

February 12, 2015

Ms. Lynn Dittmer
Metropolitan Area Planning Agency
2222 Cuming Street
Omaha, NE 68102

**Re: South Omaha Brownfields Coalition Assessment Grant
Phase II ESA Report
Axles & Gears
4808 S. 26th Street, Omaha, NE**

Attention Ms. Dittmer:

The purpose of this letter is to summarize the Phase II Environmental Site Assessment (ESA) sampling activities that were performed by Alfred Benesch & Company (Benesch) at the Axles & Gears facility (Property) located at 4808 S. 26th Street in Omaha. This Phase II ESA is being prepared for the Metropolitan Area Planning Agency (MAPA) and was conducted as part of the South Omaha Brownfields Coalition Assessment Grant being administered by MAPA. A Phase I ESA (Benesch, February 2014) was previously prepared for this site. The Phase I ESA report identified *recognized environmental conditions* (RECs) associated with the historical use of the property as an auto/truck repair shop, salvage yard, and laundry cleaning facility. The Phase I ESA also identified the historic salvage yard located adjacent to the northeast of the Property, and the location of the Property within the bounds of the Omaha Lead Site (OLS) as RECs.

The activities conducted as part of the Phase II ESA included sub-surface soil, soil vapor and groundwater sampling at the Property, and asbestos and lead based paint surveys of all structures on the Property. Field work was performed in general conformance with ASTM Standard E1903-11 for Phase II Environmental Site Assessments, the *Phase II Investigation Work Plan, Axles & Gears, 4940 S. 26th Street, Omaha* (Benesch, 5/20/2014), the project and site specific QAPP, soil, soil vapor, groundwater, and asbestos containing materials (ACM) SOPs, and Nebraska Department of Human Services (NDHHS) Title 178 Chapter 23 for lead based paint (LBP) sampling. Field work for the soil and groundwater sampling was conducted on September 4th and 5th, 2014. Field work for the ACM and LBP surveys, and the soil vapor sample collection was conducted on September 25, 2014. Prior to field work, Benesch notified the Nebraska One Call System for utility locates. All soil, soil vapor, and groundwater results were compared to Nebraska Department of Environmental Quality (NDEQ) Remedial Goals (RGs) for residential and industrial standards under the Voluntary Cleanup Program (VCP). The Phase II assessment project area is depicted on the attached Site Location Map (Figures 1 and 2).

As a result of the findings of this Phase II ESA, there are concerns with respect to property liability and/or constructability concerns with the redevelopment or re-use of the project site in regards to the ACM, LBP, and lead impacted soils observed at the site.

Field Activities

Soil Sampling

Benesch advanced sixteen (16) borings SB-1 through SB-16) at the project site; along the east side (front) of the building, along the west side (back) of the building in the storage lot, and throughout the back lot. The boring locations are depicted on the attached Boring Location Diagram Map (Figure 3).

The project site borings were advanced in conformance with the Phase II Work Plan based on historic source areas, estimated contaminant migration, and parcel boundaries. The objective of advancing borings at the project site is to assess the potential presence of soil, soil vapor and groundwater impacts resulting from the historic uses of the Property and assist with redevelopment planning. The project site is slated for redevelopment as a commercial property.

The borings were installed using a track mounted Geoprobe unit operated by Saberprobe, LLC of Omaha, NE. The samples were collected using Macro-Core samplers fitted with polyvinyl chloride (PVC) liners. With the exception of SB-1, SB-10, and SB-16, borings were advanced to a depth of 15' below ground surface (bgs). Borings SB-1, SB-10, and SB-16 were advanced to 30' bgs for the purpose of collecting groundwater samples at these locations. However, no groundwater was encountered at these locations; therefore, no groundwater samples were collected for this assessment.

Composite samples were collected for field screening purposes from the 0-3', 3-7', 7-11' and 11-15' intervals. The composite soil samples were split into two aliquots with one aliquot placed in a glass jar, covered with aluminum foil and allowed to equilibrate at ambient temperature (minimum of 65 deg. F) for a minimum of 15 minutes. A headspace analysis of each equilibrated sample was conducted using a field photoionization detector (PID) equipped with a 10.7 eV bulb. The remaining aliquot was placed into one 4-ounce jar, sealed and packed on ice.

