



May 7, 2012

Ms. Tracy Concannon  
Brownfields Project Manager  
Indiana Brownfields Program  
100 North Senate Avenue, Room IGCN 1275  
Indianapolis, Indiana 46204

RE: Remediation Work Plan  
Former Muncie Paper Processing Property  
701 West 23<sup>rd</sup> Street  
Muncie, Delaware County, Indiana  
Brownfield Site ID: 4010016

Dear Ms. Concannon:

Industrial Waste Management Consulting Group, LLC (IWM Consulting) is pleased to submit this Remediation Work Plan (RWP) for the Former Muncie Paper Processing Property located at 701 West 23<sup>rd</sup> Street, Muncie, Delaware County, IN (Site). The proposed scope of work for this site included active remediation activities (excavation and disposal of up to 1,000-tons of arsenic and lead impacted soil which is documented to exceed the corresponding Commercial/Industrial Direct Contact Screening Levels), confirmatory soil sampling, and reporting.

The site background and the tasks to be completed as part of this RWP are described in more detail in the following sections. The scope of work will be modified accordingly if it is determined that site conditions are different than originally assumed.

It should be noted that even though historical investigations indicate that additional contaminants of concern (chlorinated volatile organic compounds (cVOCs)) are present in other areas of the Site, primarily groundwater, this RWP only provides recommendations regarding cleanup of the adsorbed metals in the soils. The cVOCs will be addressed under a separate RWP, which will be submitted at a later date.

### **Site History Summary**

The record review indicates that the Site is a vacant, overgrown 13.32-acre property located at 701 West 23<sup>rd</sup> Street in Muncie, Indiana. The Site is a former metal parts and paper processing facility, located in a mixed residential, commercial, and industrial corridor on the south side of Muncie, Indiana. Commercial and industrial properties are located north, west and east (beyond Buck Creek) of the Site. Residential and agricultural properties are located south of the Site.

The Site is currently owned by the Delaware County Board of Commissioners, which obtained the Site in January 2000 due to tax delinquency. All above grade structures have been demolished at the Site; however, the building foundations and below grade structures are still present. The Site is in the process of being redeveloped by the Muncie-Delaware County Board of Commissioners for commercial/industrial use.

Based on a review of previous environmental reports, the Site was historically identified as the Muncie Paper & Pulp and Hinde & Dauch Paper Company during the time period of 1892 through 1950. The Site was later listed as the Goodyear Tire and Rubber Metal Parts facility from approximately 1950 through 1967. More recently, the Site was identified as Jordan Paper Products, Inc. in 1987 and Muncie Paper Process, Inc. (MPP) in 1992. Records from previously researched IDEM records indicated that MPP received a permit for a solid waste facility at the Site in 1990.

A Phase I Environmental Site Assessment (ESA) was completed at the Site in August 2009 and an initial Phase II ESA was completed in September 2009. The Phase I ESA identified numerous recognized environmental conditions (RECs) and the September 2009 Phase II ESA investigated three (3) of the RECs. The Phase II ESA confirmed the presence of metals (arsenic and lead), poly-aromatic hydrocarbons (PAHs), and chlorinated volatile organic compounds (cVOCs) in the soil and/or groundwater at concentrations exceeding the corresponding RISC residential default closure level (RDCLs) and/or the commercial/industrial default closure level (IDCL).

Two (2) additional Phase II ESAs were completed in 2011 and further evaluated areas the RECs identified in 2009. The initial Phase II ESA, completed in August 2011, attempted to further define the lateral and vertical soil impacts (arsenic and lead) in three key areas (in the vicinity of historical soil borings SB-4, SB-24, and SB-31) of the Site and attempted to define the lateral and vertical extent of the adsorbed and dissolved cVOCs in the vicinity of the Former Wood Pulp Bleaching Area. Based upon the results of the August 2011 sampling event, it was determined the adsorbed metal concentrations were adequately defined in the vicinity of historical soil boring SB-4, but the adsorbed arsenic and lead were not adequately defined in the vicinity of historical soil borings SB-24 and SB-31, respectively. The cVOCs also were not adequately defined during the August 2011 investigation.

A subsequent Phase II ESA was completed in September 2011 and attempted to further define the adsorbed metal impacts in the vicinity of historical soil borings SB-24 and SB-31 and to further define the extent of cVOC impacts in the vicinity of the Former Wood Pulp Bleaching Area. The September 2011 investigation did not adequately define the lateral or vertical extent of the adsorbed arsenic in the vicinity of historical soil boring SB-24 and did not define the southern and eastern lateral extents of adsorbed lead in the vicinity of historical soil boring SB-31. Generally speaking, the adsorbed arsenic impacts extend to a depth of approximately 8-9 feet below land surface (BLS) and the adsorbed lead extends to a depth of approximately 5-6 feet BLS. Additionally, the vertical and lateral extents of the cVOCs were not defined during the September 2011 Phase II ESA.

