SECTION 20107a COMPLIANCE ANALYSIS

FORMER BROKAW PROPERTY
PARCEL TAX IDENTIFICATION NUMBER H-08-012-300-027
3013 WEST HURON RIVER DRIVE
ANN ARBOR, WASHTENAW COUNTY, MICHIGAN

JANUARY 17, 2014

PREPARED FOR:
THE CITY OF ANN ARBOR
301 EAST HURON
ANN ARBOR, MICHIGAN 48104

TABLE OF CONTENTS

1.0 INTRODUCTION

As defined under *Part 201, Environmental Remediation, of the Natural Resources and Environmental Protection Act* (NREPA)*, 1994 PA 451* (Part 201)*, as amended and the rules promulgated thereunder*, the term "Facility" applies to any area, place, or property where a hazardous substance in excess of the concentrations that satisfy the cleanup criteria for unrestricted residential use has been released, deposited, disposed of, or otherwise comes to be located. The purpose of this document is to ensure compliance with the Part 20107a (1) requirement that the owner and/or operators of contaminated properties defined as a "Facility" under Part 201 assure responsible and safe use of the property. Section 7a of Part 201 provides that a person who owns or operates property that he/she has knowledge it is a "Facility" must:

1) Undertake measures to prevent exacerbation of existing soil and/or groundwater impacts.
2) Exercise due care by undertaking response activity necessary to mitigate unacceptable exposure to hazardous substances and allow for the intended use of the Site in a manner that protects the public health and safety.
3) Take reasonable precautions against the reasonably foreseeable acts or omissions of a third party and the consequences that could result from those acts or omissions.

Additionally, a person who owns or operates property that he or she has knowledge is a facility shall also do all of the following:

4) Provide reasonable cooperation, assistance, and access to the persons that are authorized to conduct response activities at the facility, including the cooperation and access necessary for the installation, integrity, operation, and maintenance of any complete or partial response activity at the facility. Nothing in this subdivision shall be interpreted to provide any right of access not expressly authorized by law, including access authorized pursuant to a warrant or a court order, or to preclude access allowed pursuant to a voluntary agreement.
5) Comply with any land use or resource use restrictions established or relied on in connection with the response activities at the facility.
6) Not impede the effectiveness or integrity of any land use or resource use restriction employed at the facility in connection with response activities.

Due care requirements are not related to the owner or operator's liability for the contaminants; they apply to non-liable parties and liable parties alike. The due care requirements were designed so contaminated properties could be safely redeveloped.

The Mannik & Smith Group, Inc. (MSG) prepared this Section 20107a Compliance Analysis (Due Care Plan) on behalf of the City of Ann Arbor (hereinafter referred to as "the City") to establish and to maintain (in part) documentation of compliance with Rule 1003(4), which requires a person subject to the provisions of Section 7a to maintain documentation of compliance with Section 7a and to provide such documentation to the Michigan Department of Environmental (MDEQ) upon their request.

In general, this Due Care Plan follows the required format outlined in the "*Instructions for Preparing and Disclosing Baseline Environmental Assessments and Section 7a Compliance Analysis to the Michigan Department of Environmental Quality and for Requesting Optional Determinations under the Authority of Part 201*". The information necessary to support this Due Care Plan is provided below.

2.0 SITE DESCRIPTION AND HISTORY

This Due Care Plan was completed for an approximate 24.45 acre parcel of land identified by parcel tax identification number H-08-12-300-027 (hereinafter referred to as the "Site"). This Site is addressed 3013 West Huron River Drive, which is located in the Southwest Quarter of Section 12, T2S-R5E of Ann Arbor, Washtenaw County, Michigan. *Figure 1, Site Location Map* depicts the location of the Site relative to nearby roads and major features. *Figure 2,*

Site Schematic Map, depicts the Site structures, sample locations and depths, and detected contaminant concentrations.

Based on review of the historic data obtained and interviews conducted during MSG's due diligence, the Site has been primarily used for agricultural and residential purposes with at least five (5) buildings present from 1937 to 1978. After 1978, the Site was generally used for residential purposes including an approximate 3,000 square feet residential building and associated outbuilding that have since become abandoned.

The following sections summarize pertinent activities and investigations completed at the Site. The information presented below is not meant nor intended to replace the whole record, it is merely intended to provide a brief background with respect to the Site.

2.1 *Phase I Environmental Site Assessment*

MSG conducted a Phase I ESA for the Site, dated September 20, 2013, in general accordance with the American Society for Testing and Materials standard E 1527-05, "*Standard Practice For Environmental Site Assessments: Phase I Environmental Site Assessment Process"* and All Appropriate Inquiry (AAI) codified in Federal Regulation – *40 Code of Federal Regulations (CFR) Part 312 - Standards and Practices for All Appropriate Inquiries.*

The following summarizes recognized environmental conditions (RECs) identified during MSG's Phase I ESA. The information presented below is not meant nor intended to replace the whole record, it is merely intended to provide a brief discussion with respect to RECs identified on the Site.

1) One (1) approximately 275-gallon steel aboveground storage tank (AST) and seven (7) approximately 5-gallon steel containers potentially used for storing gasoline, grease, and/or oil were observed within the garage of the abandoned residential building; the associated outbuilding; on the ground adjacent to the associated outbuilding; and in conjunction with poor housekeeping.
2) Partially buried and surficial debris consisting of steel, steel fence, steel and clay pipes, wood planks, plastic, glass panels, shattered glass, clay chimney flu, and/or old farm equipment were observed adjacent to the associated outbuilding, in the northeast portion of the Site, and in conjunction with poor housekeeping.
3) One (1) 55-gallon steel drum was observed in the basement of the abandoned residential building. The content of this drum is unknown and may contain hazardous substances and/or petroleum products.
4) Stained concrete was observed adjacent to the northwest exterior corner of the garage of the abandoned residential building.
5) A potential vent pipe was observed in the southeast corner of the Site that may be, or have been associated with an underground storage tank (UST) conceivably associated with the former building(s) located in this area.

2.2 *Pre-Demolition Asbestos, Lead-Based Paint, and Universal and Hazardous Materials*

In order to identify, characterize, and plan for the hazardous materials that may be encountered during demolition of the abandoned residential building and associated outbuilding, MSG performed a pre-demolition asbestos, lead-based paint (LBP), and universal and hazardous materials survey of the Site. The purpose of these surveys was to identify, quantify and document the location of suspect ACBM; identify the lead content of paint; and identify universal/hazardous waste, household chemicals, and chlorofluorocarbons (refrigerant) containing devices associated with the abandoned residential building and associated outbuilding.

The information presented below is summarized; therefore, it is not meant nor intended to replace the whole record, it is merely intended to provide a brief discussion.

1) Sampled materials in the abandoned residential building were found to contain greater than 1% asbestos which will require abatement by an accredited asbestos worker prior to demolition activities. Notification according to the procedure described by the NESHAP, Title 40 of the Code of Federal Regulations, Part 61, Subpart M, for renovation and demolition projects should be followed. Notification of demolition/renovation should be made to the Michigan Department of Environmental Quality Air Quality Division (MDEQ-AQD) prior to demolition or renovation. This form should be completed by the contractor who completes the demolition. Prior to beginning a demolition or renovation project, the contractor must make the proper notifications to the Michigan Department of Licensing and Regulatory Affairs (LARA) and MDEQ and complete pre-demolition abatement activities.
2) Hazardous and universal wastes were identified in the abandoned residential building and associated outbuilding which will require pre-demolition removal, proper disposal, and/or recycled.
3) Lead containing paint was not identified within the functional areas of the abandoned residential building and/or associated outbuilding.

