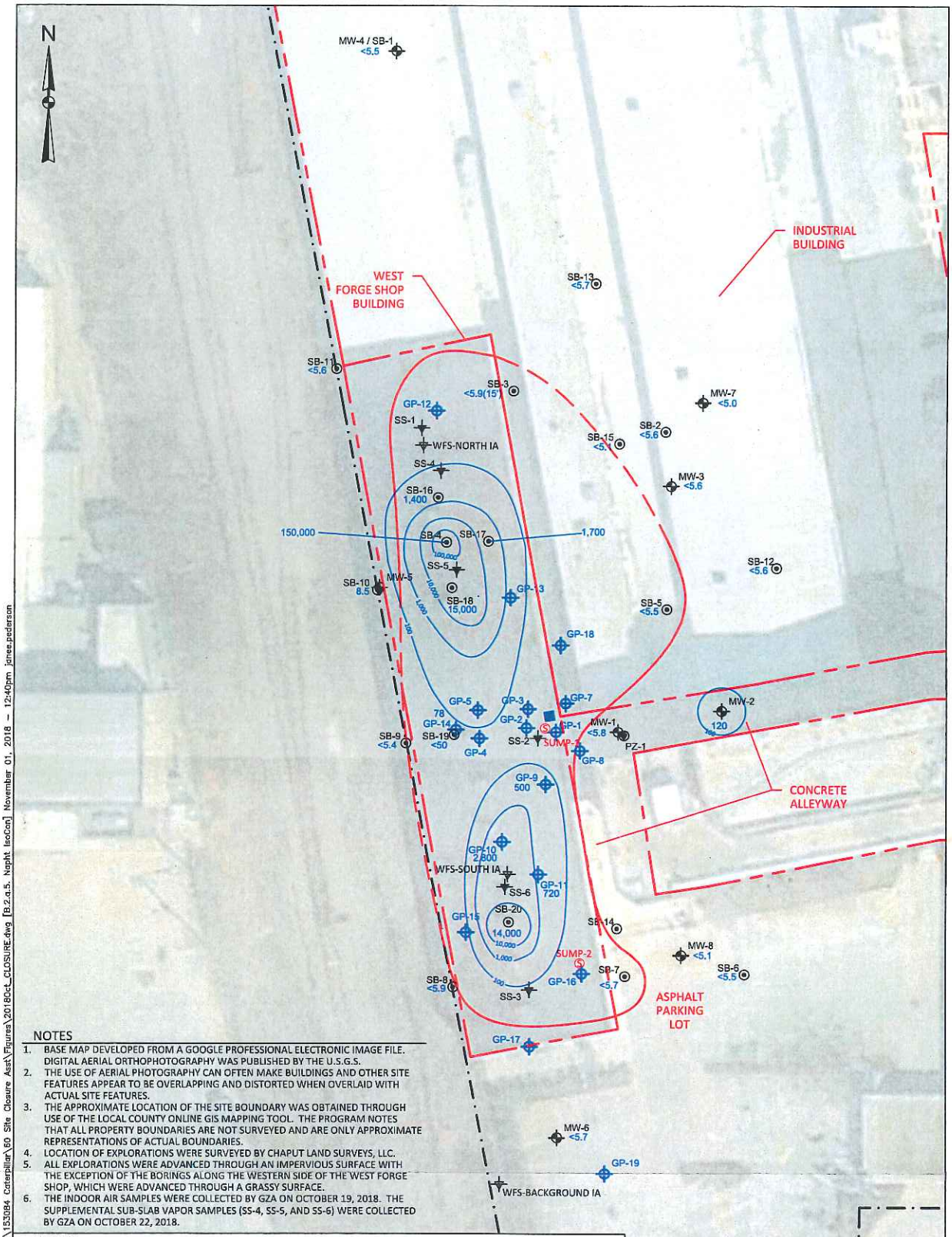
CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists, 20000 SWENSON DRIVE, SUITE 150 WAUKESHA, WISCONSIN 53186 (262) 754-2560

PREPARED FOR:

PROJ MGR:	DGB	REVIEWED BY:	DGB	CHECKED BY:	DGB
DESIGNED BY:	DGB	DRAWN BY:	JJLP	SCALE:	see above
DATE	11/1/18	PROJECT NO.	20.0153084.64	REVISION NO.	

FIGURE B.2.a.1
SHEET NO.



NOTES

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2. THE USE OF AERIAL PHOTOGRAPHY CAN OFTEN MAKE BUILDINGS AND OTHER SITE FEATURES APPEAR TO BE OVERLAPPING AND DISTORTED WHEN OVERLAID WITH ACTUAL SITE FEATURES.
3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. LOCATION OF EXPLORATIONS WERE SURVEYED BY CHAPUT LAND SURVEYS, LLC.
5. ALL EXPLORATIONS WERE ADVANCED THROUGH AN IMPERVIOUS SURFACE WITH THE EXCEPTION OF THE BORINGS ALONG THE WESTERN SIDE OF THE WEST FORGE SHOP, WHICH WERE ADVANCED THROUGH A GRASSY SURFACE.
6. THE INDOOR AIR SAMPLES WERE COLLECTED BY GZA ON OCTOBER 19, 2018. THE SUPPLEMENTAL SUB-SLAB VAPOR SAMPLES (SS-4, SS-5, AND SS-6) WERE COLLECTED BY GZA ON OCTOBER 22, 2018.

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BUILDING FOOTPRINT (EXTERIOR BUILDING WALLS CONSIDERED STRUCTURAL IMPEDIMENTS)
- GP-1 GEOPROBE PRODUCT ACCUMULATION POINT
- SB-6 SOIL BORING LOCATION
- MW-4 MONITORING WELL LOCATION
- PZ-1 PIEZOMETER LOCATION
- WATER VALVE PIT MANHOLE (ABANDONED)
- SUMP LOCATION
- SS-6 SUB-SLAB VAPOR MONITORING POINT
- WFS-IA INDOOR AIR MONITORING POINT
- APPROXIMATE EXTENT OF RESIDUAL PETROLEUM HYDROCARBON IMPACTS OBSERVED WITHIN SOIL SAMPLE PARTINGS IN 2016 (DASHED WHERE INFERRED)
- ISO-CONCENTRATION CONTOUR LINE FOR NAPTHALENE IN UNSATURATED SOIL
- <5.8 NAPTHALENE CONCENTRATION DETECTED IN UNSATURATED SOIL