Fill material, including a mixture of brick rubble, crushed rock, cinders, glass, slag, and clay was observed within the upper 1 to 3 feet of project site borings SB-1, SB-2, SB-7, SB-9, SB-10, SB-11, SB-12, SB-13, SB-14, and SB-16. Fill material was not observed in the remaining borings (SB-3, SB-4, SB-5, SB-6, SB-8, SB-15). Discolored soils (black and green) or odors indicative of petroleum contamination were not observed in project site borings, and PID readings were generally low (<6 ppm) in all of the soil samples. Boring logs for all project site borings advanced during field work are provided as an attachment to this report. All borings advanced at the project site were backfilled with hydrated bentonite chips upon completion, and the surface was generally restored to its original condition. Because low PID readings were observed at all borings, soil cuttings were not containerized and were left at the project site.

Soil samples were collected from the 0-3' interval from borings SB-1, SB-11, and SB-12 for Total RCRA metals plus mercury analysis by EPA method 6010C/7471B. Soil samples were collected from SB-1 (0-3'), SB-2 (7-11'), SB-3 (11-15'), SB-7 (0-3'), SB-9 (0-3'), SB-10 (0-3'), SB-11 (0-3'), and SB-12 (0-3') for analysis of VOCs by EPA method SW8260C, and total extractable hydrocarbons (TEH) by Iowa Method OA-2. Surface soil samples were also collected from the 0-6" interval from borings SB-1, SB-11, and SB-12 for total lead analysis by EPA method 6010C. All samples were labeled, packed on ice, and submitted under chain of custody to Test America Laboratories in Cedar Falls, Iowa. The laboratory reports and chain of custody documentation is provided as an attachment to this report.

Three (3) soil vapor points were installed in SB-2, SB-6, and SB-9. Soil vapor samples were collected from these location using SUMMA® canisters for VOCs analysis by EPA method TO-15.

Findings

The constituents detected in the soil and soil vapor samples are summarized in table 1 together with their respective Nebraska Department of Environmental Quality (NDEQ) Remedial Goals (RGs) for residential and Industrial standards.

TABLE 1 Laboratory Detections for Soil and Soil Vapor Sampling & NDEQ VCP Remedial Goals (RGs)					
Boring	Media	Constituent	Result	VCP Residential Standard	VCP Industrial Standard
SB-1 (0-6")	Soil	Lead	47.5 mg/kg	400 mg/kg	750 mg/kg
SB-1 (0-3')	Soil	Barium	202 mg/kg	3,800 mg/kg	100,000 mg/kg
SB-1 (0-3')	Soil	Chromium	23 mg/kg	0.29 mg/kg	55 mg/kg
SB-1 (0-3')	Soil	Lead	80.3 mg/kg	400 mg/kg	750 mg/kg
SB-1 (0-3')	Soil	Mercury	0.0701 mg/kg	3.1 mg/kg	160 mg/kg
SB-7 (0-3')	Soil	TEH as Waste Oil	19.4 mg/kg	*	*
SB-9 (0-3')	Soil	TEH as waste oil	180 mg/kg	*	*
SB-10 (0-3')	Soil	TEH as Waste oil	225 mg/kg	*	*
SB-11 (0-6")	Soil	Lead	192 mg/kg	400 mg/kg	750 mg/kg
SB-11 (0-3')	Soil	Barium	214 mg/kg	3,800 mg/kg	100,000 mg/kg
SB-11 (0-3')	Soil	Chromium	22.2 mg/kg	0.29 mg/kg	55 mg/kg
SB-11 (0-3')	Soil	Lead	82.5 mg/kg	400 mg/kg	750 mg/kg
SB-11 (0-3')	Soil	Mercury	0.0555 mg/kg	3.1 mg/kg	160 mg/kg
SB-12 (0-6")	Soil	Lead	4,160 mg/kg	400 mg/kg	750 mg/kg
SB-12 (0-3')	Soil	Arsenic	17.3 mg/kg	0.39 mg/kg	16 mg/kg
SB-12 (0-3')	Soil	Barium	345 mg/kg	3,800 mg/kg	100,000 mg/kg
SB-12 (0-3')	Soil	Cadmium	9.89 mg/kg	18 mg/kg	890 mg/kg
SB-12 (0-3')	Soil	Chromium	44.4 mg/kg	0.29 mg/kg	55 mg/kg
SB-12 (0-3')	Soil	Lead	975 mg/kg	400 mg/kg	750 mg/kg
SB-12 (0-3')	Soil	Mercury	0.499 mg/kg	3.1 mg/kg	160 mg/kg
SB-2	Vapor	1,2,4-Trimethylbenzene	8.4 µg/m ³	69.8 µg/m ³	5,960 µg/m ³
SB-2	Vapor	2-Butanone (MEK)	22 µg/m ³	49,900 µg/m ³	4,260,000 µg/m ³
SB-2	Vapor	Acetone	89 µg/m ³	309,000 µg/m ³	26,400,000
SB-2	Vapor	Benzene	8.1 µg/m ³	139 µg/m ³	25,600 µg/m ³
SB-2	Vapor	Carbon Disulfide	5.2 µg/m ³	6,980 µg/m ³	596,000 µg/m ³
SB-2	Vapor	Chloroform	31 µg/m ³	47.2 µg/m ³	1,040 µg/m ³
SB-2	Vapor	Dichlorodifluoromethane	6.5 µg/m ³	2,580 µg/m ³	202,000 µg/m ³
SB-2	Vapor	Ethylbenzene	6.6 µg/m ³	563 µg/m ³	113,000 µg/m ³