2.3 *Limited Phase II Investigation*

To assess select REC's identified in MSG's *Phase I Environmental Site Assessment,* dated September 20, 2013, MSG conducted a Limited Phase II Investigation for the Site on November 20, 2013. The information presented below is summarized; therefore, it is not meant nor intended to replace the whole record, it is merely intended to provide a brief discussion with respect to REC's investigated on the Site during the Limited Phase II.

1) Based on the results of the Limited Phase II Investigation, the Site meets the definition of a "facility" as defined under Part 201 based on the arsenic, lead, selenium, and zinc exceedences of the generic residential cleanup criteria as established pursuant to Part 201/213 *Operational Memorandum 1, Attachment 1*, dated September 28, 2012 (hereinafter referred to as "the generic residential cleanup criteria") for direct contact criteria (DCC), groundwater surface water interface protection criteria (GSIPC), and/or drinking water protection criteria (DWPC) in soil sample SB-3 (0'-1').

2.4 *Baseline Environmental Assessment*

Using the information summarized in Sections 2.1 through 2.2 of this Due Care Plan, MSG prepared a Baseline Environmental Assessment (BEA) for the Site dated January 13, 2014. In general, the BEA concluded the following:

1) The identified constituents of concern (COC) for the Site include, but may not be limited to, heavy metals. While the aforementioned heavy metals are present at the Site at levels exceeding the generic residential cleanup criteria, contaminants have also been identified at the Site at concentrations below the regulatory threshold for soil (i.e. barium, cadmium, chromium, copper, mercury, and silver). It is also plausible that certain other contaminants may be present at the Site, including, but not limited to volatile organic compounds (VOCs) and polynuclear aromatic compounds (PNAs).
2) Provides liability protection from environmental impacts existing at the time of property transfer pursuant to Part 201 rules.
3) The intended future use of the Site is a publically assessable park that will be managed under the City's Natural Area Preservation (NAP); a program that works to protect and restore Ann Arbor's natural areas and to foster an environmental ethic among its citizens. No structures, playgrounds, or other recreational facilities are planned.
4) There will be no storage, use, or handling of any hazardous substances above typical residential quantities at the Site.

3.0 REGIONAL TOPOGRAPHY AND GEOLOGY AND LOCAY HYDROGEOLOGY AND SOILS

The United States Geological Survey (USGS) 7.5 minute topographical map titled *Ann Arbor West, Michigan Quadrangle* (1983) was reviewed for topographical information in the vicinity of the Site (Figure 1). The elevation of the Site ranges from approximately 850 feet above mean sea level (msl) in the southeast portion of the Site to approximately 810 feet above msl in the northwest portion of the Site. The nearest identified surface water body is the Huron River located approximately 0.05 miles east and downgradient of the Site. The surface topography in the immediate vicinity of the Site generally slopes to the east. The direction of shallow groundwater flow typically mimics the ground surface contours, moving from topographic highs to topographic lows. This assumes that all lakes, rivers, streams, wetlands, and/or other surface water bodies are interconnected expressions of the water table. As such, groundwater is expected to flow in an eastern direction towards the Huron River.

According to the *Quaternary Geology of Michigan*, W. R. Farrand (1982), the geology in the vicinity of the Site consists of fine-textured glacial till and glacial outwash sand and gravel and post glacial alluvium. According to the *Michigan Department of Natural Resources Land and Minerals Services Division Resource Mapping and Aerial Photography* (1987), the bedrock geology in the vicinity of the Subject Property consists of Coldwater Shale.

According to the *United Stated Geologic Survey Summary of Hydrogeologic Conditions by County for the State of Michigan* (2007), [soils and glacial deposits that have relatively high permeability occur in areas of the county. However, surrounding these areas are regions where the surface is less permeable till or clay (Fleck, 1980). With the available information, glacial lithologies cannot be regionally correlated in the subsurface. This is likely due to the lateral and vertical heterogeneity of glacial deposits that resulted from a complex depositional history (Westjohn and others, 1994). Glacial deposits range in thickness from 50 to 400 feet in Washtenaw County. In the northeastern and central portion of Washtenaw County, the glacial deposits are commonly greater than 250 feet in thickness. Glacial deposits are composed of till, outwash, and lacustrine deposits. In the county, till is fine to coarse grained, and is present in moraines and till plains. Moraines are a combination of clay, silt, sand, and gravel. Outwash is composed of mostly sand and gravel. Moraines and outwash cover the majority of the county, except in the southeastern portion where lacustrine dominate. Lacustrine are generally composed of a thin sand layer underlain by clay and silt (Fleck, 1980)". "Bedrock underlies the glacial deposits. The bedrock is composed of Mississippian and Devonian sedimentary rocks, which generally dip to the northwest. The units of that form the bedrock surface generally trend southwest to northeast along the surface and increase in age from the northwest to the southeast. In the central portion of the county, the Coldwater Shale forms the bedrock surface (Fleck, 1980). The Coldwater Shale underlies the Marshall Sandstone and has very low permeability. The Coldwater Shale consists of shale, sandstone, siltstone, and carbonates. This is generally considered a confining unit and ranges in thickness, from east to west across the State, from 500 to 1300 feet thick (Westjohn and Weaver, 1996b). The Coldwater Shale contains more sandstone and siltstone in the eastern portion of the basin and grades into more dolomitic deposits in the western portion of the basin (Monnett, 1948)].

The *Soil Survey of Washtenaw County, Michigan*, issued 1977; reprinted 1985; amended January 1996, was consulted for soil classifications. The following is a brief description of the individual soil mapping units present on the Site:

- *Boyer loamy sand, 12 to 18 percent slopes* – This soil is on pitted outwash areas along streams and drainageways of outwash plains, kames, valley trains, terraces, and moraines. When this soil is cultivated, erosion is a severe hazard, and the soil is droughty and subject to soil blowing. Runoff is medium. This soil type is located in the northwestern portions of the Site.
- *Gilford sandy loam, 0 to 2 percent slopes* – This soil is in depressional areas, broad low-lying areas, and drainageways of outwash plains. This soil has a high water table with a very slow runoff.

Depressional areas are subject to flooding by runoff from adjacent areas. This soil type is located in the northwestern portions of the Site.

- *Spinks loamy sand, 0 to 6 percent slopes* – This soil is in on broad uplands and outwash plains, pitted outwash areas, valley trains, terraces, and moraines. This soil is droughty and is subject to soil blowing when cultivated. Runoff is slow to very slow. This soil type is located in the east, west and southern portions of the Site.

4.0 DETAILED CHARACTERISTICS OF SITE USE

Detailed information regarding the Site can be found in the BEA prepared by MSG dated January 13, 2014. In summary, the Site generally consists of undeveloped woodland property with an approximately 3,000 square foot former residential building and an associated outbuilding that have become abandoned (Figure 2).

It is to our understanding that The City's intended future use of the Site is a publically accessible park that will be managed under the City's NAP program that, in general, will preserve open space yielding a significant public benefit for the scenic enjoyment of the general public. No structures, playgrounds, or other recreational facilities are planned for the Site.

If the Site use changes in the future, the potential exposure pathways discussed in Section 5.0 may need to be reassessed and documentation of compliance with Section 7a must be maintained by the City. In accordance with the MDEQ Rule 1003(6), this document will be maintained by the City and upon request be presented to MDEQ to provide documentation (in part) of compliance with Section 7a requirements.

5.0 PATHWAY EVALUATION

MSG has completed a preliminary Risk-Based Corrective Action (RBCA) Tier I Evaluation for the Site to 1) identify potential receptors; 2) evaluate potential exposure pathway relevance with applicable cleanup criteria; and 3) compare analytical results to applicable cleanup criteria. Cleanup criteria are applicable if it is reasonable and relevant for the corresponding exposure pathway to be or become complete. An exposure pathway is comprised of a source, transport mechanism, exposure route and a receptor.

