



U.S. ENVIRONMENTAL PROTECTION AGENCY

**FINAL DECISION AND RESPONSE TO COMMENTS
FOR
SOIL, SOIL VAPOR, GROUNDWATER, AND SURFACE WATER CONTAMINATION
WITH INSTITUTIONAL CONTROLS REMEDIES**

for

Former Tecumseh Products Company Facility

**100 East Patterson Street
Tecumseh, Michigan**

EPA ID: MID 005 049 440

June 11, 2019

LIST OF ABBREVIATIONS

1,1,1-TCA	.....	1,1,1-Trichloroethane
AOC	.....	Area of Concern
CCR	.....	Construction Completion Report
cis-DCE	.....	Cis-1,2-Dichloroethene
CMP	.....	Corrective Measures Proposal
cm/s	.....	Centimeters per second
COC(s)	.....	Contaminant(s) of Concern
CSM	.....	Conceptual Site Model
CSCR	.....	Cumulative Site-Related Cancer Risk
EC	.....	Engineering Control
EGLE	.....	Michigan Department of Environment, Great Lakes, and Energy
EISB	.....	Enhanced In-Situ Biodegradation
FD/RC	.....	Final Decision & Response to Comments
ft bgs	.....	Feet Below Ground Surface
GSI	.....	Groundwater Surface Water Interface
HI	.....	Hazard Index
HPT	.....	Hydraulic Profiling Testing
HRSC	.....	High Resolution Site Characterization
IC	.....	Institutional Control
ISCO	.....	In-Situ Chemical Oxidation
MDEQ	.....	Michigan Department of Environmental Quality
mg/kg	.....	Milligrams Per Kilogram
mg/L	.....	Milligrams Per Liter
MIP	.....	Membrane Interface Probe
MNA	.....	Monitored Natural Attenuation
NPDES	.....	National Pollutant Discharge Elimination System
O&M	.....	Operations and Maintenance
PA/VSI	.....	Preliminary Assessment / Visual Site Inspection
PCE	.....	Tetrachloroethene, also called Perchloroethylene
POTW	.....	Publicly-Owned Treatment Works
ppb	.....	Parts Per Billion
ppbv	.....	Parts Per Billion Volume
ppm	.....	Parts Per Million
PRB	.....	Permeable Reactive Barrier
RBCA	.....	Risk-Based Corrective Action
RC	.....	Declaration of Restrictive Covenant
RCRA	.....	Resource Conservation & Recovery Act
RSL	.....	Regional Screening Level
SB	.....	Statement of Basis
SSD	.....	Sub Slab Depressurization
SSL	.....	Soil Screening Level
SVE	.....	Soil Vapor Extraction
SVOCs	.....	Semivolatile Organic Compounds

SWMU(s).....Solid Waste Management Unit(s)
TCE.....Trichloroethene
TPC.....Tecumseh Products Company, Inc.
trans-DCE.....Trans-1,2-Dichloroethene
UST(s).....Underground Storage Tank(s)
VOC(s).....Volatile Organic Compound(s)
VISL.....Vapor Intrusion Screening Level
ug/L.....Micrograms Per Liter
ug/kg.....Micrograms Per Kilogram

**FINAL DECISION AND RESPONSE TO COMMENTS
FOR SOIL, SOIL VAPOR, GROUNDWATER, AND SURFACE WATER
CONTAMINATION WITH INSTITUTIONAL CONTROLS REMEDY**

FOR

FORMER TECUMSEH PRODUCTS COMPANY FACILITY
100 E. Patterson Street
Tecumseh, Michigan
EPA ID: MID 005 049 440

I. INTRODUCTION

The U.S. Environmental Protection Agency, Region 5, presents this Final Decision and Response to Comments (FD/RC), which identifies the final remedies selected for the former Tecumseh Products Company (TPC) Facility (Facility), located in Tecumseh, Michigan, pursuant to the Resource Conservation and Recovery Act (RCRA) Section 3008(h). Included in this FD/RC is a summary of conditions found at the Facility, the risks posed by those conditions, the interim measures taken, the final corrective action alternatives that EPA considered, and the final selected remedies. Additional details relating to the Facility conditions, the measures taken and the alternatives considered are available in the Statement of Basis (Appendix 1) issued by EPA on September 18, 2018. Prior to issuing this FD/RC, EPA presented the Statement of Basis to the public for review and comment from October 25, 2018, to November 28, 2018. A public meeting was held on November 7, 2018. A request was later received from TPC to extend the comment period through December 12, 2018, which EPA granted. EPA received comments from TPC but no comments from the public.