TABLE 1 (continued) Laboratory Detections for Soil and Soil Vapor Sampling & NDEQ VCP Remedial Goals (RGs)					
SB-2	Vapor	Methylene Chloride	7.5 µg/m ³	2,300 µg/m ³	508,000 µg/m ³
SB-2	Vapor	m-Xylene & p-Xylene	18 µg/m ³	9,040 µg/m ³	708,000 µg/m ³
SB-2	Vapor	n-Hexane	3.4 µg/m ³	6,980 µg/m ³	596,000 µg/m ³
SB-2	Vapor	o-Xylene	7.6 µg/m ³	9,040 µg/m ³	708,000 µg/m ³
SB-2	Vapor	Tetrachloroethene	14 µg/m ³	5,430 µg/m ³	404,000 µg/m ³
SB-2	Vapor	Toluene	21 µg/m ³	49,900 µg/m ³	4,260,000 µg/m ³
SB-2	Vapor	Trichlorofluoromethane	12 µg/m ³	6,980 µg/m ³	596,000 µg/m ³
SB-6	Vapor	2-Butanone (MEK)	11 µg/m ³	49,900 µg/m ³	4,260,000 µg/m ³
SB-6	Vapor	Acetone	53 µg/m ³	309,000 µg/m ³	26,400,000 µg/m ³
SB-6	Vapor	Chloroform	4.4 µg/m ³	47.2 µg/m ³	1,040 µg/m ³
SB-6	Vapor	Methylene Chloride	11 µg/m ³	2,300 µg/m ³	508,000 µg/m ³
SB-6	Vapor	Trichlorofluoromethane	2.8 µg/m ³	6,980 µg/m ³	596,000 µg/m ³
SB-9	Vapor	2-Butanone (MEK)	63 µg/m ³	49,900 µg/m ³	4,260,000 µg/m ³
SB-9	Vapor	Acetone	210 µg/m ³	309,000 µg/m ³	26,400,000 µg/m ³
SB-9	Vapor	Carbon Disulfide	57 µg/m ³	6,980 µg/m ³	596,000 µg/m ³
SB-9	Vapor	Dichlorodifluoromethane	11 µg/m ³	2,580 µg/m ³	202,000 µg/m ³
SB-9	Vapor	Methylene Chloride	8.3 µg/m ³	2,300 µg/m ³	508,000 µg/m ³
SB-9	Vapor	Tetrachloroethene	4.7 µg/m ³	5,430 µg/m ³	404,000 µg/m ³
SB-9	Vapor	Trichlorofluoromethane	9.0 µg/m ³	6,980 µg/m ³	596,000 µg/m ³

*Note: Soil results and standards are in mg/kg and soil vapor results and standards are in µg/m³. *The NDEQ has not established VCP standards for this constituent.*

Items in bold denote VCP exceedance.