A Site Location Map has been included as **Figure 1**, a Site Vicinity Map has been included as **Figure 2**, and a Site Map has been included as **Figure 3**. The historical lead and arsenic concentrations in the vicinity of historical soil borings SB-24 and SB-31 are displayed by location on **Figure 4a** and **Figure 4b**, respectively.



**Potential Exposure Pathways**

The adsorbed COCs (arsenic and lead) being addressed under this RWP are not volatile and thus do not pose a threat for vapor intrusion. However, vapor intrusion in new on-Site buildings in the future may still be a concern from VOCs in the groundwater. Consequently, this exposure pathway has not been eliminated, but will be addressed separately.

Since the majority of the Site does not have engineered barriers (i.e. asphalt or concrete) and the adsorbed metal COCs have predominantly been detected in soil samples obtained from the surface (0-0.5 feet BLS) or shallow subsurface (0.5 – ~9.0 feet BLS), soil exposure through direct contact, inhalation (vapors or soil particles), or ingestion of impacted soil by future Site occupants or construction workers are the primary potential exposure pathways which may be viable. At this time, the future redevelopment plans indicate that the Site will be developed for commercial/industrial purposes. Therefore, the most applicable cleanup standards are Industrial/Commercial Direct Contact Screening Levels for Soil Exposure, as outlined in Table A-6, Appendix A, of IDEM’s *Remediation Closure Guide* dated March 22, 2012.

**Remediation Goals**

It is the understanding of IWM Consulting that the Site will be utilized for commercial/industrial purposes in the future. Consequently, the remediation goals for the Site are the applicable lead and arsenic Commercial/Industrial Direct Contact Screening Levels for Soil Exposure, as documented in Table A-6, Appendix A, of IDEM’s *Remediation Closure Guide* dated March 22, 2012. The direct contact screening levels for each contaminant of concern (COC) are provided in the following table.

COC	Commercial/Industrial Direct Contact Screening Level (mg/kg)*
Lead	800
Arsenic	16

\*Screening levels derived from Table A-6, Appendix A, of IDEM’s *Remediation Closure Guide* dated March 22, 2012.

**Potential Remediation Alternatives**

IWM Consulting reviewed the available environmental data and evaluated three potential remediation alternatives. The potential remediation alternatives, including the feasibility of successfully implementing these activities and reaching the established remediation goals are summarized below.



#### No Active Remediation Action

If no action is taken at the Site, the impacted soil will remain on the Site for decades and will not be a developable property. Additionally, if the Site is not secured, it is possible that the general public could come into direct contact with the impacted surface soils, thus creating a potential environmental, health, and welfare liability for the Muncie-Delaware County Redevelopment Commission (MDC). This option is considered the least environmentally protective and the impacts to the environment will continue for many years to come. The no action alternative does not have an associated cost, is easy to implement and does not require ongoing operation or maintenance costs. There are no required actions or technology necessary to implement this option. The time frame needed for the no action alternative to result in improved environmental conditions at the Site is unknown; however, given the fact that the historical activities that adversely impacted the Site ceased operations decades ago, the amount of time required to significantly reduce concentrations to acceptable levels is expected to be greater than 25 years. This approach would prohibit redevelopment of this Site and the Site will continue to pose an environmental and health risk to the residents of the surrounding neighborhood.

#### Installation of a Soil Cap

The advantage of soil capping (importing 2 feet of clean soil) is that it quickly addresses the immediate environmental and health risks associated with direct contact with contaminated surface soil located throughout portions of the Site. However, the contaminants are left in-situ at depths below two feet and future construction or onsite excavation workers at the Site may be exposed to the contaminants left in place when the Site is redeveloped. Although soil capping is easy to implement and quickly addresses the direct contact issue related to impacted surface soil, this option is not the best option for the Site since the contaminants are left in-situ and future construction workers would be exposed to the contaminants remaining below the soil cap during site development activities. The imported soil will also raise the elevation of the Site by 2 feet, potentially creating drainage issues and impeding future development of the Site into commercial/industrial purposes.

#### Targeted Excavation & Disposal & Institutional Controls

The advantage of the targeted excavation and disposal portion of this remedial option is that it is easy to implement and expeditiously addresses the environmental concerns with respect to the hazardous substances (metals) adsorbed to the surface and subsurface soil and immediately removes the impacted soil from the Site. The excavation areas can focus on source areas or only areas with the highest contaminant concentrations and alleviates any long term affects with managing direct contact with the surface and subsurface soil. The risks associated with the remaining soil can be managed through the use of institutional controls. The disadvantage of soil excavation is that it does not necessarily remediate the impacted soil since the impacted soil is simply removed from the Site and transported and disposed, untreated, at an offsite landfill.