Potential sources include:

- Impacted soils

Transport Mechanisms include:

- Wind/Water Erosion and Atmospheric Dispersion

Relevant exposure routes include:

- Ingestion/ Dermal Contact
- Recreational Use/Sensitive Habitat

5.1 Potential Receptors

MSG conducted an assessment to determine the potential receptors that could be exposed to chemicals impacting the Site. The potential receptor assessment included a review of the current Site; the foreseeable future intended use of the Site; and foreseeable human and ecological receptors both on- and off-site. Based on these factors, potentially exposed receptors at the Site include, but are not limited to the following:

1) Dermal Contact

   - Future workers constructing and/or maintaining the publically accessible park, of which may be exposed to impacted soils.

   - Operational workers, service workers, public, and/or trespassers that may be exposed to impacted soils.

- Construction workers that may be exposed to impacted soils during response activities.
- Utility workers installing, maintaining, or improving utilities at the Site that may be exposed to impacted soils.

2) Recreational Use/Sensitive Habitat

- Ecological receptors

5.2 Exposure Evaluation

This exposure pathway evaluation is based on the hydrogeologic setting; maximum known chemical concentrations/distribution; likely presence of a chemical release; future intended Site use; and potential receptors.

The Site's future intended land use as a publically accessible park does not conform to the residential land use category; therefore, the current non-generic residential cleanup criteria as established pursuant to Part 201/213 *Operational Memorandum 1, Attachment 1*, dated September 28, 2012 (hereinafter referred to as "the generic non-residential cleanup criteria") was utilized for evaluation purposes. Part 201 generic non-residential cleanup criteria have been developed to correspond to specific exposure pathways for land uses that do not conform to the residential land use.

Figure 3, Exposure Pathway Evaluation, summarizes the exposure evaluation process based on current and foreseeable future Site conditions. The analytical results and comparisons to the generic non-residential cleanup criteria are located in *Table 1, Soil Sample Analytical Detection Summary* and summarized below:

- Soil sample SB-3 (0'-1') contained concentrations of lead exceeding generic residential cleanup criteria for DCC and arsenic and selenium exceeding generic residential cleanup criteria for GSIPC and/or DWPC.
- Soil Sample SB-3 (0'-1') contained concentrations of barium, cadmium, copper, and zinc above their statewide default background levels [75,000 micrograms per kilogram (ug/kg), 1,200 ug/kg and 160,000 ug/kg, 47000 ug/kg], respectively; however, were below generic residential cleanup criteria.
- Soil samples SB-4 (4'-5') and SB-5 (4'-5') contained arsenic, barium, cadmium, chromium, copper, lead, and zinc concentrations below the generic residential cleanup criteria.
- Soil samples SB-1 (4'-5') and SB-2 (4'-5') did not contain VOCs and PNAs concentrations above laboratory method detection limits.
- Soil samples SB-4 (4'-5') and SB-5 (4'-5') did not contain mercury, selenium, and silver concentrations above laboratory method detection limits.

Therefore, exposure pathways of due care concern at the Site that are or may become complete in light of the intended use as a publically accessible park include:

Soil

- Soil Ingestion/Dermal Contact

Response activities can be performed to mitigate the risk of exposure to contaminated media. Section 7.0 presents a plan for response activities as it relates to achieving compliance with due care obligations at the Site.

6.0 HAZARDOUS SUBSTANCE INFORMATION

Constituents of concern (COCs) that has been detected in the soil at the Site include those identified in the BEA and summarized in Section 5.2. The sample locations are depicted on Figure 2 and identified COCs are summarized in Tables 1. The identified COCs for the Site include, but may not be limited to, heavy metals. While the aforementioned heavy metals are present at the Site at levels exceeding the generic residential cleanup criteria,

contaminants have also been identified at the Site at concentrations below the regulatory threshold for soil (i.e. barium, cadmium, chromium, copper, mercury, and silver). It is also plausible that certain other contaminants may be present at the Site, including, but not limited to VOCs and PNAs. Contaminants may be hidden in subsurface material, covered by pavement, vegetation, or other substances. Additionally, contamination may not be present in predictable locations. Even with additional exploration, it is not possible to completely eliminate the risk of discovering other contamination on Site. It cannot be assumed that samples collected and conditions observed are representative of an area that has not been sampled and/or tested.

7.0 PLAN FOR RESPONSE ACTIVITIES

The plan for response activities is as follows:

1) Limited soil removal within the vicinity of SB-3 will be performed to eliminate or reduce lead concentrations below applicable generic non-residential cleanup criteria. Upon completion of limited soil removal activities, confirmation soil samples will be submitted for laboratory analysis of lead using USEPA Test Method 0200.2/6020A. The excavation will be backfilled with clean sand as appropriate. Results will be documented and maintained in the file for the Site and managed as appropriate by the City.
2) Proper abandonment of the onsite water well by a licensed water well drilling contractor registered in the State of Michigan.
3) Proper abandonment of the onsite crock well by a licensed water well drilling contractor registered in the State of Michigan and/or improving and enhancing safety measures to ensure long-term protection from the public.
4) As an institutional control, the use of drinking water at the Site will be avoided by proper planning and management of the Site using NAP Program. Documentation will be maintained in the file for the Site and managed as appropriate by the City.
5) Surficial debris will be removed from the Site to improve the safety and aesthetics of the publically accessible park and to provide protection to third parties. If evidence of a possible release is identified in the vicinity of surficial debris, one or more soil samples will be collected for laboratory analysis. Specific analyses will be determined based on field observations, but may include VOCs using USEPA Method 8260, PNAs using USEPA Method 8270, 10 Michigan metals using USEPA Method 0200.2/6020A, and/or PCBs using USEPA Method 8082.
6) Periodic monitoring and landscape maintenance of the Site to adequately address the potential for erosion, runoff and sedimentation, which includes implementation of a contingency plan in the event of unforeseen conditions. When appropriate, to further assess the impacts above GSIPC, soil samples may be submitted for leach testing of lead using appropriate methods. If the leach testing results indicate hazardous concentrations of lead may leach to groundwater, statistical analysis, modeling or additional response activities may be performed.
7) Copies of the BEA and this Due Care Plan will be provided to all construction workers, maintenance personnel, and individuals responsible for implementing planned response activities and/or due care at the Site. Access to the Site will be limited during implementation of response activities. Documentation will be maintained in the file for the Site and managed as appropriate by the City.

8.0 EVALUATION AND DEMONSTRATION OF COMPLIANCE WITH 7A OBLIGATIONS

The following sections evaluate and outline the methods of compliance with 7A obligations at the Site. This section will be appropriately amended if additional impacts are identified at the Site.

8.1 Prevent Exacerbation

Exacerbation occurs when a party's activities cause contamination to spread. After the planned response activities (Section 7.0) are completed, the proposed use of the Site as a publically accessible park is not expected to exacerbate the existing known contamination.

Construction workers, maintenance personnel and individuals responsible for implementing Due Care at the Site, as directed by the City, will be properly trained and wear appropriate personal protective equipment (PPE), when necessary, including but not limited to steel-toed boots, long pants, and gloves. Soils or other materials removed from the impacted area located on the Site during response activities; general maintenance of the Site; or periodic monitoring and landscape maintenance of the Site, will be characterized and properly disposed off-site when appropriate. If impacted groundwater is encountered, it will be characterized and properly managed.

Copies of the BEA and Due Care Plan will be provided to all construction workers, maintenance personnel and individuals responsible for implementing planned response activities and/or due care at the Site. Access to the Site will be limited during implementation of response activities.

If unforeseen conditions are encountered during response activities, general maintenance, or periodic monitoring and landscape maintenance of the Site, results of additional response activities will be maintained in the file for the Site and managed as appropriate by the City.

8.2 Due Care

Based on the intended land use, unacceptable exposures to hazardous substances will be mitigated at the Site after response activities are completed. In addition, the City will perform periodic monitoring and landscape maintenance to adequately identify the potential for erosion, runoff, sedimentation and/or exposure of surficial debris. Contingencies to mitigate any impacts representing unacceptable exposures identified in the future are discussed in Section 8.3.