Chromium was detected at the 0-3' interval in soil borings SB-1, SB-11, and SB-12 at 23 mg/kg, 22.2 mg/kg and 44.4 mg/kg, respectively. The chromium concentrations exceeded the NDEQ VCP residential standard of 0.29 mg/kg but was below the industrial standard of 55 mg/kg.

Arsenic was detected at the 0-3' interval in soil boring SB-12, with a concentration of 17.3 mg/kg. This concentration was above the NDEQ VCP residential and industrial standards, which are 0.39 mg/kg and 16 mg/kg, respectively. The arsenic level observed is considered isolated, and although above the residential and industrial RGs, may be typical of background levels in areas of Nebraska which are known to range from 5 to perhaps 50 mg/kg in native soils and fill material.

Lead was detected in soil boring SB-12 with a concentration of 4,160 mg/kg in the surface sample (0-6"), and 975 mg/kg in the 0-3' interval. Lead was not detected above residential or industrial RGs in either of the other two borings sampled for lead (SB-1 and SB-11). Based on review of historical aerial photographs, it appears that the yard in the area of SB-12 was covered with a canopy from at least 1952 until circa 2013. It is assumed that the elevated lead concentrations at this location are the result of historical activities conducted or materials stored or disposed of in this area of the yard. There is no indication that the

project site has been impacted by contamination from the Omaha Lead Site (OLS), a USEPA NPL site related to the former Asarco lead smelting operation in downtown Omaha.

Total extractable hydrocarbons (TEH) as waste oil were detected in soil borings SB-7, SB-9, and SB-10. Note however that the NDEQ has not established residential or industrial standards for TEH in soils at VCP sites. In addition, the NDEQ standards for RBCA Tier I Site Assessments for petroleum sites in Nebraska do not include look up tables and values for TEH in soils at remedial action class three (RAC-3) sites, where there is no industrial or potable water use in the area.

Project site soils were sampled and analyzed for VOCs (SB-2, SB-3, SB-7, SB-10); however, no detections above laboratory detection limits were observed.

The laboratory reports and chain of custody documentation for soil sampling is provided as an attachment to this report.

Soil Vapor

Based on field screening results and field conditions, soil vapor points were installed in borings SB-2, SB-6, and SB-9 to assess the soil vapor to enclosed space pathway. The vapor points were set at 6' bgs and vapor samples were collected using 1L SUMMA[®] canisters. Soil vapor samples were collected according to *Environmental Standard Operating Procedures for Soil Vapor Sampling* (Benesch). Once the samples were collected, the tubing was removed from the boring and the surface was restored to its original condition.

The vapor samples were labeled and submitted under chain of custody to Test America Laboratories in Knoxville, TN for full VOC analysis by EPA method TO-15. The rationale for vapor sampling locations is as follows: To determine the presence of soil impacts from historical site operations in the area of the maintenance garage around boring SB-2, in the area of the upper storage yard and the Property structure around SB-6, and in the area of the lower storage yard and former laundry facility in the area of SB-9. Fifteen (15), five (5), and seven (7) VOC constituents were detected in the soil vapor samples collected from the project site at SB-2, SB-6, and SB-9, respectively; however, there were no detections above residential or industrial RGs. The laboratory reports and chain of custody documentation for soil vapor sampling is provided as an attachment to this report.

Groundwater Sampling

No groundwater was encountered at the project site down to 30 feet bgs. Therefore, no groundwater samples were collected.