The institutional controls can consist of restricting the zoning of the property to non-residential purposes, prohibiting the installation of a garden (unless it is located in a raised garden bed) in the remaining affected areas, and require that any soil excavated from the affected areas be properly characterized prior to leaving the Site or being stockpiled on the Site. The advantages of using the institutional control is that it is quick and easy to implement yet very effective at controlling the environmental risks of human exposure to the contaminants that remain in-situ.

The most feasible and appropriate cleanup alternative is Targeted Excavation & Disposal, & Institutional Controls. This remedial approach immediately remediates and removes areas with the highest contaminant concentrations and expeditiously minimizes potential exposure pathways. This approach promotes redevelopment of the Site by cleaning up the Site to levels at or below the Commercial/Industrial Direct Contact Screening Levels and it is the most health protective option for future site occupants and construction workers.

### **Proposed Remediation Activities**

#### **Soil Excavation Activities**

IWM Consulting proposes the over-excavation of lead and arsenic impacted surface and relatively shallow subsurface (< 10 feet BLS) soil at the Site which exceeds the applicable lead and arsenic Commercial/Industrial Direct Contact Screening Levels for Soil Exposure, as documented in Table A-6, Appendix A, of IDEM's *Remediation Closure Guide* dated March 22, 2012. Although metals were detected throughout the Site during the 2009 investigation, the remediation activities will focus on two areas of the Site which were further assessed in 2011.

Based upon the historical soil analytical data obtained at the Site, soil remediation activities are warranted in order to adequately remediate the lead and arsenic impacted surface and shallow subsurface soils to a level that allows for future redevelopment into a commercial/industrial use. Specifically, IWM Consulting proposes to excavate and remove approximately 1,000-tons of arsenic and lead impacted soil which is documented to exceed the corresponding Commercial/Industrial Direct Contact Screening Levels. The excavation and remediation activities will concentrate in areas immediately surrounding historical soil borings SB-24 and SB-31. It should be noted that the estimated extent of soil excavation activities is based upon information obtained to date, which has not fully delineated the lateral and/or vertical extent of impacts in the areas immediately surrounding SB-24 and SB-31. Consequently, the actual amount of soil to be removed during the remediation project may be higher than the currently estimated amount and will be dependent upon the results of the confirmation soil sampling activities. The areas that are proposed to be excavated and the approximate dimension to be excavated around each soil boring are summarized below.

**SB-24:** Based upon available data, IWM Consulting estimates excavating a minimum area approximating 40' x 40' x 8' deep. Historical soil borings SB-24, GP-13 through GP-18, and GP-200 through GP-207 will be over-excavated during the remediation activities. Since shallow groundwater monitoring well SW-9 is located in the center of proposed excavation area and corresponds to historical soil boring SB-24, shallow monitoring well SW-9 will be abandoned by



a licensed well driller prior to initiating the excavation activities. The total volume of soil to be removed from this area is approximately 650 tons. A Proposed Excavation Map has been included as **Figure 4A**.

**SB-31:** Based upon available data, IWM Consulting estimates excavating a minimum area approximating 35' x 35' x 6' deep. Historical soil borings SB-31, SB-31A, GP-19 through GP-24, GP-208, and GP-210 through GP-214 will be over-excavated during the remediation activities. The total volume of soil to be removed from this area is approximately 350 tons. A Proposed Excavation Map has been included as **Figure 4B**.

The soil will be transported to and disposed at a special waste landfill (Jay County). IWM Consulting anticipates that the material will be classified as a non-hazardous special waste but additional waste characterization sampling and analysis (TCLP lead and TCLP arsenic) will be needed prior to the landfill approving the waste stream as a non-hazardous special waste.

Confirmatory soil samples will be obtained at the conclusion of the over-excavation activities at a rate of approximately one sample per every 20 linear feet along the sidewalls and one sample for every 400 square feet along the base of the excavation. Initially, IWM Consulting will utilize a portable X-ray fluorescence (XRF) analyzer (Alpha 4000 Series INNOV-X System) during the excavation activities. The XRF is capable of detecting lead and arsenic levels as low 13 mg/kg and 9 mg/kg, respectively and will provide real time arsenic and lead concentration information. This information will expeditiously guide the excavation work since the data is obtained immediately instead of having to wait for the laboratory to complete the analysis. Consequently, utilization of the XRF will be very beneficial when making field decisions regarding the depth and/or lateral extent of the excavation.