0 20' 40' 80'
APPROXIMATE SCALE IN FEET

NO.	ISSUE/DESCRIPTION	BY	DATE

NAPHTHALENE CONCENTRATIONS IN SHALLOW SOIL WITH VAPOR / AIR MONITORING LOCATIONS

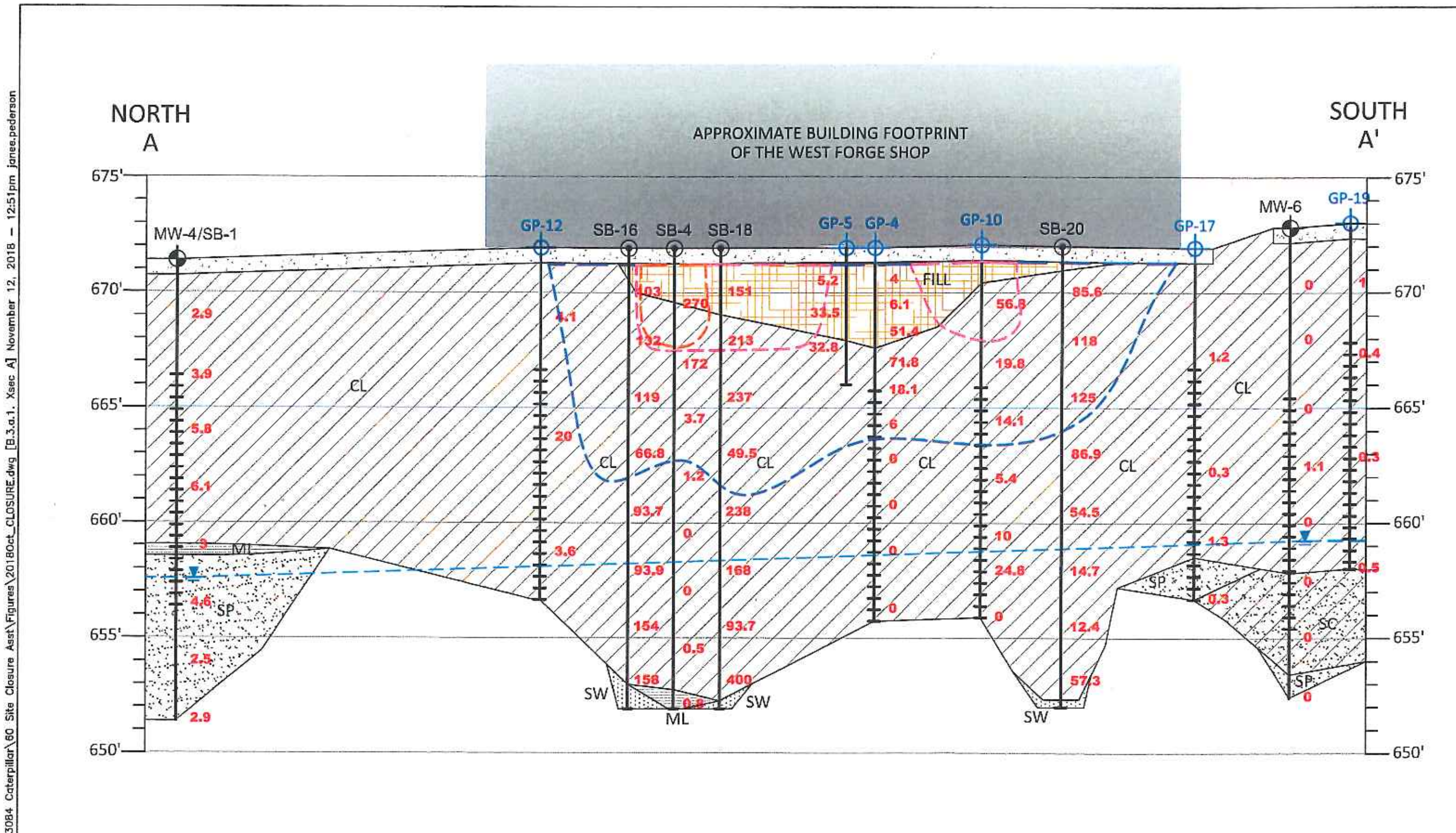
CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

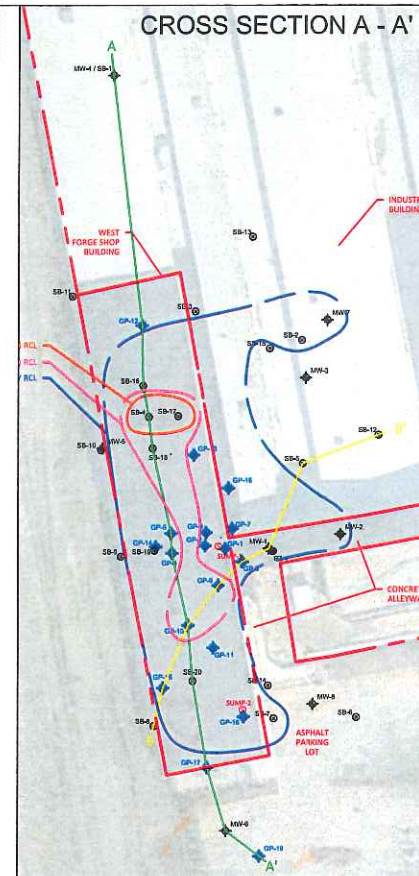
PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists
20500 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2500

PREPARED FOR:

PROJ MGR:	DGB	REVIEWED BY:	JCD	CHECKED BY:	DGB
DESIGNED BY:	DGB	DRAWN BY:	JJLP	SCALE:	see above
DATE	11/1/18	PROJECT NO.	20.0153084.64	REVISION NO.	

FIGURE B.2.a.5
SHEET NO.





LEGEND

	FILL (SAND & GRAVEL)
	SILTY SAND (ML)
	LEAN CLAY (CL) WITH TRACE SAND & GRAVEL INCLUSIONS, AND FEW INTER-BEDDED AND DISCONTINUOUS LENSES OF SILT AND WELL TO POORLY GRADED SAND.
	POORLY GRADED SAND (SP)
	POORLY GRADED CLAYEY SAND (SC)
	WELL GRADED SAND (SW)
	CONCRETE / ASPHALT
SB-4	SOIL BORING
MW-4	MONITORING WELL
GP-9	GEOPROBE PRODUCT ACCUMULATION POINT
	WELL SCREENED INTERVAL
	WATER TABLE (SEPTEMBER 18, 2017) DASHED WHERE INFERRED
2.9	PID READING IN SOIL (IN INSTRUMENT UNITS)
	INFERRED UNSATURATED HORIZONTAL EXTENT OF IMPACTED SOIL IN EXCEEDANCE OF AN INDUSTRIAL DIRECT CONTACT RCL (0 TO 4 FEET BELOW GROUND SURFACE)
	INFERRED UNSATURATED HORIZONTAL EXTENT OF IMPACTED SOIL IN EXCEEDANCE OF A NON-INDUSTRIAL DIRECT CONTACT RCL (0 TO 4 FEET BELOW GROUND SURFACE)
	INFERRED UNSATURATED HORIZONTAL EXTENT OF IMPACTED SOIL IN EXCEEDANCE OF A SOIL TO GROUNDWATER PATHWAY RCL

VERTICAL SCALE IN FEET: 0 – 5' – 10'

HORIZONTAL SCALE IN FEET: 0 – 25' – 50' – 100'

VERTICAL EXAGGERATION: 10X

NOTES

1. MAGNIFICATION OF VERTICAL SCALE FOR PURPOSES OF PRESENTATION CAUSES UNDERGROUND FEATURES TO APPEAR MORE PRONOUNCED THAN THAT WHICH ACTUALLY EXISTS.
2. SURFACE ELEVATIONS WERE APPROXIMATED UTILIZING THE BUILDING SLAB AS ELEVATION 100'.
3. SOIL BORING GP-5 HAD REFUSAL DURING DRILLING AT 6 FEET BELOW GROUND SURFACE.
4. SOIL SAMPLES FROM GP-4 AND GP-5 WERE NOT SUBMITTED FOR LABORATORY ANALYTICAL TESTING.