Quality Assurance/Quality Control

Duplicate samples for soil, soil vapor, and building materials, in addition to rinsate samples were collected for quality assurance and quality control (QA/QC) purposes and were submitted for the same analysis as the parent samples. These duplicate samples were submitted for analysis to assess the precision of the analysis and the variability of the media. Based on review of the duplicate and rinsate sample data, all data can be relied upon for its intended purpose. Data validation sets are included as an attachment to this report.

Summary of Laboratory Results for Constituents Exceeding the NDEQ VCP Remedial Goals

Based on laboratory results, the following table provides information for the locations where soil samples exceeded the NDEQ VCP RGs.

TABLE 2 Laboratory Results for Soil and Soil Vapor Sampling Sample Locations Exceeding NDEQ VCP Remediation Goals (RGs)					
Boring	Media	Constituent	Result	VCP Residential Standard	VCP Industrial Standard
SB-1 (0-3')	Soil	Chromium	23 mg/kg	0.29 mg/kg	55 mg/kg
SB-11 (0-3')	Soil	Chromium	22.2 mg/kg	0.29 mg/kg	55 mg/kg
SB-12 (0-6")	Soil	Lead	4,160 mg/kg	400 mg/kg	750 mg/kg
SB-12 (0-3')	Soil	Lead	975 mg/kg	400 mg/kg	750 mg/kg
SB-12 (0-3')	Soil	Arsenic	17.3 mg/kg	0.39 mg/kg	16 mg/kg
SB-12 (0-3')	Soil	Chromium	44.4 mg/kg	0.29 mg/kg	55 mg/kg

Asbestos Survey

An asbestos survey was conducted to determine the presence of Asbestos Containing Material (ACM) within the project site structures. An asbestos containing material is defined by the State of Nebraska, EPA, and OSHA regulations as any material or product that contains more than 1% asbestos. Asbestos was found to be present in nine locations within the structure; however, only two locations contained more than 1% asbestos and are considered ACM. The two locations are the red 9 x 9 floor tile and mastic, and the black 9 x 9 floor tile and mastic, both in the “library” located adjacent to the retail store. Both ACMs were observed to be non-friable and in generally good condition. Please refer to the attached Asbestos Surveys for 4808 S. 26th Street, Omaha, Nebraska for additional details regarding the ACM survey.

Lead Based Paint Survey

A lead based paint (LBP) survey was conducted to determine the presence of lead in the paints on the project site structures. A LBP is defined by the United States Department of Housing and Urban Development (HUD) as a paint that contains lead in the amount of 5,000 parts per million (ppm) and/or 0.5% by weight. LBP was identified on the surface of three areas from within the structure; green paint on the exterior wood surfaces at the south entrance; green paint on the plaster walls in the main floor south office area; and yellow paint on the window sills in the second floor south area. Please refer to the attached Lead Based Paint Survey for 2630 'N' Street, Omaha, Nebraska for additional details regarding the LBP survey.

Analysis and Recommendations

Concentrations of chromium were observed above the residential RG at three locations (SB-1, SB-11, SB-12); however, the industrial RG was not exceeded. Therefore, observed chromium concentrations in project site soils are not a significant concern with respect to property liability and/or constructability concerns with the redevelopment or re-use of the project site for industrial use.

Observed levels of arsenic in subsurface soils (17.3 mg/kg in SB-12) at the project site above residential and industrial soil RGs may be typical of background levels in areas of Nebraska. As such, observed arsenic concentrations in project site soils are not a significant concern with respect to property liability and/or constructability concerns with the projected redevelopment of the project site for industrial use.

Concentrations of lead in surface and subsurface soils were above the residential and industrial RGs in SB-12. The elevated concentrations appear to be isolated and not widespread. **The high lead concentrations observed in project site soils in boring SB-12 are a concern with respect to property liability and/or constructability concerns with the redevelopment or re-use of the project site for industrial use.** If redevelopment occurs at the project site, it is recommended that the soils in the vicinity of SB-12 are removed and properly disposed of as hazardous waste. However, if redevelopment does not occur, it is recommended that the surface soils either be removed and disposed of as hazardous waste and replaced with clean soils, or the area be capped with clean soils or paved over. This will eliminate worker exposure and restrict access to the impacted soils. Prior to disposal, the soils should be characterized, and the lead impacted soil delineated to determine the extent of the lead impacts and the amount of soils to be removed.