Once the excavation limits have been defined, IWM Consulting will obtain soil samples from the base and sidewalls for laboratory analysis. IWM Consulting is estimating that seven (7) base samples and fifteen (15) sidewall samples will be obtained post excavation activities. The confirmatory soil samples will be submitted to Pace Analytical Services, Inc. (Pace) located in Indianapolis, Indiana and Level IV quality assurance/quality control (QA/QC) documentation will be provided by the laboratory. The confirmatory soil samples will be analyzed on a standard turnaround time for the following parameters: Arsenic (SB-24 excavation) and Lead (SB-31 excavation) using SW-846 Method 6010B and percent moisture. The soil sample analytical results will be compared to the Office of Land Quality, Indiana Department of Environmental Management (IDEM) Commercial/Industrial Direct Contact Screening Levels for Soil Exposure, as documented in Table A-6, Appendix A, of IDEM's *Remediation Closure Guide* dated March 22, 2012.

One (1) duplicate soil sample and one (1) MS/MSD soil sample will be obtained during the over-excavation sampling activities at a rate of one (1) sample per every twenty (20) confirmatory soil samples and analyzed for the same analytical parameters.

The over-excavation area(s) will be backfilled and brought to grade with imported soil. In order to document the condition of the imported soil, confirmatory soil samples will be obtained from each source of the fill material at a rate of three (3) soil samples per source and then one (1) additional soil sample



will be obtained if the total imported amount of soil exceeds 500 tons. In this case, all of the fill material (soil) is anticipated to come from one (1) common source area and the total amount of imported material is anticipated to be 1,000 tons. Consequently, IWM Consulting will obtain a total of four (4) confirmatory soil samples (3 from the source and 1 additional sample since >500 tons) from the imported backfill material and the soil samples will be submitted to Pace and analyzed for the following analytical parameters: volatile organic compounds (VOCs) using SW-846 Method 8260B, poly-aromatic hydrocarbons (PAHs) using SW-846 Method 8270, RCRA-8 Metals using the appropriate SW-846 Method, and percent moisture. The soil samples will be analyzed on a normal turnaround time and Level II QA/QC documentation will be provided by the laboratory.

Prior to initiating the remediation activities, IWM Consulting will contact the Indiana Underground Plant Protective Services (IUPPS) to request a utility locate for all public utilities located at and immediately surrounding the Site.

**Proposed Timeline**

IWM Consulting anticipates the following timeline in relationship to completing this project:

<b>Proposed Timeline Former Muncie Paper Processing Property Muncie, IN</b>		
<i>Task</i>	<i>Estimated Timeline</i>	<i>Comments</i>
Submittal of the RWP, ABCA, HASP, & QAPP	May 7, 2012	
Initiation of the 30-day comment period	May 7, 2012	
Completion of the 30-day comment period	June 7, 2012	
Decision Memo Finalized	June 13, 2012	
Conduct Soil Excavation Activities	June 18, 2012	Estimate 3-days to complete field activities
Submittal of RWP Implementation/Closure Report	August 3, 2012	

At the conclusion of the excavation activities, IWM Consulting will prepare and submit a Remediation Work Plan Implementation Report to the IBP which documents the implemented corrective action activities and summarizes the soil analytical results. The analytical results will be provided in tabular format and the analytical results will be displayed by location on a figure drawn to scale.



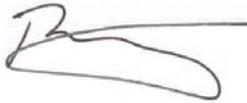
IWM Consulting appreciates the opportunity to provide the Indiana Brownfields Program with this RWP. If you have any questions regarding this transmittal, please contact the undersigned at 317-347-1111.