NO.	ISSUE/DESCRIPTION	BY	DATE

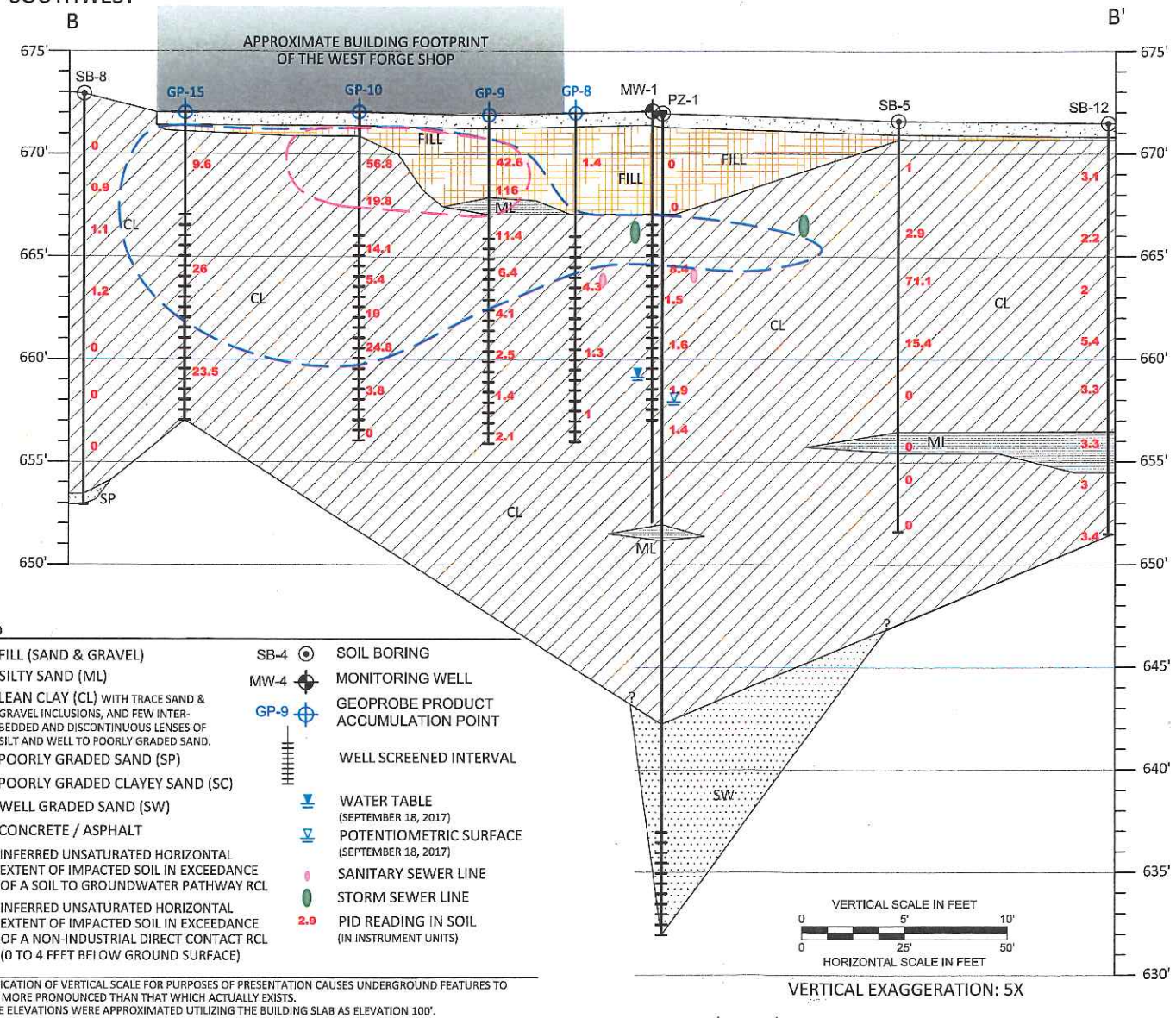
GEOLOGIC CROSS-SECTION
NORTH A - SOUTH A'

CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists
20900 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2560

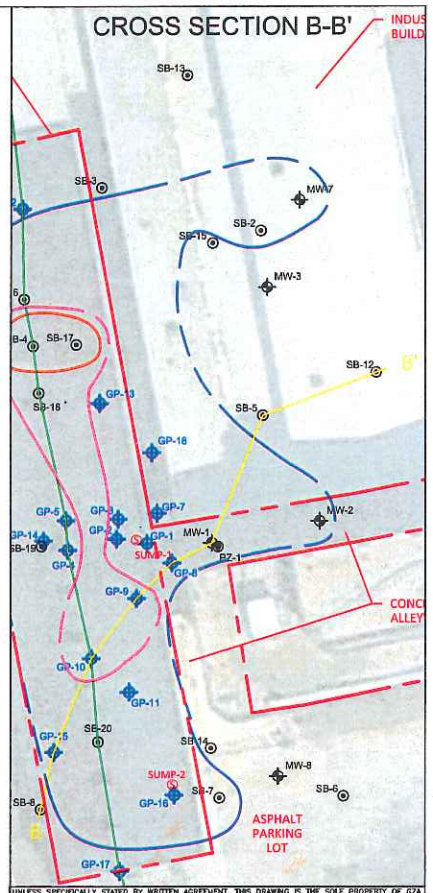
PREPARED FOR:

PROJ MGR: DGB	REVIEWED BY: JCD	CHECKED BY: DGB	FIG
DESIGNED BY: DGB	DRAWN BY: JJLP	SCALE: see above	B.3.a.1.
DATE 11/12/18	PROJECT NO. 20.0153084.64	REVISION NO.	SHEET NO.