Based on the current conditions, EPA has selected a combination of active on-site remediation of soil and groundwater, combined with the use of institutional controls and monitoring for the site remedies.

II. FACILITY CONDITIONS AND PREVIOUS ACTIONS TAKEN

Location and History

The former TPC Facility contained several interconnected building additions that once occupied approximately 750,000 square feet on approximately 53 acres of land. The buildings have since been demolished except for the “P-Building”, which occupies approximately 162,000 square feet. The Facility address is 100 East Patterson Street, Tecumseh, Michigan, located in Lenawee County (Appendix 2, Figure 1). The land is zoned as Industrial. The Facility property is bounded on the west by Evans Street and a manufacturing building located south of a residential area. To the north is Patterson Street, beyond which are found Industrial/Commercial Properties and residences that pre-date industrial zoning. To the east are miscellaneous commercial/light industrial properties and residences that pre-date industrial zoning, followed by a wetland and the River Raisin. To the south of the Facility is a commercial warehouse and fire station, in addition

to other properties that are zoned as industrial. This area as described is considered the area subject to RCRA and will be referred to as the Facility.

The Tecumseh Compressor Company (Tecumseh Products Company, Inc.) Facility was acquired by TPC in 1934. The Facility was originally used to produce automotive parts, refrigeration systems, small tools and toys, and later for reconditioning compressors and condensing units for refrigeration and air conditioning units. Prior to TPC's acquisition, portions of the property were developed by various industrial users in the late 1800s, including foundries and a fence and wire manufacturer. Past industrial owners that operated on the property included Tiffany Iron Works (iron foundry); Heesen Brothers and Company (feed cookers, hog rings and hollowware); Carson Foundry and Manufacturing/Bruce Manufacturing (job castings and food cookers); Anthony Fence Company/American Steel and Wire Company (steel wire and woven wire fencing); and H. Brewer Company (concrete mixers and general foundry products).

TPC owned the property from 1934 until 2010. Significant manufacturing processes conducted by TPC at the Facility included parts degreasing, unit assembly, paint preparation, unit painting, unit reconditioning and shipping and receiving, including use of an on-site rail spur until the 1960s. Manufacturing operations ceased at the Facility in June 2008, and it was sold in 2010. During TPC's operation, the uses of the Facility did not change significantly, other than changes in some product lines, several episodes of facility expansion, and various levels of development.

Materials Used and Wastes Generated

The predominant wastes generated by the former TPC Facility included solvent distillation sludge (F001), spent mineral spirits (D001), paint waste (D007), waste oil (F002), scrap metal and fines, iron phosphate, and citric acid solution. Past Facility operations reportedly included the use of trichloroethene (TCE) in the degreasing process, until the company switched to the use of 1,1,1-trichloroethane (1,1,1-TCA) along with water-based solvents. The wastes were generated during the manufacturing and rebuilding of compressor and refrigeration units and were stored in a former Spent Solvent Storage Tank and a Hazardous Waste Drum Storage Area (both decommissioned in 1979), in addition to less than 90-day accumulation areas and Waste Oil Storage Tanks. After RCRA closure of the Spent Solvent Storage Tank and the Hazardous Waste Drum Storage Area in 1982, RCRA hazardous wastes were temporarily stored in containers in drum storage areas and removed off-site to a RCRA-permitted treatment facility within 90 days of generation.

Wastewater treatment was performed at two locations at the Facility; one within the west-central portion of the main building, and another at a newer Wastewater Treatment System built in 1994 and located in a separate building east of the main building. These systems treated process wastewater that contained suspended solids, water-based cleaning compounds, coolants, and a trace amount of oil and solvents. Wastes generated included filter cake from water filtration, solids from the settling process, and residual oil that was skimmed off and managed with all other waste oil generated at the Facility (solvent waste code F002). Treated wastewater was discharged to the City of Tecumseh publicly-owned treatment works (POTW).

Waste citric acid and iron phosphate solutions were generated during the cleaning and priming of the units prior to the painting process. The two waste streams were collected in 55-gallon drums and emptied into the Wastewater Treatment System.

Paint waste was generated from the cleaning of paint areas, which included the scraping of paint from the sides of the paint conveyor system. Such waste was accumulated in 55-gallon drums and stored at a Paint Waste Accumulation Area and transferred to the Hazardous Waste Drum Storage Area before pick-up for treatment and disposal.