Sincerely,

**IWM CONSULTING GROUP, LLC**



Christopher D. Parks, LPG #2169  
Project Manager

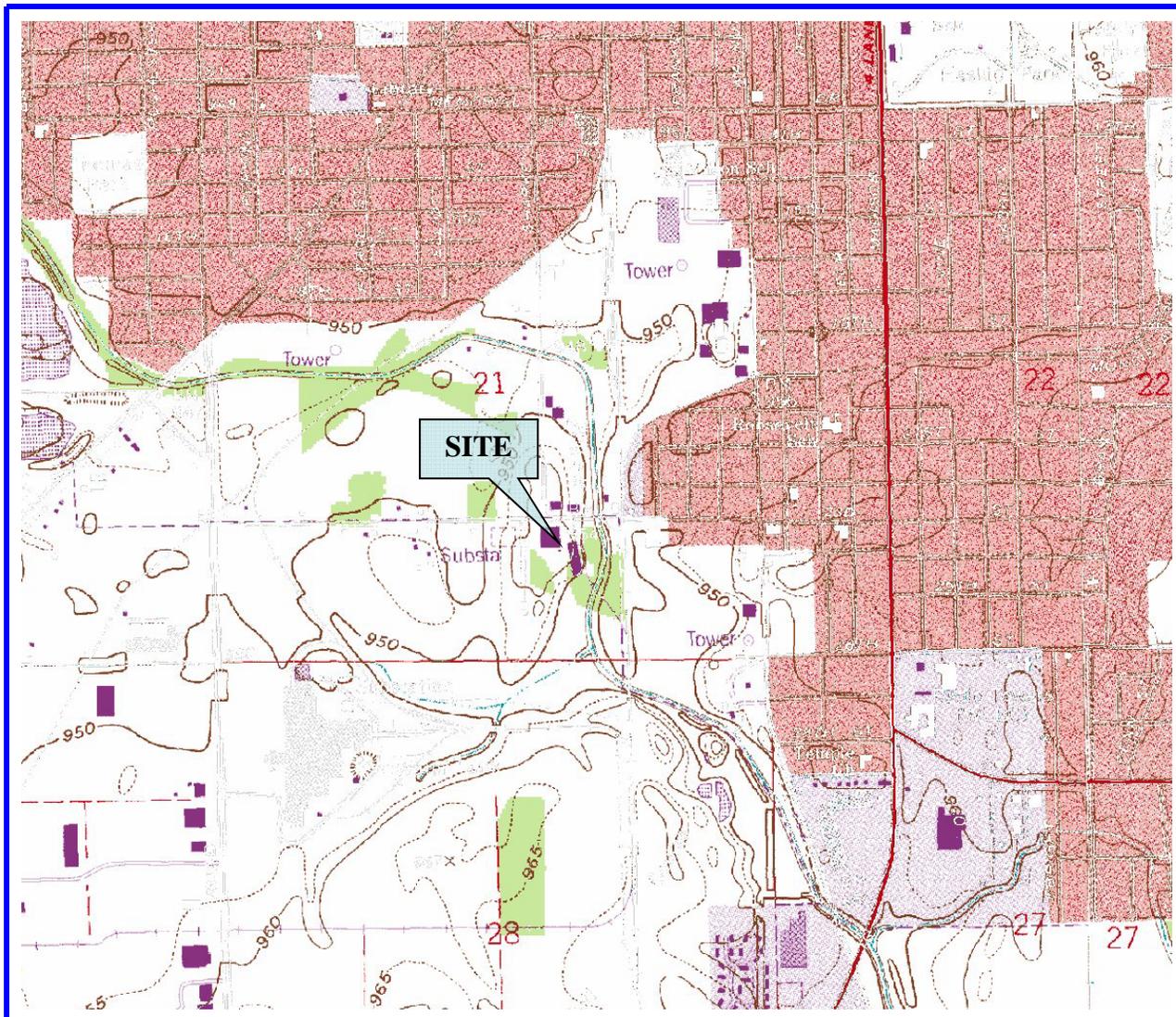


Bradley E. Gentry, LPG #2165  
Senior Project Manager

cc: Brad Bookout, Muncie-Delaware County Redevelopment Commission  
Jan Pels, USEPA Region V