NOTES

1. MAGNIFICATION OF VERTICAL SCALE FOR PURPOSES OF PRESENTATION CAUSES UNDERGROUND FEATURES TO APPEAR MORE PRONOUNCED THAN THAT WHICH ACTUALLY EXISTS.
2. SURFACE ELEVATIONS WERE APPROXIMATED UTILIZING THE BUILDING SLAB AS ELEVATION 100'.



NO.	ISSUE/DESCRIPTION	BY	DATE

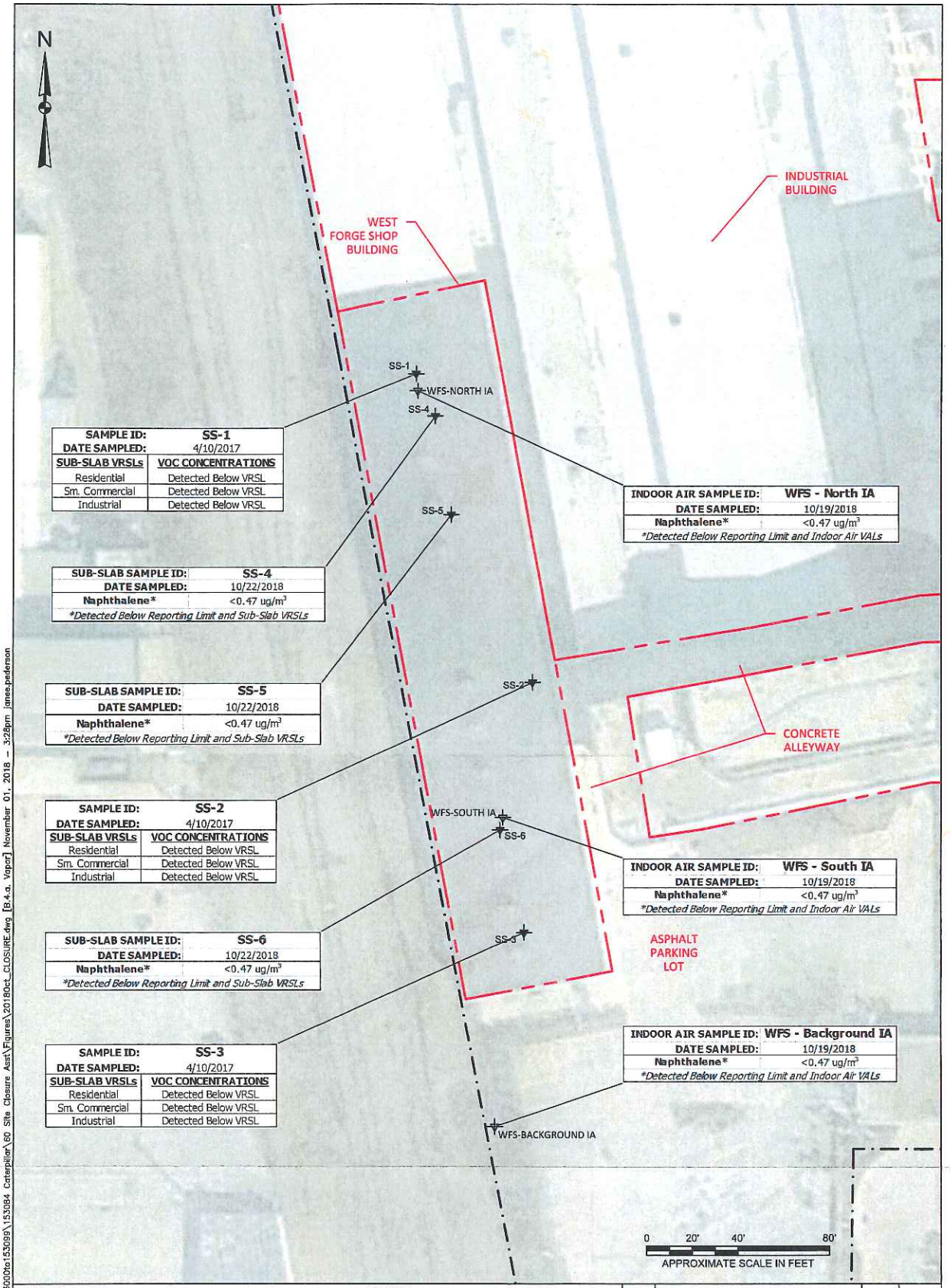
GEOLOGIC CROSS-SECTION
SOUTHWEST B - NORTHEAST B'

CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists
20900 SWENSON DRIVE, SUITE 100
WAUKESHA, WISCONSIN 53186
(262) 754-2560

PREPARED FOR:

PROJ MGR: DGB	REVIEWED BY: JCO	CHECKED BY: DGB	FIG
DESIGNED BY: DGB	DRAWN BY: KLK	SCALE: see above	B.3.a.2.
DATE 11/12/18	PROJECT NO. 20.0153084.64	REVISION NO.	SHEET NO.



NOTES

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3. THE APPROXIMATE LOCATION OF THE SITE BOUNDARY WAS OBTAINED THROUGH USE OF THE LOCAL COUNTY ONLINE GIS MAPPING TOOL. THE PROGRAM NOTES THAT ALL PROPERTY BOUNDARIES ARE NOT SURVEYED AND ARE ONLY APPROXIMATE REPRESENTATIONS OF ACTUAL BOUNDARIES.
4. LOCATION OF EXPLORATIONS WERE SURVEYED BY CHAPUT LAND SURVEYS, LLC.
5. THE SUB-SLAB VAPOR MONITORING POINTS WERE ADVANCED THROUGH AN IMPERVIOUS SURFACE (CONCRETE SLAB).

VOC VOLATILE ORGANIC COMPOUND
ug/m3 MICROGRAMS PER CUBIC METER
VRSL VAPOR RISK SCREENING LEVEL (REFERENCE TABLE A.4)
VAL VAPOR ACTION LEVEL (REFERENCE TABLE A.4)

LEGEND

- APPROXIMATE SITE BOUNDARY
- APPROXIMATE BUILDING FOOTPRINT
- SS-6 SUB-SLAB VAPOR MONITORING POINT
- WFS-IA INDOOR AIR MONITORING POINT

NO.	ISSUE/DESCRIPTION	BY	DATE

VAPOR INTRUSION MAP

CATERPILLAR WEST FORGE SHOP
1100 MILWAUKEE AVENUE
SOUTH MILWAUKEE, WISCONSIN

PREPARED BY: GZA GeoEnvironmental, Inc. Engineers and Scientists
20000 SWENSON DRIVE, SUITE 150
WAUKESHA, WISCONSIN 53186
(262) 754-2500

PREPARED FOR:

PROJ MGR: DGB	REVIEWED BY: JCO	CHECKED BY: DGB	FIGURE
DESIGNED BY: DGB	DRAWN BY: JJLP	SCALE: see above	B.4.a.
DATE 11/1/18	PROJECT NO. 20.0153084.64	REVISION NO.	SHEET NO.