8.3 Reasonable Precautions

If further impacts are identified on the Site, either during response activities or at a later date, additional activities should be conducted to appropriately manage the impacts, including, but not limited to, the following:

1) Assess the nature and extent of the newly identified impact(s).
2) If the extent of impact(s) is limited to a small area(s), then the impacted media should be removed and the excavation backfilled with clean sand and covered with topsoil or wood chips, as appropriate.
3) If the extent of impacts is widespread, then fencing and appropriate signage may be installed to limit public access. Signage should warn the public to keep out of the fenced area and to avoid digging or excavation without permission and appropriate PPE and field screening.

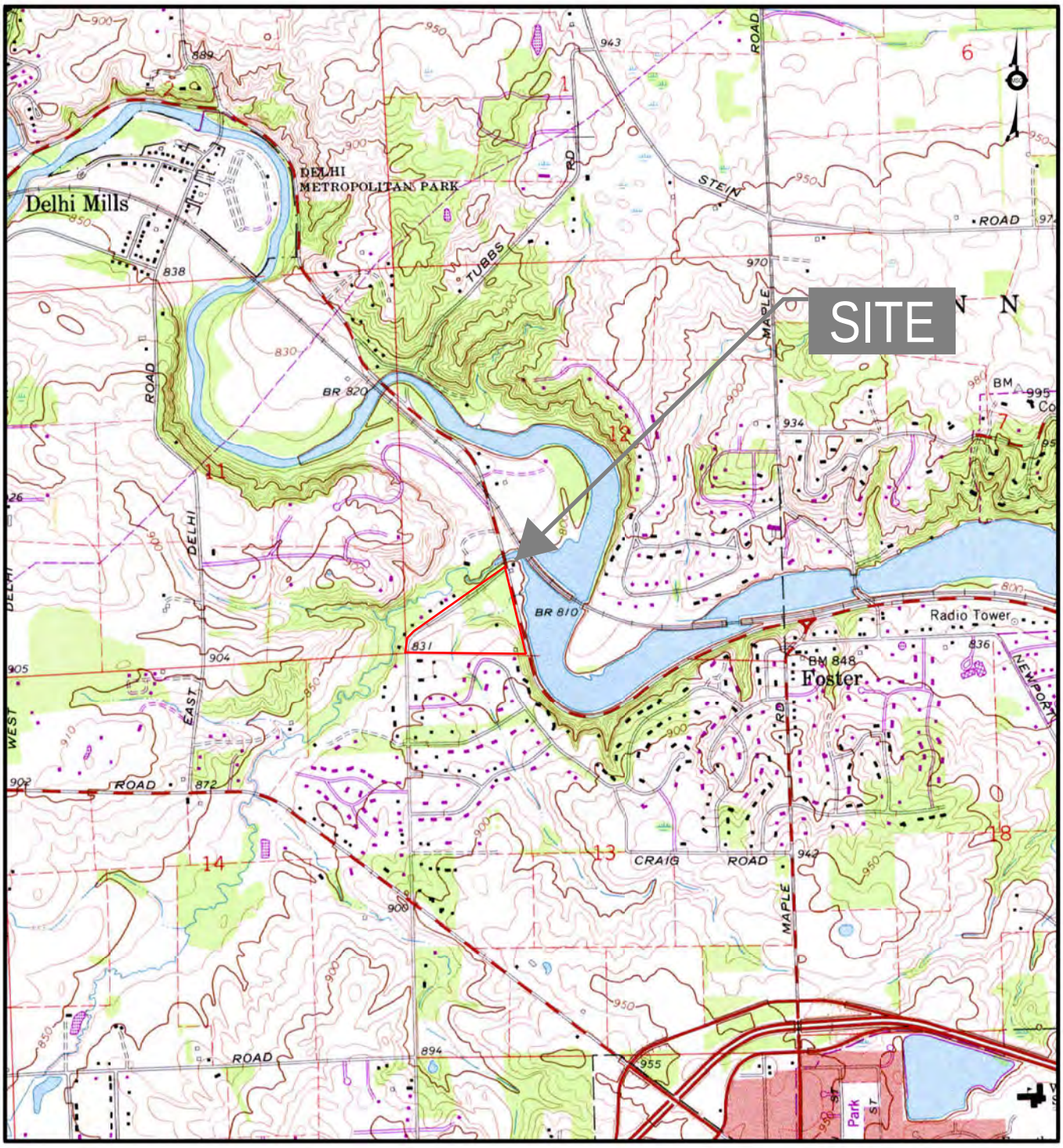
Any excavated soils will be characterized to determine proper offsite disposal requirements, and soil requiring offsite disposal will be transported and disposed into an appropriate, properly licensed landfill facility. When necessary, soil may be temporarily staged within the area of impacts prior to offsite disposal. Temporarily staged soils will be placed on 10-mil or greater plastic sheeting and then covered with 10-mil or greater plastic sheeting in a manner that prevents rainwater from contacting the soils.

Offsite soil disposal activities will be recorded by appropriate documentation, including, as applicable: manifests, trucking logs, receipts, and other required documentation consistent with Section 20120c(6). Results of the response activities will be documented and maintained in the file for the Site and managed as appropriate by the City.

8.4 Precautions Against Third Party Acts or Omissions

As a precaution against third party acts or omissions, the Site access will be restricted during implementation of response activities, particularly at times and in areas that contaminated soil may be exposed.

FIGURES



CONTOUR INTERVAL 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Approximate Site Boundary

Mannik Smith GROUP
TECHNICAL SKILL. CREATIVE SPIRIT.
www.MannikSmithGroup.com

FIGURE 1
SITE LOCATION MAP

PARCEL TAX IDENTIFICATION NUMBER H-08-012-300-027
3013 WEST HURON RIVER DRIVE, ANN ARBOR, WASHTENAW COUNTY, MI

DATE	DRAWN BY	DESIGNED BY	PROJECT NO
1/8/2014	SAH	REM	ANNA0026

$TIME$
$DATE$ $FILEL$

SB-1 (SOIL)
DEPTH (4'-5')
VOCs BC
PNAs BC
MI 10 NS

Abandoned Residential Building

SB-2 (SOIL)
DEPTH (4'-5')
VOCs BC
PNAs BC
MI 10 NS

Outbuilding

SB-5 (SOIL)
DEPTH (4'-5')
VOCs NS
PNAs NS
As BC
Ba BC
Cad BC
Cu BC
Pb BC
Zn BC
Hg ND
Se ND
Ag ND

MSG

CHEMICAL ABBREVIATIONS
As = Arsenic
Ba = Barium
Cd = Cadmium
Cr = Chromium
Cu = Copper
Pb = Lead
Hg = Mercury
Se = Selenium
Ag = Silver
Zn = Zinc
VOCs = Volatile Organic Compounds
PNAs = Polynuclear Aromatic Hydrocarbons
MI 10 = 10 Michigan Metals
ND = Not Detected
BC = Below Criteria
NS = Not Sampled

SOILCOMPOUND CONCENTRATIONS
XI Drinking Water Protection Criteria
XII Groundwater Surface Water Interface Protection Criteria
XIX Direct Contact Criteria
Exceedance of the current generic residential cleanup criteria as established pursuant to Part 201 (Revised September 28, 2012). All units are in micrograms per kilogram (*ug/kg*).