## FIGURES



**MUNCIE WEST, IND.**

**QUADRANGLE**

MUNCIE-INDIANA

7.5 MINUTE SERIES  
(TOPOGRAPHIC)



QUADRANGLE LOCATION



**Former Muncie Paper Processing Property  
701 West 23<sup>rd</sup> Street  
Muncie, Indiana**

**Figure 1  
Site Location Map**

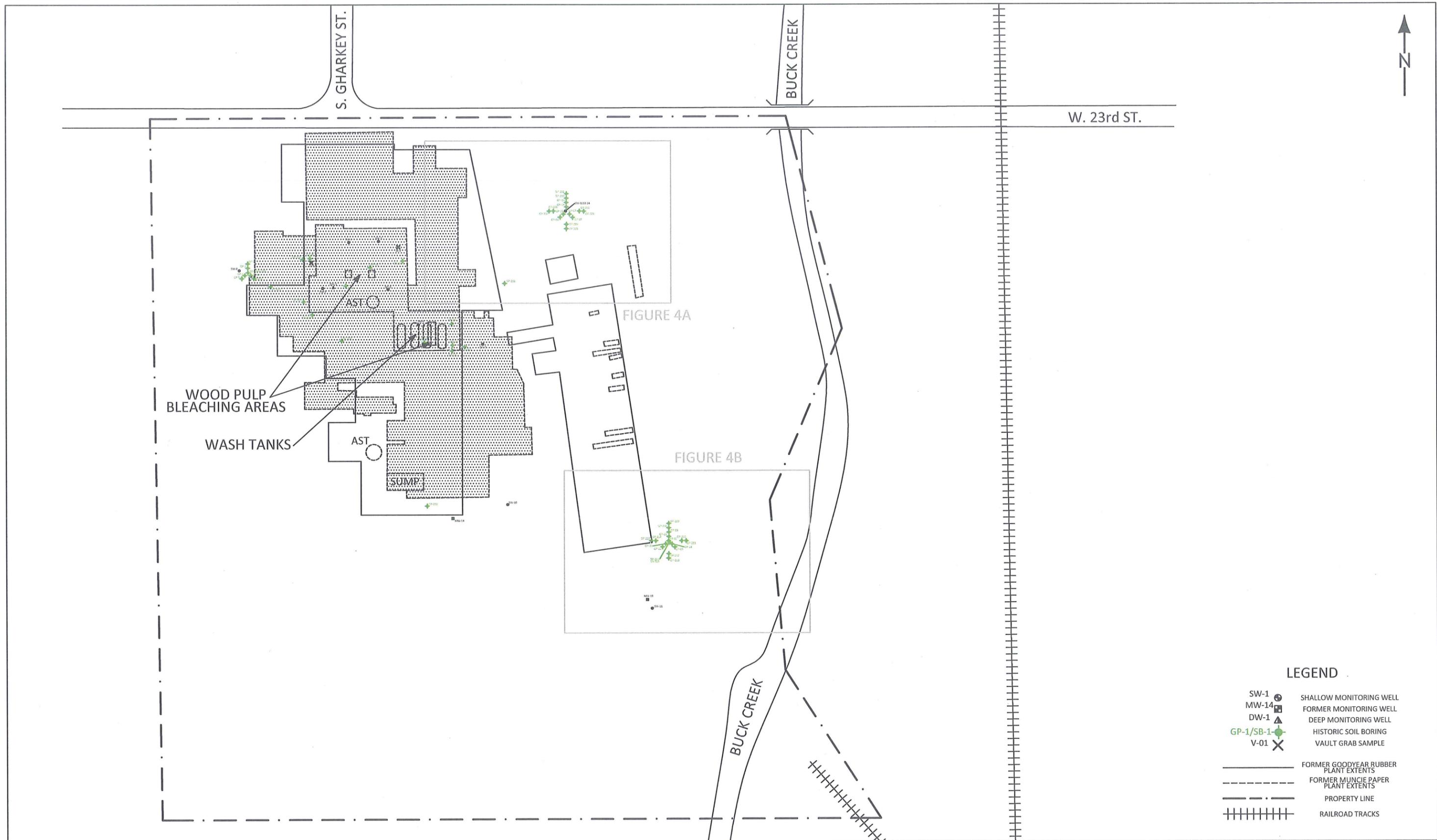


Figure 2 – Site Vicinity Map



Former Muncie Paper Processing Property  
701 W. 23<sup>rd</sup> St.  
Muncie, Indiana  
Image dated 2012 from Google Earth.





S. GARKEY ST.

BUCK CREEK

W. 23rd ST.

WOOD PULP BLEACHING AREAS

WASH TANKS

AST

SUMP

FIGURE 4A

FIGURE 4B

BUCK CREEK

LEGEND

- SW-1 ○ SHALLOW MONITORING WELL
- MW-14 □ FORMER MONITORING WELL
- DW-1 ▲ DEEP MONITORING WELL
- GP-1/SB-1 ● HISTORIC SOIL BORING
- V-01 ✕ VAULT GRAB SAMPLE
- FORMER GOODYEAR RUBBER PLANT EXTENTS
- - - FORMER MUNCIE PAPER PLANT EXTENTS
- . — . PROPERTY LINE
- ++++ RAILROAD TRACKS