A Distillation Solvent Recovery System located in the far southeastern portion of the building was used to distill spent 1,1,1-TCA from two vapor degreasers. The vapor degreasers were used to clean motors and parts before unit assembly. Clean solvent was recycled back into the vapor degreasers and sludge from the distillation of the spent 1,1,1-TCA was stored in the Hazardous Waste Drum Storage Area before off-site disposal. Prior to use of the recovery system, TPC managed spent 1,1,1-TCA in the former hazardous waste storage tank.

Waste oil was generated during the following operations: maintenance of plant machinery; drainage of oil from compressors and motors, and removal of oil from the skimmers that operated as a part of the Wastewater Treatment System. Maintenance of machinery as a part of site operations generated waste hydraulic oil. Waste oil was collected in the 6,000-gallon Waste Oil Storage Tank.

Metal fines and scrap metal were generated during the machining process and replacement of worn parts. These were collected and placed in Scrap Metal Bins in various areas before being sold to foundries or recycling facilities.

Historical Facility records indicate that at least 18 underground storage tanks (USTs) have been present at the site. Fifteen of the USTs were listed in the Michigan Department of Environmental Quality (MDEQ) UST database. These range in size from 6,000 to 20,000 gallons. The USTs were used for storage of lubricating oils, lap oil, kerosene, used oil, fuel oil, and hazardous substances. The USTs were installed between 1946 and 1970 and were located immediately west of former Buildings E and Y in the central part of the building complex. Three of the tanks were abandoned in place, and the remaining tanks were reportedly removed from the ground between July 1990 and November 1990. In addition, three tanks that were not in the MDEQ UST database were identified, including a two-compartment, 20,000-gallon tank located beneath the floor of the former wastewater treatment area, which reportedly had been pumped out and filled with sand in 1990, and two additional USTs (a 20,000-gallon quench oil tank and a 6,000-gallon alcohol tank) that were reportedly removed in November 1987.

Site Geology and Hydrogeology

The Facility geology consists of a series of unconsolidated glacial deposits, predominantly gravel and sand with areas of silt and clay overlying Mississippian age shales. Soil at the Facility consists of a surficial silty/sandy clay interval ranging from 3 to 7 feet thick, underlain by unconsolidated fine to coarse sand and gravel to depths ranging from approximately 25 to 50 feet below ground surface (ft bgs) or more, depending upon the location and site topography, which

dips sharply to the east towards the River Raisin. A continuous clay layer that is a minimum of 5 feet thick is present below the sand and gravel deposits, serving as an aquitard for the shallow groundwater aquifer. Well logs from borings in other areas of Tecumseh indicate that alternating layers of sand and clays can be present to depths of 200 ft bgs. Information has not been collected regarding the stratigraphy at deeper depths at the Facility. The bedrock underlying Lenawee County is expected to be the Coldwater Shale, which is reportedly first encountered at depths of between 100 to 250 feet.

A shallow groundwater unit is present at a depth ranging from approximately 5 ft bgs to more than 30 ft bgs within the sand and gravel unit, which reaches a depth of approximately 63 ft bgs northeast of the site. Investigation work indicates the water-bearing sand unit has an approximate hydraulic conductivity (K) of 1×10^{-2} centimeters per second (cm/s), but significant variations in K values occur due to the distribution of gravel or silt within the sand. The deeper clay layer has a K value of approximately 1×10^{-8} cm/s. The horizontal hydraulic gradient of the water table on-site is approximately 0.001 ft/ft, but is much steeper near the eastern perimeter of the site, since the ground elevation further east of the site decreases significantly towards the River Raisin. The vertical hydraulic gradient in the upper sand/gravel aquifer at the Facility is essentially neutral, but a significant vertical downward gradient (-0.68 ft/ft) exists to the east/southeast of the Facility. Groundwater flows east across the Facility with a calculated groundwater flow velocity of approximately 30 feet per year.

Water for the majority of the City of Tecumseh comes from public water supply wells. The city well fields are located within 0.3 miles west (upgradient) of the Facility and over a mile north of the Facility. The well field west of the TPC Facility is positioned within the shallow, unconsolidated sand and gravel aquifer, and monitoring wells near the western boundary of the former TPC Facility have shown marginal or no contamination is present. Private water supply wells are also present near the Facility, but none are located within the area affected by groundwater contamination. A Groundwater Ordinance prevents the use or installation of wells for potable purposes within the affected area, as discussed further in later sections of this FD/RC.