ATTACHMENT C
TABLE OF CONTENTS
Caterpillar West Forge Shop
Former Bucyrus International Inc.
1100 Milwaukee Avenue
South Milwaukee, Wisconsin
WDNR BRRTS # 02-41-577015 & 02-41-256986

DOCUMENTATION OF REMEDIAL ACTION

C.1. Site Investigation Documentation
- **C.1.a.** Monitoring Well Construction Forms for MW-7 and MW-8
- **C.1.b.** Abandonment Form for MW-8
- **C.1.c.** Monitoring Well Construction Form for MW-8 Replacement

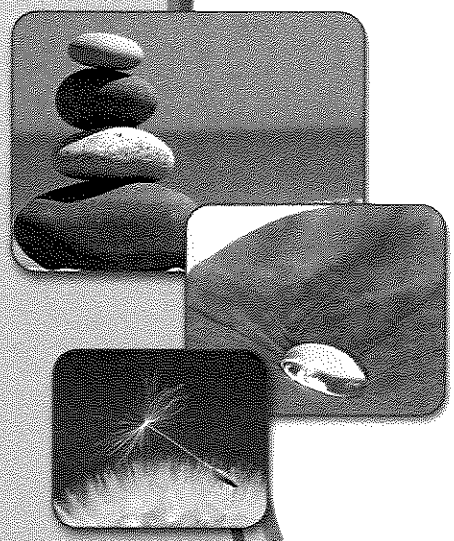
C.2. Investigative Waste Documentation

C.3. Description of RCL Documentation Methodology
- GZA compared the concentrations of constituents detected in soil samples from the Site to Residual Contaminant Levels (RCLs) obtained from the RCL spreadsheet (updated March 2017) available through a link on the Wisconsin Department of Natural Resources (WDNR) website: http://dnr.wi.gov/topic/Brownfields/Professionals.html The spreadsheet was prepared by WDNR staff using the United States Environmental Protection Agency's (USEPA) Regional Screening Level (RSL) Web-Calculator. GZA compared concentrations detected in soil samples from the Site to the soil to groundwater pathway and the industrial direct contact RCLs, as provided in the RCL spreadsheet and presented in Attachments A.2 and A.3. As such, Attachment C.3. is not included.

C.4. Construction Documentation
- Construction related to an interim action or remedial action remedy was not performed at the Site. As such, Attachment C.4. is not included.

C.5. Decommissioning of Remedial Systems
- A remediation system was not operated at the Site. As such, Attachment C.5. is not included.

C.6. Other – Supplemental VI Investigation Laboratory Analytical Reports
- **C.6.a.** 2018 Indoor Air Laboratory Analytical Report
- **C.6.b.** 2018 Sub-Slab Vapor Laboratory Analytical Report



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-13125-1
Client Project/Site: Caterpillar - South Milwaukee

For:
GZA GeoEnvironmental, Inc.
20900 Swenson Drive Suite 150
Waukesha, Wisconsin 53186

Attn: David Bauer

Therese Hargraves

Authorized for release by:
10/27/2018 10:41:19 AM
Therese Hargraves, Project Manager I
therese.hargraves@testamericainc.com

Designee for

Sandie Fredrick, Project Manager II
(920)261-1660
sandie.fredrick@testamericainc.com

Table of Contents

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Case Narrative

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Job ID: 140-13125-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-13125-1

Comments
No additional comments.

Receipt
The samples were received on 10/23/2018 9:10 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA
Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Client Sample ID: WEST FORGE SHOP-NORTH IA — **Lab Sample ID: 140-13125-1**

No Detections.

Client Sample ID: WEST FORGE SHOP-SOUTH IA — **Lab Sample ID: 140-13125-2**

No Detections.

Client Sample ID: WEST FORGE SHOP-BACKGROUND IA — **Lab Sample ID: 140-13125-3**

No Detections.

This Detection Summary does not include radiochemical test results.

Client Sample Results

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Client Sample ID: WEST FORGE SHOP-NORTH IA

Lab Sample ID: 140-13125-1
Matrix: Air

Date Collected: 10/19/18 16:04
Date Received: 10/23/18 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.090		0.50	0.090	ppb v/v			10/24/18 18:19	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.47		2.6	0.47	ug/m3			10/24/18 18:19	1

Client Sample ID: WEST FORGE SHOP-SOUTH IA

Lab Sample ID: 140-13125-2
Matrix: Air

Date Collected: 10/19/18 16:06
Date Received: 10/23/18 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.090		0.50	0.090	ppb v/v			10/24/18 19:04	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.47		2.6	0.47	ug/m3			10/24/18 19:04	1

Client Sample ID: WEST FORGE SHOP-BACKGROUND IA

Lab Sample ID: 140-13125-3
Matrix: Air

Date Collected: 10/19/18 16:20
Date Received: 10/23/18 09:10
Sample Container: Summa Canister 6L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.090		0.50	0.090	ppb v/v			10/24/18 19:50	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.47		2.6	0.47	ug/m3			10/24/18 19:50	1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-24683/8
Matrix: Air
Analysis Batch: 24683

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.090		0.50	0.090	ppb v/v			10/24/18 15:21	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.47		2.6	0.47	ug/m3			10/24/18 15:21	1

Lab Sample ID: LCS 140-24683/1006
Matrix: Air
Analysis Batch: 24683

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	2.00	2.31		ppb v/v		116	60 - 140

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	10	12.1		ug/m3		116	60 - 140

Default Detection Limits

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	RL	MDL	Units	Method
Naphthalene	0.50	0.090	ppb v/v	TO-15
Naphthalene	2.6	0.47	ug/m3	TO-15

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Client Sample ID: WEST FORGE SHOP-NORTH IA

Lab Sample ID: 140-13125-1

Date Collected: 10/19/18 16:04
Date Received: 10/23/18 09:10

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	24683	10/24/18 18:19	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: WEST FORGE SHOP-SOUTH IA

Lab Sample ID: 140-13125-2

Date Collected: 10/19/18 16:06
Date Received: 10/23/18 09:10

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	24683	10/24/18 19:04	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: WEST FORGE SHOP-BACKGROUND IA

Lab Sample ID: 140-13125-3

Date Collected: 10/19/18 16:20
Date Received: 10/23/18 09:10

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	24683	10/24/18 19:50	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-24683/8

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	24683	10/24/18 15:21	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-24683/1006

Date Collected: N/A
Date Received: N/A

Matrix: Air

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	24683	10/24/18 12:43	PS	TAL KNX
	Instrument ID: MH									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

QC Association Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Air - GC/MS VOA

Analysis Batch: 24683

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13125-1	WEST FORGE SHOP-NORTH IA	Total/NA	Air	TO-15	
140-13125-2	WEST FORGE SHOP-SOUTH IA	Total/NA	Air	TO-15	
140-13125-3	WEST FORGE SHOP-BACKGROUND IA	Total/NA	Air	TO-15	
MB 140-24683/8	Method Blank	Total/NA	Air	TO-15	
LCS 140-24683/1006	Lab Control Sample	Total/NA	Air	TO-15	