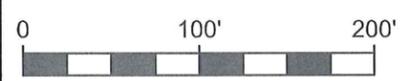
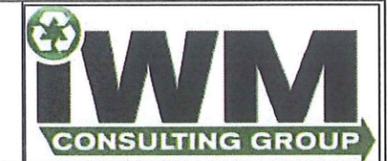
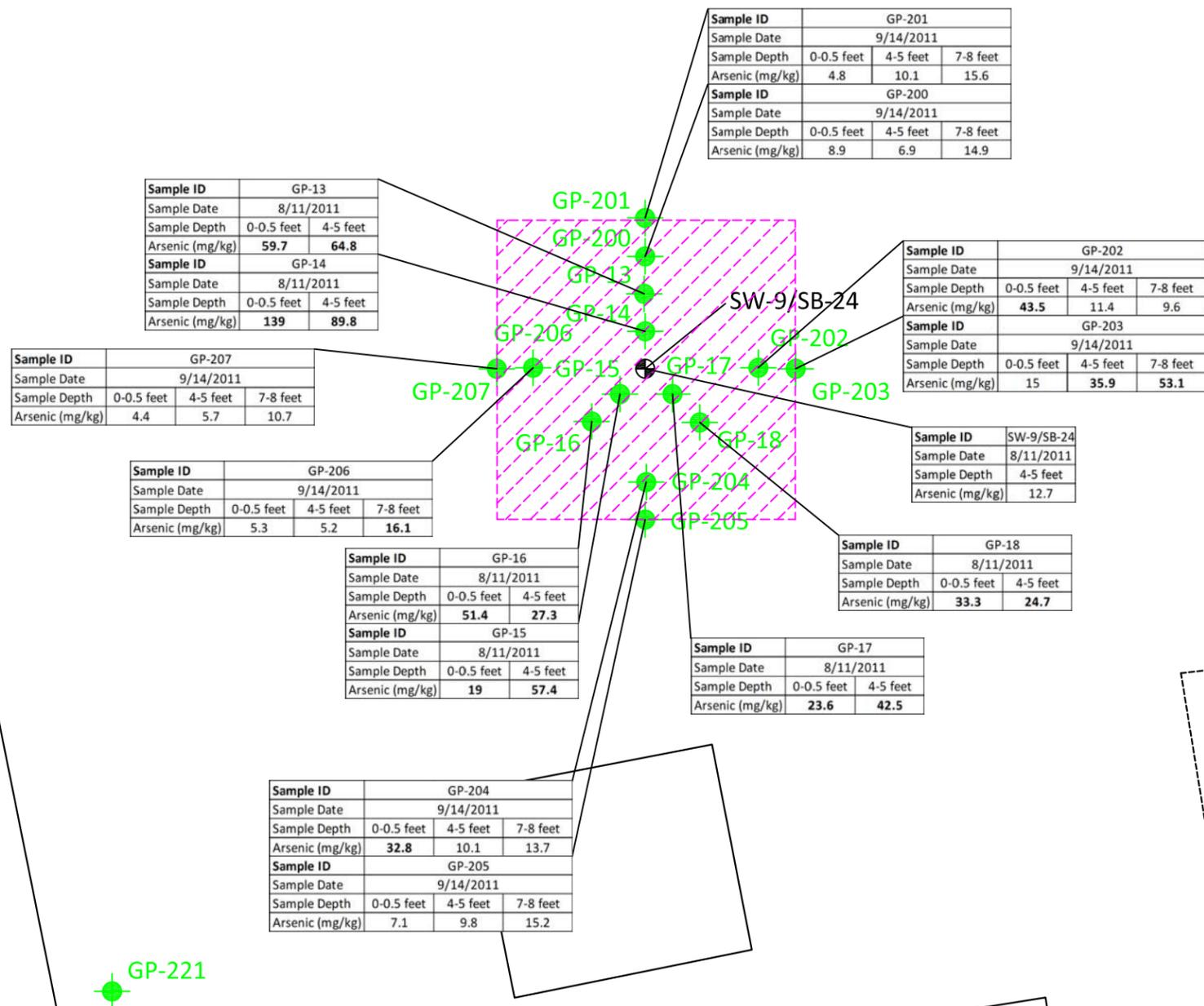


FIGURE 3  
SITE MAP

DRAWN BY: C. NEWELL  
DATE: 04/26/12  
REVISED:  
IN12017  
DWG #SITE MAP

FORMER MUNCIE PAPER PROCESSING PROPERTY  
701 W. 23RD ST.  
MUNCIE, INDIANA





**Bolded concentrations above Commercial/Industrial Direct Contact Screening Level (16 mg/kg) from the RCG dated March 22, 2012.**

**LEGEND**

- SW-1 SHALLOW MONITORING WELL
- MW-14 FORMER MONITORING WELL
- DW-1 DEEP MONITORING WELL
- GP-1/SB-1 HISTORIC SOIL BORING
- V-01 VAULT GRAB SAMPLE
- FORMER GOODYEAR RUBBER PLANT EXTENTS
- FORMER MUNCIE PAPER PLANT EXTENTS
- PROPOSED EXCAVATION LIMITS