Surface Water

The nearest surface water feature is the River Raisin, located at distances ranging from approximately 1,500 feet to 2,500 feet east of the Facility (Appendix 2, Figure 1).

Regulatory History and Corrective Action Background

On March 17, 1981, TPC submitted a Federal RCRA Part A hazardous waste permit application with EPA to allow for container (S01) and tank (S02) storage of solvent wastes (F002 and F017). On June 10, 1982, EPA granted TPC interim status for the container storage and the tank storage areas. The permit allowed for tank storage of 2,500 gallons of hazardous waste and storage of up to 5,500 gallons (100 drums) of hazardous waste in containers.

On June 21, 1982, TPC submitted a closure plan for its container storage and 2,500-gallon spent solvent storage tank. EPA approved the closure plan, with final closure contingent on the submittal of a certification of closure for the storage tank. On October 18, 1982, EPA issued a

conditional approval to TPC, which required a certificate of closure for the storage tank. On November 12, 1982, McNamee, Porter, and Seeley Consulting Engineers submitted on TPC's behalf the certificate of closure. At that time, TPC became regulated as a generator of hazardous waste with less-than-90-day storage and remained regulated as such until 2008, when the plant closed.

Under the RCRA statute, the Interim Status Hazardous Waste Storage Facility owned by TPC remained subject to corrective action requirements for releases of hazardous wastes or constituents from any location where process wastes were stored, treated, disposed or routinely and systematically accumulated or released. Locations where wastes are managed or accumulated are defined as Solid Waste Management Units (SWMUs).

In 1993, EPA and its contractors performed a file review (Preliminary Assessment) and site visit (Visual Site Inspection), or PA/VSI, to identify SWMUs at the Facility and evaluate each for evidence of releases or the potential to release hazardous constituents. The PA/VSI identified the following 12 SWMUs at the Facility. These SWMUs are identified on Figure 2 in Appendix 2.

SWMUs:

1. Wastewater Treatment System
2. Metal Solids Bin
3. Underground Wastewater Storage Tanks
4. Final Holding Tank
5. Distillation Solvent Recovery System
6. Hazardous Waste Drum Storage Area
7. Citric Acid and Iron Phosphate Solution Accumulation Area
8. Scrap Metal Bins
9. Paint Waste Accumulation Area
10. Former Spent Solvent Storage Tank
11. Waste Oil Storage Tank
12. Metal Fines Storage

The PA/VSI indicated that no evidence of releases was visible at any of the SWMUs at the time of inspection.

EPA began working with TPC in 2009 when TPC was negotiating the sale of the property. TPC approached MDEQ to discuss entering the Part 201 program to address contamination identified at the Facility and subsequently negotiated a RCRA 3008(h) Administrative Order on Consent signed March 29, 2010 with EPA as the project lead. The main goals were to protect the community from potential exposures that could affect human health, establish control of the migration of contaminated groundwater off-site, and to conduct investigations and identify the corrective actions necessary under RCRA to allow for the reuse of the property by the new owner.

III. INVESTIGATIONS AND RISK ASSESSMENT

Industrial process wastes from manufacturing operations at the facility have been released into on-site soil and have leached to groundwater. Data provided in a 2012 Remedial Investigation and Groundwater Environmental Indicator Report and supplemental investigations conducted by TPC indicate that volatile organic compounds (VOCs), including TCE, tetrachloroethene (also called perchloroethylene, PCE), 1,1,1-TCA, cis-1,2-dichloroethene (cis-DCE), trans-1,2-dichloroethene (trans-DCE), xylene, and vinyl chloride (among others) are the primary contaminants of concern (COCs) in the soil from about 0 to 20 feet ft bgs, and extending to greater depths. Based on their distribution and elevated concentrations, those VOCs are also considered the primary COCs in groundwater at the Facility. Analysis of groundwater samples taken upgradient to the west of the Facility indicate that the contamination has not adversely impacted groundwater quality beyond the immediate area of the property line. However, downgradient to the east, groundwater contamination extends off-site in two directions at distances of up to 2,500 feet, and contaminated venting groundwater discharges to the River Raisin. This is explained in more detail in the *Investigation Results* section of this FD/RC.