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Laboratory: TestAmerica Knoxville

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998044300	08-31-19

Laboratory: TestAmerica Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999580010	08-31-19

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13125-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-13125-1	WEST FORGE SHOP-NORTH IA	Air	10/19/18 16:04	10/23/18 09:10
140-13125-2	WEST FORGE SHOP-SOUTH IA	Air	10/19/18 16:06	10/23/18 09:10
140-13125-3	WEST FORGE SHOP-BACKGROUND IA	Air	10/19/18 16:20	10/23/18 09:10

TAL Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
phone 865-291-3000 fax 865-584-4315

Canister Samples Chain of Custody Record

TestAmerica assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact Information	
Company:	GZA GeoEnvironmental Inc
Address:	20900 Swenson Drive Suite 150
City/State/Zip	Waukesha, WI 53186
Phone:	262-754-2560
FAX:	262-754-9711
Project Name:	Caterpillar
Site/location:	South Milwaukee, WI
PO #	
Project Manager:	David Bauer
Phone:	
Site Contact:	
TAL Contact:	Sandie Fredrick
Sampled By:	C Ainsworth
COCs	1 of 1

Analysis Turnaround Time
Standard (Specify) X
Rush (Specify)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15 NAPHTHALENE	TO-14A	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
WEST FORGE SHOP - NORTH IA	10/19/18	804	1604	-30	-3	11921	11199	X											
West Forge Shop - South IA	|	808	1606	-30	-3	11477	11259	X											
West Forge Shop - Background IA	|	827	1620	-28	-4	10193	09961	X											

Sampled by :

Temperature (Fahrenheit)	Interior	Ambient	
Start			
Stop			

Pressure (inches of Hg)	Interior	Ambient	
Start			
Stop			

Received @ ambient, 1 box
Fedex SO, Custody seal intact
Trk# 8127 7329 6645
KL 10/23/18

140-13125 Chain of Custody

Special Instructions/QC Requirements & Comments:

Canisters Shipped by: [signature]	Date/Time: 10/22/18 1700	Canisters Received by: Fed Ex
Samples Relinquished by:	Date/Time:	Received by: [signature] 10/23/18 0910 TA-Knox
Relinquished by:	Date/Time:	Received by:

3 cans
3 flows

Lab Use Only Shipper Name: Opened by: Condition:

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G5
Date: 10/23/2018

Analyst	Sample ID	Asset #	Cleaning Job	Cert	Size (L)	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
afb	140-13125-A-1	11199	12536	b	6	-4.7	1530	
afb	140-13125-A-2	11259	12469	b	6	-3.1	1531	
afb	140-13125-A-3	09961	12536	b	6	-3.4	1532	

□ Receiving –Air Can –Calve Open (NCM #__________)
□ Air - Can P -24 to -25 " - Flow Contr. Works (NCM#__________)
□ Air - Can P -24 to -25 " - Flow Contr. Faulty (NCM#__________)
□ Air - Can P Out -26" - Flow Contr. Works (NCM#__________)
□ Air - Can P Out -26" - Flow Contr. Faulty (NCM#__________)
□ Air - Can P Low -24 to -25 " - Grab Sample (NCM#__________)
□ Air - Can P Low -26 "- Grab Sample (NCM#__________)

Loc: 140
13125

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	/			☐ Containers, Broken
2. Were ambient air containers received intact?			/	☑ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	/			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID :_____ Correction factor: _____			/	☐ Cooler Out of Temp, Client Contacted, Proceed/Cancel ☐ Cooler Out of Temp, Same Day Receipt
5. Were all of the sample containers received intact?	/			☐ Containers, Broken
6. Were samples received in appropriate containers?	/			☐ Containers, Improper; Client Contacted; Proceed/Cancel
7. Do sample container labels match COC? (IDs, Dates, Times)	/			☐ COC & Samples Do Not Match ☐ COC Incorrect/Incomplete ☐ COC Not Received
8. Were all of the samples listed on the COC received?	/			☐ Sample Received, Not on COC ☐ Sample on COC, Not Received
9. Is the date/time of sample collection noted?	/			☐ COC; No Date/Time; Client Contacted
10. Was the sampler identified on the COC?	/			☐ Sampler Not Listed on COC
11. Is the client and project name/# identified?	/			☐ COC Incorrect/Incomplete
12. Are tests/parameters listed for each sample?	/			☐ COC No tests on COC
13. Is the matrix of the samples noted?	/			☐ COC Incorrect/Incomplete
14. Was COC relinquished? (Signed/Dated/Timed)	/			☐ COC Incorrect/Incomplete
15. Were samples received within holding time?	/			☐ Holding Time - Receipt
16. Were samples received with correct chemical preservative (excluding Encore)?			/	☐ pH Adjusted, pH Included (See box 16A) ☐ Incorrect Preservative
17. Were VOA samples received without headspace?			/	☐ Headspace (VOA only)
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			/	☐ Residual Chlorine
19. For 1613B water samples is pH<9?			/	☐ If no, lab will adjust
20. For rad samples was sample activity info. Provided?			/	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: **Date:**

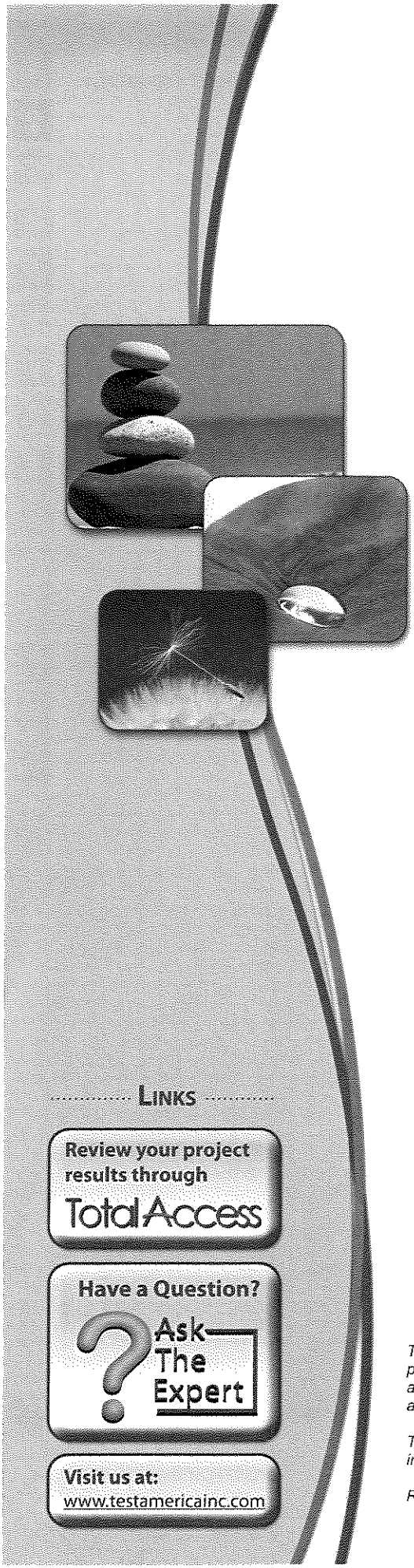
pH test strip lot number:

	Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:		
Lot Number:		
Exp Date:		
Analyst:		
Date:		
Time:		

Project #: 5000 6920 PM Instructions:

Sample Receiving Associate: Date: 10/27/18

QA026R30.doc, 080916



TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
Tel: (865)291-3000

TestAmerica Job ID: 140-13121-1
Client Project/Site: Caterpillar - South Milwaukee

For:
GZA GeoEnvironmental, Inc.
20900 Swenson Drive Suite 150
Waukesha, Wisconsin 53186

Attn: David Bauer

Therese Hargraves

Authorized for release by:
10/27/2018 10:39:21 AM
Therese Hargraves, Project Manager I
therese.hargraves@testamericainc.com

Designee for

Sandie Fredrick, Project Manager II
(920)261-1660
sandie.fredrick@testamericainc.com

Table of Contents

Case Narrative

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Job ID: 140-13121-1

Laboratory: TestAmerica Knoxville

Narrative

Job Narrative
140-13121-1

Comments
No additional comments.

Receipt
The samples were received on 10/23/2018 9:25 AM; the samples arrived in good condition, properly preserved and, where required, on ice.

Air - GC/MS VOA
Method(s) TO 15 LL, TO-15: EPA methods TO-14A and TO-15 specify the use of humidified "zero air" as the blank reagent for canister cleaning, instrument calibration and sample analysis. Ultra-high purity humidified nitrogen from a cryogenic reservoir is used in place of "zero air" by TestAmerica Knoxville.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Client Sample ID: WEST FORGE SHOP - SS4

Lab Sample ID: 140-13121-1
Matrix: Air

Date Collected: 10/22/18 12:31
Date Received: 10/23/18 09:25
Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.90		5.0	0.90	ppb v/v			10/25/18 03:57	3.19

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<4.7		26	4.7	ug/m3			10/25/18 03:57	3.19

Client Sample ID: WEST FORGE SHOP - SS5

Lab Sample ID: 140-13121-2
Matrix: Air

Date Collected: 10/22/18 13:03
Date Received: 10/23/18 09:25
Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.90		5.0	0.90	ppb v/v			10/24/18 16:48	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<4.7		26	4.7	ug/m3			10/24/18 16:48	1

Client Sample ID: WEST FORGE SHOP - SS6

Lab Sample ID: 140-13121-3
Matrix: Air

Date Collected: 10/22/18 13:44
Date Received: 10/23/18 09:25
Sample Container: Summa Canister 1L

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.90		5.0	0.90	ppb v/v			10/24/18 17:33	1

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<4.7		26	4.7	ug/m3			10/24/18 17:33	1

Detection Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Client Sample ID: WEST FORGE SHOP - SS4 — **Lab Sample ID: 140-13121-1**

No Detections.

Client Sample ID: WEST FORGE SHOP - SS5 — **Lab Sample ID: 140-13121-2**

No Detections.

Client Sample ID: WEST FORGE SHOP - SS6 — **Lab Sample ID: 140-13121-3**

No Detections.

This Detection Summary does not include radiochemical test results.

Default Detection Limits

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Analyte	RL	MDL	Units	Method
Naphthalene	0.50	0.090	ppb v/v	TO-15
Naphthalene	2.6	0.47	ug/m3	TO-15

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Method: TO-15 - Volatile Organic Compounds in Ambient Air

Lab Sample ID: MB 140-24683/8
Matrix: Air
Analysis Batch: 24683

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.090		0.50	0.090	ppb v/v			10/24/18 15:21	1

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Naphthalene	<0.47		2.6	0.47	ug/m3			10/24/18 15:21	1

Lab Sample ID: LCS 140-24683/1006
Matrix: Air
Analysis Batch: 24683

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	2.00	2.31		ppb v/v		116	60 - 140

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Naphthalene	10	12.1		ug/m3		116	60 - 140

QC Association Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Air - GC/MS VOA

Analysis Batch: 24683

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
140-13121-1	WEST FORGE SHOP - SS4	Total/NA	Air	TO-15	
140-13121-2	WEST FORGE SHOP - SS5	Total/NA	Air	TO-15	
140-13121-3	WEST FORGE SHOP - SS6	Total/NA	Air	TO-15	
MB 140-24683/8	Method Blank	Total/NA	Air	TO-15	
LCS 140-24683/1006	Lab Control Sample	Total/NA	Air	TO-15	

Lab Chronicle

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Client Sample ID: WEST FORGE SHOP - SS4

Lab Sample ID: 140-13121-1
Matrix: Air

Date Collected: 10/22/18 12:31
Date Received: 10/23/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		3.19	64 mL	500 mL	24683	10/25/18 03:57	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: WEST FORGE SHOP - SS5

Lab Sample ID: 140-13121-2
Matrix: Air

Date Collected: 10/22/18 13:03
Date Received: 10/23/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	20 mL	500 mL	24683	10/24/18 16:48	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: WEST FORGE SHOP - SS6

Lab Sample ID: 140-13121-3
Matrix: Air

Date Collected: 10/22/18 13:44
Date Received: 10/23/18 09:25

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	20 mL	500 mL	24683	10/24/18 17:33	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: Method Blank

Lab Sample ID: MB 140-24683/8
Matrix: Air

Date Collected: N/A
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	200 mL	500 mL	24683	10/24/18 15:21	PS	TAL KNX
	Instrument ID: MH									

Client Sample ID: Lab Control Sample

Lab Sample ID: LCS 140-24683/1006
Matrix: Air

Date Collected: N/A
Date Received: N/A

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	TO-15		1	500 mL	500 mL	24683	10/24/18 12:43	PS	TAL KNX
	Instrument ID: MH									

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Method Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Method	Method Description	Protocol	Laboratory
TO-15	Volatile Organic Compounds in Ambient Air	EPA	TAL KNX

Protocol References:

EPA = US Environmental Protection Agency

Laboratory References:

TAL KNX = TestAmerica Knoxville, 5815 Middlebrook Pike, Knoxville, TN 37921, TEL (865)291-3000

Accreditation/Certification Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Laboratory: TestAmerica Knoxville

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	998044300	08-31-19

Laboratory: TestAmerica Chicago

The accreditations/certifications listed below are applicable to this report.