Approximate Site Boundary

SB-4 (SOIL)
DEPTH (4'-5')
VOCs NS
PNAs NS
As BC
Ba BC
Cad BC
Cu BC
Pb BC
Zn BC
Hg ND
Se ND
Ag ND

SB-3 (SOIL)
DEPTH (4'-5')
VOCs NS
PNAs NS
As 9,000 (XIX)
Pb 3,900,000 (XIX)
Se 680 (XII)
Zn 3,400,000 (XIX)

Former Building(s)

GRAPHIC SCALE
0' 100' 200' 400'
SCALE: 1" = 200'

Mannik Smith GROUP
TECHNICAL SKILL. CREATIVE SPIRIT.
www.MannikSmithGroup.com

FIGURE 2

SITE SCHEMATIC MAP

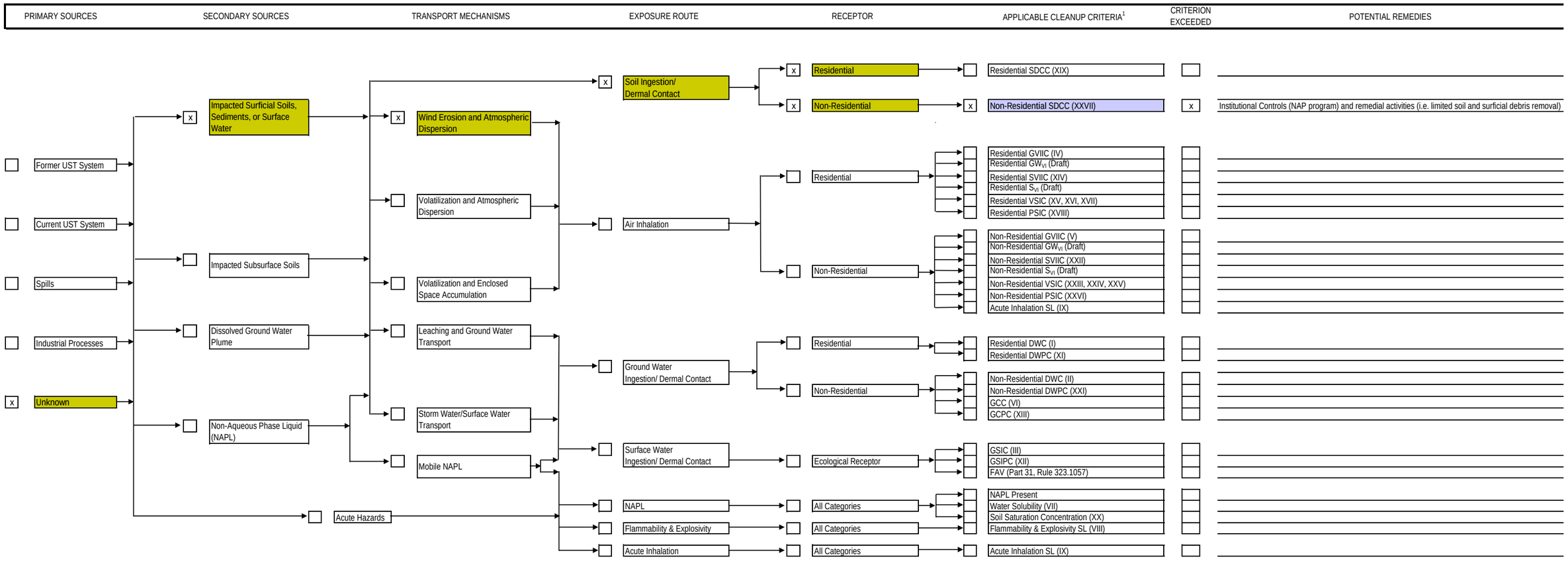
PARCEL TAX IDENTIFICATION NUMBER H-08-012-300-027
3013 WEST HURON RIVER DRIVE, ANN ARBOR, WASHTENAW COUNTY, MI

DATE	DRAWN BY	DESIGNED BY	PROJECT NO.
1/8/2014	SAH	REM	ANNA0026

1/8/2014 2:26:47 PM
W:\Projects\Projects A-E\ANNA0026\CAD\BEAVANNA0026_Figure 2_Site Schematic Map.dgn

FIGURE 3
EXPOSURE PATHWAY EVALUATION

Brokaw Property
3013 West Huron River Drive
Ann Arbor, Washtenaw County, Michigan



X Indicates this portion of exposure pathway is present at the Site.
X Indicates this criterion is exceeded at the Site.

[1] DEQ-RD Op Memo 1 (updated September 28, 2012), unless otherwise noted
Roman numerals indicate DEQ criterion number

TABLES

Table 1
Soil Sample Analytical Detection Summary
3013 West Huron River Drive
Ann Arbor, Washtenaw County, Michigan