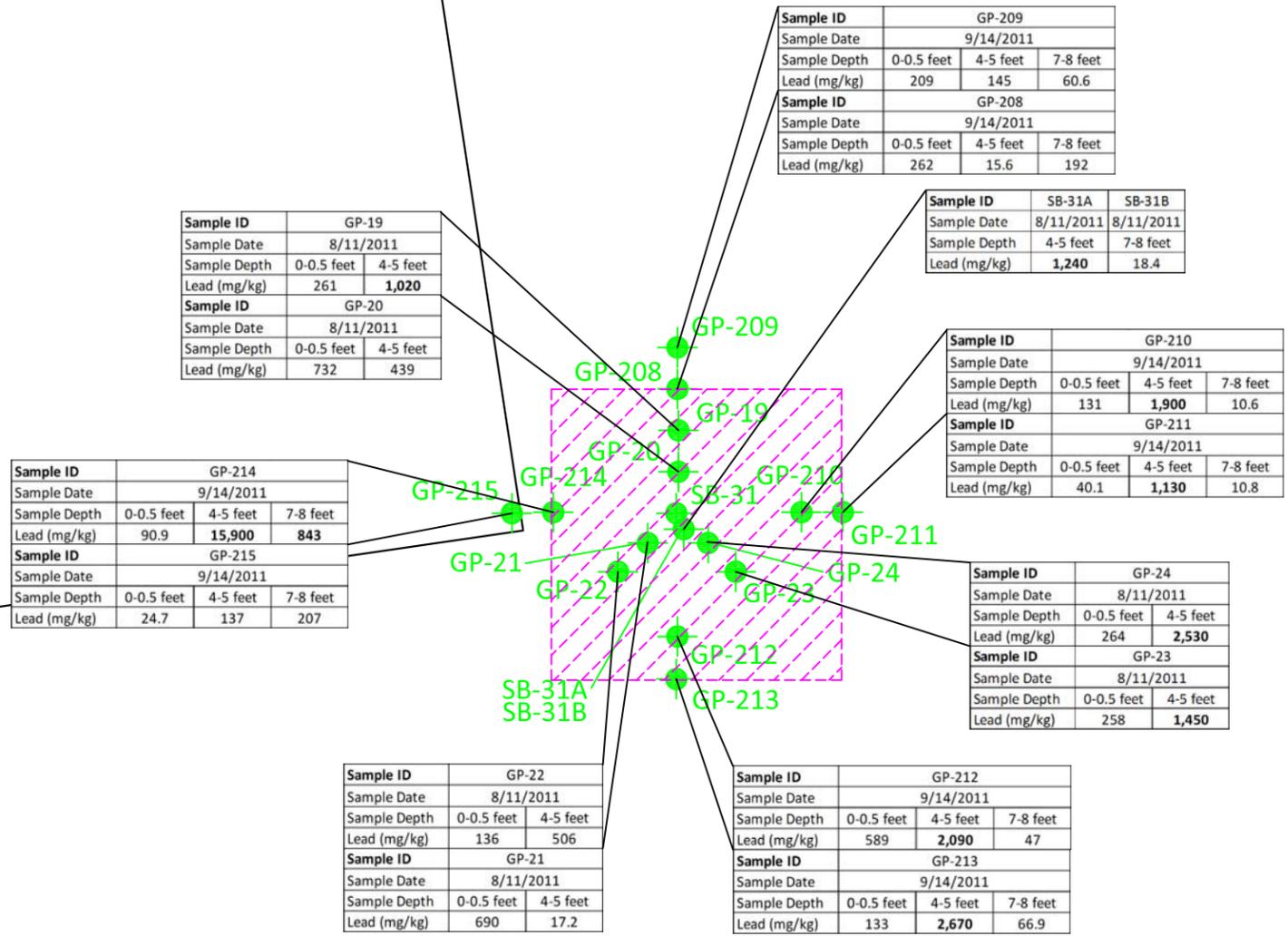


**FIGURE 4A**  
**PROPOSED SB-24 EXCAVATION MAP**

DRAWN BY: C. NEWELL  
DATE: 04/26/12  
REVISED:  
IN12017  
DWG #SITE MAP

FORMER MUNCIE PAPER PROCESSING PROPERTY  
701 W. 23RD ST.  
MUNCIE, INDIANA





**LEGEND**

- SW-1 SHALLOW MONITORING WELL
- MW-14 FORMER MONITORING WELL
- DW-1 DEEP MONITORING WELL
- GP-1/SB-1 HISTORIC SOIL BORING
- V-01 VAULT GRAB SAMPLE
- FORMER GOODYEAR RUBBER PLANT EXTENTS
- FORMER MUNCIE PAPER PLANT EXTENTS
- PROPERTY LINE
- PROPOSED EXCAVATION LIMITS

MW-19

SW-11

BUCK CREEK

**Bolded concentrations above Commercial/Industrial Direct Contact Screening Level (800 mg/kg) from the RCG dated March 22, 2012.**



**FIGURE 4B**  
**PROPOSED SB-31 EXCAVATION MAP**

DRAWN BY: C. NEWELL  
DATE: 04/26/12  
REVISED:  
IN12017  
DWG #SITE MAP

FORMER MUNCIE PAPER PROCESSING PROPERTY  
701 W. 23RD ST.  
MUNCIE, INDIANA