Authority	Program	EPA Region	Identification Number	Expiration Date
Wisconsin	State Program	5	999580010	08-31-19

Sample Summary

Client: GZA GeoEnvironmental, Inc.
Project/Site: Caterpillar - South Milwaukee

TestAmerica Job ID: 140-13121-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
140-13121-1	WEST FORGE SHOP - SS4	Air	10/22/18 12:31	10/23/18 09:25
140-13121-2	WEST FORGE SHOP - SS5	Air	10/22/18 13:03	10/23/18 09:25
140-13121-3	WEST FORGE SHOP - SS6	Air	10/22/18 13:44	10/23/18 09:25

TAL Knoxville
5815 Middlebrook Pike
Knoxville, TN 37921
phone 865-291-3000 fax 865-584-4315

Canister Samples Chain of Custody Record

TestAmerica assumes no liability with respect to the collection and shipment of these samples.

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

Client Contact Information
Company: G2A GEOENVIRONMENTAL
Address: 20900 SWENSON DR WESTFIELD
City/State/Zip: WAUKESHA, WI 53186
Phone: 262-754-2560
FAX: 262-754-9711
Project Name: CATERPILLAR
Site/location: SOUTH MILWAUKEE, WI
PO #

Project Manager: DAVID BAUER
Phone:
Site Contact:
TAL Contact: SANDIE FREDRICK

Sampled By: C. AINSWORTH

1 of 1 COCs

Analysis Turnaround Time
Standard (Specify) X
Rush (Specify)

Sample Identification	Sample Date(s)	Time Start	Time Stop	Canister Vacuum in Field, "Hg (Start)	Canister Vacuum in Field, "Hg (Stop)	Flow Controller ID	Canister ID	TO-15 (NAPHTHALENE)	TO-14A	EPA 3C	EPA 25C	ASTM D-1946	Other (Please specify in notes section)	Sample Type	Indoor Air	Ambient Air	Soil Gas	Landfill Gas	Other (Please specify in notes section)
WEST FORGE SHOP - SS4	10/22/18	1211	1231	-30	-2	11436	11885	X											
WEST FORGE SHOP - SS5	↓	1245	1303	-29	-1.5	09897	10760	X											
WEST FORGE SHOP - SS6	↓	1316	1344	-30	-.5	11440	11658	X											

Sampled by :

Temperature (Fahrenheit)	Interior	Ambient	
Start			
Stop			

Pressure (inches of Hg)	Interior	Ambient	
Start			
Stop			

Received @ ambient
Icooler, FedEx S.O
trk# 8116 7060 9407
Custody seal intact
KU 10/23/18

140-13121 Chain of Custody

Special Instructions/QC Requirements & Comments:

Canisters Shipped by:	Date/Time: 10/22/18 1700	Canisters Received by: PER FEDEX	
Samples Relinquished by:	Date/Time:	Received by: 10/23/18 0910 TA-Knox	
Relinquished by:	Date/Time:	Received by:	

3 cans
3KR

Lab Use Only Shipper Name: Opened by: Condition:

10/27/2018

Loc: 140
13121

TESTAMERICA KNOXVILLE SAMPLE RECEIPT/CONDITION UPON RECEIPT ANOMALY CHECKLIST

Log In Number:

Review Items	Yes	No	NA	If No, what was the problem?
1. Are the shipping containers intact?	/			☐ Containers, Broken
2. Were ambient air containers received intact?			/	☑ Checked in lab
3. The coolers/containers custody seal if present, is it intact?	/			☐ Yes ☐ NA
4. Is the cooler temperature within limits? (> freezing temp. of water to 6 °C, VOST: 10°C) Thermometer ID :_____ Correction factor: _____			/	☐ Cooler Out of Temp, Client Contacted, Proceed/Cancel ☐ Cooler Out of Temp, Same Day Receipt
5. Were all of the sample containers received intact?	/			☐ Containers, Broken
6. Were samples received in appropriate containers?	/			☐ Containers, Improper; Client Contacted; Proceed/Cancel
7. Do sample container labels match COC? (IDs, Dates, Times)	/			☐ COC & Samples Do Not Match ☐ COC Incorrect/Incomplete ☐ COC Not Received
8. Were all of the samples listed on the COC received?	/			☐ Sample Received, Not on COC ☐ Sample on COC, Not Received
9. Is the date/time of sample collection noted?	/			☐ COC; No Date/Time; Client Contacted
10. Was the sampler identified on the COC?	/			☐ Sampler Not Listed on COC
11. Is the client and project name/# identified?	/			☐ COC Incorrect/Incomplete
12. Are tests/parameters listed for each sample?	/			☐ COC No tests on COC
13. Is the matrix of the samples noted?	/			☐ COC Incorrect/Incomplete
14. Was COC relinquished? (Signed/Dated/Timed)	/			☐ COC Incorrect/Incomplete
15. Were samples received within holding time?	/			☐ Holding Time - Receipt
16. Were samples received with correct chemical preservative (excluding Encore)?			/	☐ pH Adjusted, pH Included (See box 16A) ☐ Incorrect Preservative
17. Were VOA samples received without headspace?			/	☐ Headspace (VOA only)
18. Did you check for residual chlorine, if necessary? (e.g. 1613B, 1668) Chlorine test strip lot number:			/	☐ Residual Chlorine
19. For 1613B water samples is pH<9?			/	☐ If no, lab will adjust
20. For rad samples was sample activity info. Provided?			/	☐ Project missing info

Comments/Actions Taken

Labeling Verified by: Date:

pH test strip lot number:

Box 16A: pH Preservation	Box 18A: Residual Chlorine
Preservative:	
Lot Number:	
Exp Date:	
Analyst:	
Date:	
Time:	

Project #: 500b920 PM Instructions:

Sample Receiving Associate: Date: 10/27/18

QA026R30.doc, 080916

TestAmerica Knoxville - Air Canister Initial Pressure Check

Gauge ID: G5

Date: 10/23/2018

Analyst	Sample ID	Asset #	Cleaning Job	Cert	Size (L)	Pressure @ Receipt (-in Hg or +psig)	Time	Comments
afb	140-13121-A-1	11885	12893	b	1	-1.2	1430	
afb	140-13121-A-2	10760	12893	b	1	-1.5	1431	
afb	140-13121-A-3	11658	12893	b	1	0	1432	

☐ Receiving –Air Can –Calve Open (NCM #__________)

☐ Air - Can P -24 to -25 " - Flow Contr. Works (NCM#_________)

☐ Air - Can P -24 to -25 " - Flow Contr. Faulty (NCM#_________)

☐ Air - Can P Out -26" - Flow Contr. Works (NCM#___________)

☐ Air - Can P Out -26" - Flow Contr. Faulty (NCM#___________)

☐ Air - Can P Low -24 to -25 " - Grab Sample (NCM#___________)

☐ Air - Can P Low -26 "- Grab Sample (NCM#___________)