SOIL: Part 201/213 Generic Non-Residential Cleanup Criteria Revised September 28, 2012 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/kg			Volatile Organic Compounds (VOCs)																				
			Acetone	Acrylonitrile	Benzene	Bromobenzene	Bromodichloromethane (Dichlorobromomethane)	Bromoform	Bromomethane	2-Butanone (MEK)	n-Butylbenzene	sec-Butylbenzene	tert-Butylbenzene	Carbon Disulfide	Carbon Tetrachloride	Chlorobenzene	Chloroethane	Chloroform	Chloromethane	o-Chlorotoluene (2-Chlorotoluene)	Dibromochloromethane	1,2-Dibromo-3-chloropropane (Dibromochloropropane)	Dibromomethane	1,2-Dichlorobenzene
CAS Number			67-64-1	107-13-1	71-43-2	108-86-1	75-27-4	75-25-2	74-83-9	78-93-3	104-51-8	135-98-8	98-06-6	75-15-0	56-23-5	108-90-7	75-00-3	67-66-3	74-87-3	95-49-8	124-48-1	96-12-8	74-95-3	95-50-1
Statewide Default Background Levels (X)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drinking Water Protection Criteria (XXI)			42,000	220	100	1,500	1,600 (W)	1,600 (W)	580	7.6E+05	4,600	4,600	4,600	46,000	100	2,000	34,000	1,600 (W)	22,000	9,300	1,600 (W)	10 (M); 4.0	4,600	14,000
Groundwater Surface Water Interface Protection Criteria (XII)			34,000	100 (M, X); 40	4,000 (X)	NA	ID	ID	700	44,000	ID	ID	ID	ID	900 (x)	500	22,000 (X)	7,000	ID	ID	ID	ID	NA	280
Groundwater Contact Protection Criteria (XIII)			1.1E+08 (C)	2.8E+05	2.2E+05	3.6E+05	2.8E+05	8.7E+05(C)	1.4E+06	2.7E+07 (C)	1.2E+05	88,000	1.8E+05	2.8E+05 (C)	92,000	2.6E+05 (C)	9.5E+05 (C)	1.5E+06 (C)	1.1E+06 (C)	5.0E+05 (C)	3.6E+05	1,200 (C)	2.0E+06 (C)	2.1E+05 (C)
Soil Vapor Intrusion Concentration (S_{VI-nr}) (c)			5.23E+06	137	84.5	12,900	104	11,400	200 (t)	3.04E+06	7,560	738	1,290	3,800	50.0 (t)	5,850	67,200	340	323	12,800	266	194	NA	96,900
Soil Volatilization to Indoor Air Inhalation (XXII)			1.1E+8 (C)	35,000	8,400	5.8E+05	6,400	7.7E+05	1,600	2.7E+07 (C)	ID	ID	ID	1.4E+05	990	2.2E+05 (C)	9.5E+05 (C)	3.8E+04	10,000	5.0E+05 (C)	21,000	1,200 (C)	ID	2.1E+05 (C)
Infinite Source Volatile Soil Inhalation Criteria (XXIII)			1.6E+08	17,000	45,000	5.4E+05	31,000	3.1E+06	13,000	3.5E+07	ID	ID	ID	1.6E+06	12,000	9.2E+05	3.6E+07	1.5E+05	1.2E+05	1.5E+06	80,000	900	ID	4.6E+07
Finite Source Source Volatile Soil Inhalation Criteria (5 m) (XXIV)			1.6E+08	17,000	99,000	5.4E+05	31,000	3.1E+06	57,000	3.5E+07	ID	ID	ID	8.0E+06	34,000	1.1E+06	1.2E+08	3.4E+05	1.0E+06	3.1E+06	80,000	900	ID	4.6E+07
Finite Source Source Volatile Soil Inhalation Criteria (2 m) (XXV)			2.0E+08	31,000	2.3E+05	5.4E+05	57,000	3.1E+06	1.4E+05	3.6E+07	ID	ID	ID	1.9E+07	79,000	2.1E+06	2.8E+08	7.9E+05	2.5E+06	6.4E+06	98,000	900	ID	5.5E+07
Particulate Soil Inhalation Criteria (XXVI)			1.7E+11	5.8E+07	4.7E+08	2.4E+08	1.1E+08	3.6E+09	1.5E+08	2.9E+10	8.8E+08	1.8E+08	2.9E+08	2.1E+10	1.7E+08	2.1E+09	2.9E+10	1.6E+09	2.6E+09	2.1E+09	1.6E+08	7.0E+05	ID	4.4E+10
Non-Residential Direct Contact Criteria (XXVII)			7.3E+07	74,000	4.0E+05(C)	7.6E+05 (C)	4.9E+05	8.7E+05(C)	1.0E+06	2.7E+07(C,DD)	8.0E+06	8.0E+06	8.0E+06	2.8E+05 (C,DD)	3.9E+05 (C)	2.6E+05 (C)	9.5E+05 (C)	1.5E+06 (C)	1.1E+06 (C)	5.0E+05 (C)	5.0E+05	1,200 (C)	2.0E+06 (C)	2.1E+05 (C)
Soil Saturation Concentration Screening Levels (C_{sat}) (XXX)			1.1E+08	8.3E+06	4.0E+05	7.6E+05	1.5E+06	8.7E+05	2.2E+06	2.7E+07	1.0E+07	1.0E+07	1.0E+07	2.8E+05	3.9E+05	2.6E+05	9.5E+05	1.5E+06	1.1E+06	5.0E+05	6.1E+05	1,200	2.0E+06	2.1E+05
SAMPLE ID	Depth	SAMPLE																						
SB-1	4'-5'	11/20/2013	<1,000	<120	<50	<100	<100	<120	<200	<750	<50	<58	<50	<290	<58	<58	<290	<58	<250	<50	<120	<29	<250	<100
SB-2	4'-5'	11/20/2013	<1,000	<110	<50	<100	<100	<110	<200	<750	<50	<55	<50	<270	<55	<55	<270	<55	<250	<50	<110	<27	<250	<100
SB-3	0'-1'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-4	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-5	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-6	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-7	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-8	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-9	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-10	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-11	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-12	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-13	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-14	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-15	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:
Bold indicates concentration above laboratory reporting limits.
Roman numerals indicate DEQ criterion number
Gray indicates indicates sample location subsequently removed
Exceeds Drinking Water Protection Criteria (XI)
Exceeds Groundwater Surface Water Interface Protection Criteria (XII)
Exceeds Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Two or More DWP (XI), GSIP (XII) and/or Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Generic Groundwater Contact Protection Criteria (XIII)
Exceeds Direct Contact Criteria (XIX), Soil Saturation Concentration Screening Levels (Csat) (XX)
ND = Not Detected above laboratory reporting limits
NS = Not Sampled or Not Analyzed
NR = Not Reported (Data missing from provided report)
Notes in parentheses and standard abbreviations from MDEQ Operational Memorandum 1, Attachment 1, dated September 28, 2012 or MDEQ Guidance Document for the Vapor Intrusion Pathway, dated May 2013

Table 1
Soil Sample Analytical Detection Summary
3013 West Huron River Drive
Ann Arbor, Washtenaw County, Michigan

SOIL: Part 201/213 Generic Non-Residential Cleanup Criteria Revised September 28, 2012 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/kg			VOCs Continued																					
			1,3-Dichlorobenzene	1,4-Dichlorobenzene	Dichlorodifluoromethane	1,1-Dichloroethane	1,2-Dichloroethane	1,1-Dichloroethylene	cis-1,2-Dichloroethene	trans-1,2-Dichloroethene	1,2-Dichloropropane	1,3-Dichloropropene	Ethylbenzene	Ethylene Dibromide (EDB, 1,2-Dibromoethane)	2-Hexanone	Iodomethane (Methyl iodide)	Isopropylbenzene (Cumene)	4-Methyl-2-Pentanone (MIBK)	Methylene Chloride	Methyl-tert-buryl ether(MTBE)	Naphthalene	n-Propylbenzene	Styrene	1,1,1,2-Tetrachloroethane	1,1,2,2-Tetrachloroethane
CAS Number			541-73-1	106-46-7	75-71-8	75-34-3	107-06-2	75-35-4	156-59-2	156-60-5	78-87-5	542-75-6	100-41-4	106-93-4	591-78-6	74-88-4	98-82-8	108-10-1	75-09-2	1634-04-4	91-20-3	103-65-1	100-42-5	630-20-6	79-34-5
Statewide Default Background Levels (X)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drinking Water Protection Criteria (XXI)			480	1,700	2.70E+05	50,000	100	140	1,400	2,000	100	700	1,500	20 (M); 1.0	58,000	NA	2.6E+05	1.0E+05	100	800	1.0E+05	4,600	2,700	6,400	700
Groundwater Surface Water Interface Protection Criteria (XII)			680	360	ID	15,000	7,200 (X)	2,600	12,000	30,000 (X)	4,600 (X)	180 (X)	360	110 (X)	ID	NA	3,200	ID	30,000 (X)	1.4E+05 (X)	730	ID	2,100 (X)	ID	1,600 (X)
Groundwater Contact Protection Criteria (XIII)			51,000	1.4E+05	1.0E+6 (C)	8.9E+05 (C)	3.8E+05	2.2E+05	6.4E+05 (C)	1.4E+6 (C)	3.2E+05	1.1E+05	1.4E+05 (C)	500	2.5E+06 (C)	NA	3.9E+05 (C)	2.7E+06 (C)	2.3E+06	5.9E+06 (C)	2.1E+06	3.0E+05	2.7E+05	4.4E+05 (C)	94,000
Soil Vapor Intrusion Concentration (S_{VI-nr}) (c)			740	1,420	68,200	7,330	83.7	1,230	165	760	151	305	3,990	20.0 (t)	16,900	NA	304	1.04E+06	1,540	2.38E+05	8,940	2,370	30,200	292	230
Soil Volatilization to Indoor Air Inhalation (XXII)			48,000	1.0E+05	1.7E+06	4.3E+05	11,000	330	41,000	43,000	7,400	5,400	1.4E+05 (C)	3,600	1.8E+06	NA	3.9E+05 (C)	2.7E+06 (C)	2.4E+05	5.9E+06 (C)	4.7E+05	ID	5.2E+05 (C)	33,000	23,000
Infinite Source Volatile Soil Inhalation Criteria (XXIII)			94,000	2.6E+05	6.3E+07	2.5E+06	21,000	3,700	2.1E+05	3.3E+05	30,000	60,000	2.4E+06	5,800	1.3E+06	NA	2.0E+06	5.3E+07	7.0E+05	3.0E+07	3.5E+05	ID	3.3E+06	1.2E+05	34,000
Finite Source Source Volatile Soil Inhalation Criteria (5 m) (XXIV)			94,000	2.6E+05	5.5E+08	6.0E+06	33,000	15,000	4.3E+05	8.4E+05	51,000	2.0E+05	3.1E+06	5,800	1.3E+06	NA	2.0E+06	5.3E+07	1.7E+06	4.1E+07	3.5E+05	ID	3.3E+06	2.1E+05	34,000
Finite Source Source Volatile Soil Inhalation Criteria (2 m) (XXV)			1.1E+05	3.4E+05	1.4E+09	1.4E+07	74,000	37,000	1.0E+06	2.0E+06	1.2E+05	4.7E+05	6.5E+06	9,800	1.5E+06	NA	3.0E+06	7.0E+07	4.0E+06	8.9E+07	3.5E+05	ID	4.2E+06	3.3E+05	34,000
Particulate Soil Inhalation Criteria (XXVI)			8.8E+07	5.7E+08	1.5E+12	1.5E+10	1.5E+08	7.8E+07	1.0E+09	2.1E+09	1.2E+08	5.9E+08	1.3E+10	1.8E+07	1.2E+09	NA	2.6E+09	6.0E+10	8.3E+09	8.8E+10	8.8E+07	5.9E+08	6.9E+09	5.3E+08	6.8E+07
Non-Residential Direct Contact Criteria (XXVII)			1.7E+05 (C)	1.9E+06	1.0E+6 (C)	8.9E+05 (C)	4.2E+05	5.7E+05 (C)	6.4E+05 (C)	1.4E+6 (C)	5.5E+05 (C)	2.4E+05	1.4E+05 (C)	430	2.5E+06 (C)	NA	3.9E+05 (C)	2.7E+06 (C)	2.3E+06 (C)	5.9E+6 (C)	5.2E+07	8.0E+06	5.2E+05 (C)	4.4E+05 (C)	2.4E+05
Soil Saturation Concentration Screening Levels (C_{sat}) (XXX)			1.7E+05	NA	1.0E+06	8.9E+05	1.2E+06	5.7E+05	6.4E+05	1.4E+06	5.5E+05	6.2E+05	1.4E+05	8.9E+05	2.5E+06	NA	3.9E+05	2.7E+06	2.3E+06	5.9E+06	NA	1.0E+07	5.2E+05	4.4E+05	8.7E+05
SAMPLE ID	Depth	SAMPLE																							
SB-1	4'-5'	11/20/2013	<100	<100	<250	<58	<58	<50	<50	<50	<58	<58	<50	<58	<2,500	<120	<250	<2,500	<100	<250	<330	<100	<58	<120	<58
SB-2	4'-5'	11/20/2013	<100	<100	<250	<55	<55	<50	<50	<50	<55	<55	<50	<55	<2,500	<110	<250	<2,500	<100	<250	<330	<100	<55	<110	<55
SB-3	0'-1'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-4	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-5	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-6	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-7	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-8	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-9	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-10	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-11	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-12	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-13	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-14	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-15	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:
Bold indicates concentration above laboratory reporting limits.
Roman numerals indicate DEQ criterion number
Gray indicates indicates sample location subsequently removed
Exceeds Drinking Water Protection Criteria (XI)
Exceeds Groundwater Surface Water Interface Protection Criteria (XII)
Exceeds Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Two or More DWP (XI), GSIP (XII) and/or Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Generic Groundwater Contact Protection Criteria (XIII)
Exceeds Direct Contact Criteria (XIX), Soil Saturation Concentration Screening Levels (Csat) (XX)
ND = Not Detected above laboratory reporting limits
NS = Not Sampled or Not Analyzed
NR = Not Reported (Data missing from provided report)