To develop a Conceptual Site Model (CSM) of potential exposure to contamination for human and ecological receptors, EPA and TPC evaluated the scenarios listed in Table 1, below:

**Table 1: Potential Human Receptors and Exposure Pathways
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Receptor	Pathways for Exposure
ON-SITE	
Routine Outdoor Workers	Inhalation of soil contaminants via volatilization to ambient air; Direct contact with surface soil; Inhalation of soil particulates and fugitive dust.
Routine Indoor Workers	Inhalation of volatile contaminants in indoor air (vapor intrusion); Hypothetical groundwater ingestion.
Non-Routine Outdoor Workers	Direct contact with groundwater (AOC-1 only); Inhalation of soil contaminants via volatilization to ambient air; Direct contact with surface and subsurface soil; Inhalation of soil particulates and fugitive dust.
On-Site Environmental Workers	Direct contact with surface and sub-surface soils; Inhalation of soil contaminants via volatilization to ambient air; Inhalation of soil particulates and fugitive dust; Direct contact with groundwater.
Trespassers	Inhalation of soil contaminants via volatilization to ambient air; Direct contact with surface soil; Inhalation of soil particulates and fugitive dust.
OFF-SITE	
Routine Outdoor Workers	Inhalation of soil ¹ contaminants via volatilization to ambient air; Direct contact with surface soil ¹ ; Inhalation of soil ¹ particulates and fugitive dust.
Routine Indoor Workers	Inhalation of volatile contaminants in indoor air (vapor intrusion); Hypothetical groundwater ingestion.

Receptor	Pathways for Exposure
Non-Routine Outdoor Workers	Inhalation of soil ¹ and groundwater contaminants via volatilization to ambient air; Direct contact with surface soil ¹ and groundwater; Inhalation of soil ¹ particulates and fugitive dust.
Environmental Workers	Direct contact with surface ^a and sub-surface soils; Inhalation of soil ¹ and groundwater contaminants via volatilization to ambient air; Inhalation of soil ¹ particulates and fugitive dust; Direct contact with groundwater.
Residents	Inhalation of volatile contaminants in indoor air (vapor intrusion); Inhalation of soil ¹ contaminants via volatilization to ambient air; Direct contact with surface soil ¹ ; Inhalation of soil ¹ particulates and fugitive dust; Hypothetical groundwater ingestion.
Recreational Users	Direct contact with surface soil ¹ and surface water.

^a Exposure is hypothetical; no off-site data exists for surface or subsurface soil. Off-site soil impacts would only be related to soils in contact with contaminated groundwater at depth.

The risk assumptions for this Facility were evaluated based on the Facility’s prior use for manufacturing and its anticipated use for light industrial/commercial purposes in the foreseeable future. Much of the area where contamination is present is covered by concrete building slabs or low-permeability pavement which minimizes infiltration of precipitation and mobilization of contaminants into groundwater. Some of the areas are being addressed with active Interim Measures, including operation of a permeable reactive barrier (PRB), two Soil Vapor Extraction (SVE) systems, and excavation/disposal.

Institutional controls developed and implemented for the Facility in the form of a Declaration of Restrictive Covenant (RC, Appendix 3) include:

- a nonresidential use restriction;
- a prohibition on the on-site use or installation of drinking water or groundwater extraction wells, except those related to cleanup;
- a prohibition on the relocation of contaminated soils onsite, except as allowed under Section 324.20120c of Michigan’s Natural Resources and Environmental Protection Act,
- a prohibition on future permitting for treatment, storage, or disposal of hazardous wastes onsite;
- a requirement to complete a Soil Management Plan for submittal to EPA and MDEQ, now known as Michigan Department of Environment, Great Lakes, and Energy or EGLE¹, for review and approval before completing excavations in areas of high contamination;
- a requirement to maintain or reinstall and maintain impervious surfaces where required for operation of cleanup systems;
- a prohibition on installation of on-site storm water detention basins; and,

¹ Michigan Department of Environment, Great Lakes, and Energy, or EGLE, will be used when referencing the state in “future” activities; whereas, MDEQ is used when referencing the state for events that occurred in the past.

- a requirement to address vapor intrusion in on-site buildings through testing/sampling of contaminants in the subsurface or installation of engineering controls to prevent vapor intrusion.