Total extractable hydrocarbons (TEH) as waste oil were detected in soil boring SB-7, SB-9, and SB-10. Note however that the NDEQ has not established residential or industrial standards for TEH in soils at VCP sites. In addition, the NDEQ standards for RBCA Tier I Site Assessments for petroleum sites in Nebraska do not include look up tables and values for TEH in soils at remedial action class three (RAC-3) sites, where there is no industrial or potable water use in the area. In summary, the presence of TEH in soils at SB-7, SB-9, and SB-10 are of generally insignificant concentrations, and not a significant concern with respect to property liability and/or constructability concerns with the redevelopment or re-use of the project site for industrial use.

Laboratory concentrations of constituents were minimal and considerably lower than the NDEQ soil vapor VCP RGs for residential and industrial use and are not considered a significant concern with respect to property liability and/or constructability concerns with the redevelopment or re-use of the project site for industrial use.

Observed ACM in project structures (two locations in “library”) is currently non-friable and in generally good condition, and therefore, the Property ACM do not pose an immediate threat to human health. If the ACM materials will be disturbed during construction, renovation, or the structure demolition, such ACM should be removed according to Nebraska Asbestos Control Program Regulations and with proper notification provided to NDHHS and the City of Omaha.

LBP was observed on the surface of three structures from with the structure. If the site structures were to be renovated as part of the redevelopment of this site, a LBP abatement would be required. The LBP abatement shall be conducted as per Title 178 Chapter 23 of the Nebraska Health and Human Services regulations.

As a result of the findings of this Phase II ESA, there are concerns with respect to property liability and/or constructability concerns with the redevelopment or re-use of the project site in regards to the ACM, LBP, and lead impacted soils observed at the site. Further action is recommended at the site, as noted above, if redevelopment occurs regarding the ACM, LBP, and subsurface lead impacted soils (0-3’).

If redevelopment does not occur, further action is recommended regarding the lead impacted surface soils (0-6").

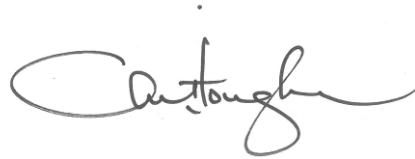
It should be noted that the condition of the soils encountered for this assessment may not be representative of the soils across the site. The potential exists that impacted soils, buried tanks or other waste may be encountered during excavation or redevelopment activities, and if encountered should be properly handled in accordance with all local, state and/or federal requirements.

If you have any questions regarding the conduct or conclusions of this assessment, please do not hesitate to contact either of the undersigned at (402) 333-5792.

Respectfully Submitted,



Brian Fetting
Project Scientist II



Chin Lim, P.E.
Project Manager

Attachments:

- Figures
- Boring Logs
- Field Notes
- Lab Data
- Data Validation Sets
- ACM Survey
- LBP Survey

Sources (not provided as an attachment; previously submitted or referenced in report):

ASTM International, *ASTM Standard E1903-11, Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process*.
Benesch, *Phase I ESA, Axles and Gears Truck Parts Warehouse, 4840 S. 26th Street, Omaha, NE*, February 2014.
Benesch, *Phase II Investigation Work Plan for Axles & Gears, 4840 S. 26th Street, 5/20/2014*.
Benesch, *QAPP Version 0, Brownfields Coalition Assessment Grant, MAPA, SORA, Omaha, NE, 5/21/12*.
Benesch, *QAPP Supplement 6, Brownfields Coalition Assessment Grant, MAPA, SORA, Omaha, NE, 5/23/2014*.
NDEQ, Nebraska Voluntary Cleanup Program, VCP Remediation Goals (RGs), residential and industrial values (2012).
USEPA Environmental Response Team, *Standard Operating Procedures, Soil Sampling, SOP 4230.03*.
Benesch, *Environmental Standard for Soil Vapor Sampling*.
NDHHS Title 178 Chapter 22- ACM Sampling.
NDHHS Title 178 Chapter 23- LBP Sampling.