Table 1
Soil Sample Analytical Detection Summary
3013 West Huron River Drive
Ann Arbor, Washtenaw County, Michigan

SOIL: Part 201/213 Generic Non-Residential Cleanup Criteria Revised September 28, 2012 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/kg			VOCs Continued											
			Tetrachloroethylene	Toluene	1,2,4-Trichlorobenzene	1,1,1-Trichloroethane	1,1,2-Trichloroethane	Trichloroethylene	Trichlorofluoromethane	1,2,3-Trichloropropane	1,2,3-Trimethylbenzene	1,2,4-Trimethylbenzene	1,3,5-Trimethylbenzene	Vinyl Chloride	Total Xylenes
CAS Number			127-18-4	108-88-3	120-82-1	71-55-6	79-00-5	79-01-6	75-69-4	96-18-4	526-73-8	95-63-6	108-67-8	75-01-4	1330-20-7
Statewide Default Background Levels (X)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Drinking Water Protection Criteria (XXI)			100	16,000	4,200	4,000	100	100	1.50E+05	2,400	NA	2,100	1,800	40	5,600
Groundwater Surface Water Interface Protection Criteria (XII)			1,200 (X)	5,400	5,900 (X)	1,800	6,600 (X)	4,000 (X)	NA	NA	NA	570	1,100	260 (X)	820
Groundwater Contact Protection Criteria (XIII)			88,000 (C)	2.5E+05 (C)	1.1E+06	4.6E+05 (C)	4.2E+05	4.4E+05	5.6E+05 (C)	8.3E+05 (C)	NA	1.1E+05 (C)	94,000 (C)	2.0E+04	1.5E+05 (C)
Soil Vapor Intrusion Concentration (S_{VI-nr}) (c)			1,030	1.69E+05	5,860	66,600	365	50.0 (t,e)	1.18E+05	NA	53,500	36,900	27,900	40.0 (t,f)	4,890
Soil Volatilization to Indoor Air Inhalation (XXII)			21,000	2.5E+05 (C)	1.1E+6 (C)	4.6E+05	24,000	1,900	5.6E+05 (C)	7,500	NA	1.1E+05 (C)	94,000 (C)	2,800	1.5E+05 (C)
Infinite Source Volatile Soil Inhalation Criteria (XXIII)			2.1E+05	3.3E+06	3.4E+07	4.5E+06	57,000	14,000	1.1E+08	11,000	NA	2.5E+07	1.9E+07	29,000	5.4E+07
Finite Source Source Volatile Soil Inhalation Criteria (5 m) (XXIV)			4.9E+05	3.6E+07	3.4E+07	1.5E+07	57,000	25,000	1.4E+11	11,000	NA	6.0E+08	4.6E+08	1.7E+05	6.5E+07
Finite Source Source Volatile Soil Inhalation Criteria (2 m) (XXV)			1.1E+06	3.6E+07	3.4E+07	3.1E+07	1.2E+05	58,000	1.4E+11	12,000	NA	6.0E+08	4.6E+08	4.2E+05	1.3E+08
Particulate Soil Inhalation Criteria (XXVI)			1.2E+09	1.2E+10	1.1E+10	2.9E+10	2.5E+08	5.9E+07	1.7E+12	8.8E+06	NA	3.6E+10	3.6E+10	8.9E+08	1.3E+11
Non-Residential Direct Contact Criteria (XXVII)			88,000 (C)	2.5E+05 (C)	1.1E+6 (C,DD)	4.6E+05 (C)	8.4E+05	5.0E+5 (C,DD)	5.6E+05 (C)	8.3E+05 (C)	NA	1.1E+05 (C)	94,000 (C)	34,000	1.5E+05 (C)
Soil Saturation Concentration Screening Levels (C_{sat}) (XXX)			88,000	2.5E+05	1.1E+06	4.6E+05	9.2E+05	5.0E+05	5.6E+05	8.3E+05	NA	1.1E+05	94,000	4.9E+05	1.5E+05
SAMPLE ID	Depth	SAMPLE													
SB-1	4'-5'	11/20/2013	<50	<50	<330	<58	<58	<58	<100	<120	<100	<100	<100	<58	<150
SB-2	4'-5'	11/20/2013	<50	<50	<330	<55	<55	<55	<100	<110	<100	<100	<100	<55	<150
SB-3	0'-1'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-4	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-5	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-6	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-7	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-8	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-9	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-10	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-11	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-12	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-13	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-14	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-15	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS

Notes:
Bold indicates concentration above laboratory reporting limits.
Roman numerals indicate DEQ criterion number
Gray indicates indicates sample location subsequently removed
Exceeds Drinking Water Protection Criteria (XI)
Exceeds Groundwater Surface Water Interface Protection Criteria (XII)
Exceeds Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Two or More DWP (XI), GSIP (XII) and/or Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Generic Groundwater Contact Protection Criteria (XIII)
Exceeds Direct Contact Criteria (XIX), Soil Saturation Concentration Screening Levels (Csat) (XX)
ND = Not Detected above laboratory reporting limits
NS = Not Sampled or Not Analyzed
NR = Not Reported (Data missing from provided report)

Table 1
Soil Sample Analytical Detection Summary
3013 West Huron River Drive
Ann Arbor, Washtenaw County, Michigan

SOIL: Part 201/213 Generic Non-Residential Cleanup Criteria Revised September 28, 2012 and Guidance Document for the Vapor Intrusion Pathway May 2013 Units: µg/kg			Polynuclear Aromatic Compounds (PNAs)															Metals									
			Acenaphthene	Acenaphthylene	Anthracene	Benzo(a)anthracene	Benzo(a)pyrene	Benzo(b)fluoranthene	Benzo(g,h,i)perylene	Benzo(k)fluoranthene	Chrysene	Dibenzo(a,h)anthracene	Fluoranthrene	Fluorene	Indeno(1,2,3-cd)pyrene	2-Methylnaphthalene	Phenanthrene	Pyrene	Arsenic (B)	Barium (B)	Cadmium (B)	Chromium	Copper (B)	Lead (B)	Mercury (B,Z)	Selenium (B)	Silver (B)	Zinc (B)
CAS Number			83-32-9	208-96-8	120-12-7	56-55-3	50-32-8	205-99-2	191-24-2	207-08-9	218-01-9	53-70-3	206-44-0	86-73-7	193-39-5	91-57-6	85-01-8	129-00-0	7440-38-2	7440-39-3	7440-43-9	7440-47-3	7440-50-8	7439-92-1	7439-97-6	7782-49-2	7440-22-4	7440-66-6
Statewide Default Background Levels (X)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,800	75,000	1,200	18,000	32,000	21,000	130	410	1,000	47,000
Drinking Water Protection Criteria (XXI)			8.8E+05	17,000	41,000	NLL	NLL	NLL	NLL	NLL	NLL	NLL	7.3E+05	8.9E+05	NLL	1.7E+05	1.6E+05	4.8E+05	4,600	1.30E+06	6,000	30,000	5.80E+06	7.00E+05	1,700	4,000	13,000	5.00E+06
Groundwater Surface Water Interface Protection Criteria (XII)			8,700	ID	ID	NLL	NLL	NLL	NLL	NLL	NLL	NLL	5,500	5,300	NLL	4,200	2,100	ID	4,600	(G)	(G,X)	3,300	(G)	(G,X)	50 (M); 1.2	400	100 (M); 27	(G)
Groundwater Contact Protection Criteria (XIII)			9.7E+05	4.4E+05	41,000	NLL	NLL	NLL	NLL	NLL	NLL	NLL	7.3E+05	8.9E+05	NLL	5.5E+06	1.1E+06	4.8E+05	2.0E+06	1.0E+09 (D)	2.30E+08	1.40E+08	1.0E+09 (D)	ID	47,000	7.80E+07	2.00E+08	1.0E+09 (D)
Soil Vapor Intrusion Concentration ($S_{VI\text{-}nr}$) (c)			7.26E+06	2.82E+06	5.98E+08	NA	NA	NA	NA	NA	NA	NA	NA	1.19E+07	NA	1.26E+05	86,300	1.09E+09	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Soil Volatilization to Indoor Air Inhalation (XXII)			3.5E+08	3.0E+06	1.0E+09 (D)	NLV	NLV	ID	NLV	NLV	ID	NLV	1.0E+09 (D)	1.0E+9 (D)	NLV	4.9E+06	5.1E+06	1.0E+09 (D)	NLV	NLV	NLV	NLV	NLV	NLV	8.9E+04	NLV	NLV	NLV
Infinite Source Volatile Soil Inhalation Criteria (XXIII)			9.7E+07	2.7E+06	1.6E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	8.9E+08	1.5E+08	NLV	1.8E+06	1.9E+05	7.8E+08	NLV	NLV	NLV	NLV	NLV	NLV	6.2E+04	NLV	NLV	NLV
Finite Source Source Volatile Soil Inhalation Criteria (5 m) (XXIV)			9.7E+07	2.7E+06	1.6E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	8.8E+08	1.5E+08	NLV	1.8E+06	1.9E+05	7.8E+08	NLV	NLV	NLV	NLV	NLV	NLV	6.2E+04	NLV	NLV	NLV
Finite Source Source Volatile Soil Inhalation Criteria (2 m) (XXV)			9.7E+07	2.7E+06	1.6E+09	NLV	NLV	ID	NLV	NLV	ID	NLV	8.8E+08	1.5E+08	NLV	1.8E+06	1.9E+05	7.8E+08	NLV	NLV	NLV	NLV	NLV	NLV	6.2E+04	NLV	NLV	NLV
Particulate Soil Inhalation Criteria (XXVI)			6.2E+09	1.0E+09	2.9E+10	ID	1.9E+06	ID	3.5E+08	ID	ID	ID	4.1E+09	4.1E+09	ID	2.9E+08	2.9E+06	2.9E+09	9.1E+05	1.5E+08	2.2E+06	2.4E+05	5.9E+07	4.4E+07	8.8E+06	5.9E+07	2.9E+06	ID
Non-Residential Direct Contact Criteria (XXVII)			1.3E+08	5.2E+06	7.3E+08	80,000	8,000	80,000	7.0E+06	8.0E+05	8.0E+06	8,000	1.3E+08	8.7E+07	80,000	2.6E+07	5.2E+06	8.4E+07	3.7E+04	1.3E+08	2.1E+06	9.2E+06	7.3E+07	9.0E+05 (DD)	5.8E+05	9.6E+06	9.0E+06	6.3E+08
Soil Saturation Concentration Screening Levels (C_{sat}) (XXX)			NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
SAMPLE ID	Depth	SAMPLE																										
SB-1	4'-5'	11/20/2013	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-2	4'-5'	11/20/2013	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	<330	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS
SB-3	0'-1'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	9,000	1,200,000	3,100	17,000	160,000	3,900,000	<50	680	190	3,400,000
SB-4	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,800	9,800	100	3,800	5,300	3,800	<50	<200	<100	18,000
SB-5	4'-5'	11/20/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	4,400	13,000	100	6,100	6,900	7,000	<50	<200	<100	21,000
SB-6	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	3,500,000	NS	NS	NS	NS
SB-7	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	490,000	NS	NS	NS	NS
SB-8	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,800,000	NS	NS	NS	NS
SB-9	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	580,000	NS	NS	NS	NS
SB-10	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,100,000	NS	NS	NS	NS
SB-11	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	390,000	NS	NS	NS	NS
SB-12	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,600,000	NS	NS	NS	NS
SB-13	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	2,000,000	NS	NS	NS	NS
SB-14	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	1,100,000	NS	NS	NS	NS
SB-15	0'-1'	12/3/2013	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	NS	630,000	NS	NS	NS	NS

Notes:
Bold indicates concentration above laboratory reporting limits.
Roman numerals indicate DEQ criterion number
Gray indicates indicates sample location subsequently removed
Exceeds Drinking Water Protection Criteria (XI)
Exceeds Groundwater Surface Water Interface Protection Criteria (XII)
Exceeds Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Two or More DWP (XI), GSIP (XII) and/or Applicable Soil Vapor Inhalation Criteria (XIV, c)
Exceeds Generic Groundwater Contact Protection Criteria (XIII)
Exceeds Direct Contact Criteria (XIX), Soil Saturation Concentration Screening Levels (Csat) (XX)
ND = Not Detected above laboratory reporting limits
NS = Not Sampled or Not Analyzed
NR = Not Reported (Data missing from provided report)