As required by the existing RC, a soil management plan must be developed to prevent the accidental movement of contaminated soil into areas with lower levels of contaminant impacts in soil during future excavation. TPC must prevent damage to the impervious barriers that are used as part of the final remedy including those related to soil vapor management and ensure long-term operations and maintenance of barriers in perpetuity, or until cleanup objectives are achieved. These barriers need to be surveyed, with exhibits documenting the locations of the barriers and related exposure pathways recorded as amendments to the RC. Any modifications to current or proposed future restrictions or barriers will require EPA's reevaluation of exposure scenarios and approval of any proposed changes to corrective measures.

EPA also evaluated the potential for exposure of on-site workers and off-site residents to vapor-phase contaminants via inhalation of volatile contaminants which could migrate to indoor air from a source beneath buildings; or from volatile contaminants migrating out of shallow groundwater beneath off-site residential buildings (vapor intrusion pathways). Data from monitoring wells both at the Facility and off-site showed that concentrations of certain VOCs in groundwater exceeded the EPA's vapor intrusion screening levels (VISLs) and therefore, the *potential* for migration of VOCs from groundwater to indoor air represented a *potential* health risk concern. However, contaminant concentrations in indoor air samples in most of the areas tested were below the current screening levels. For those residential properties where indoor air concentrations were above the screening criteria, or where individual residents preferred additional protections, the risks of exposure by vapor intrusion was further reduced by installing sub slab depressurization (SSD) systems.

The ground surface is covered by structures, concrete, asphalt, or grass. No endangered ecosystems have been identified within the Facility boundaries. As a result, there are no potential risks to endangered ecosystems on-site. However, a wetland is located adjacent to the River Raisin off-site at a distance of 1,500 feet to 2,500 feet to the east. Threats to the wetland have been confirmed based on water sample results with concentrations above MDEQ's default Groundwater-Surface Water Interface (GSI) criteria, which represent levels that if exceeded would have harmful effects on sensitive taxa and aquatic organisms. Recreational users in the wetland area may also be exposed to contaminated surface water via direct contact or incidental ingestion because concentrations above those related screening criteria are present.

Health Risk Screening Levels

To evaluate the health risk significance of soil and groundwater contamination at the Facility, EPA and TPC’s consultants initially used default, pathway-specific Site Screening Levels (SSLs) for the chemical compounds used in manufacturing and their byproducts. This evaluation focused on the location of the Facility, area land use, and potential pathways of human exposure to contaminants according to EPA guidance. EPA requires that the screening criteria for each SSL have an allowable risk threshold, with a non-cancer Hazard Index (HI) of 1 or lower and a Cumulative Site-Related Cancer Risk (CSCR) of 1×10^{-5} or lower (i.e., 1 in 100,000). The default screening levels used in the evaluation of contaminant data at TPC meet these criteria.

Published sources that were used to select SSLs include:

- EPA Regional Screening Levels (RSLs) for groundwater and on-site worker and trespasser soil exposure scenarios;
- EPA Maximum Contaminant Levels (federal regulatory standards for drinking water including groundwater used as drinking water);
- MDEQ Part 201 Generic Criteria;
- MDEQ screening levels for evaluating migration of volatile groundwater contaminants to indoor air at non-residential buildings;
- MDEQ screening levels for evaluating migration of volatile soil contaminants to indoor air at non-residential buildings; and,
- MDEQ indoor air screening levels for the vapor intrusion pathway.

The screening criteria that were used for investigation of the TPC facility are listed in Tables 2 through 4 that follow.

**Table 2: Soil Screening Level (SL) Criteria for TPC Risk Assessment
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Soil Direct Exposure ^b SL for On-Site Worker or Trespasser (mg/kg)	Groundwater Protection SL for Soil (mg/kg)	Vapor Intrusion SL for Soil (mg/kg)
Organic Contaminants			
1,1-Dichloroethane	160	0.0078	7.3
1,1-Dichloroethene	3.7	0.10	1.2
Cis-1,2-Dichloroethene	9.3	0.011	0.17
Trans-1,2-Dichloroethene	72	0.11	0.76
Ethylbenzene	41	0.017	4.0
Naphthalene	24	0.0054	8.9
Tetrachloroethene	45	0.051	1.0
Toluene	3300	0.76	169
1,1,1-Trichloroethane	4000	2.8	66.6

Detected Contaminant/COC	Soil Direct Exposure ^b SL for On-Site Worker or Trespasser (mg/kg)	Groundwater Protection SL for Soil (mg/kg)	Vapor Intrusion SL for Soil (mg/kg)
Trichloroethene	1.4	0.0018	0.05
1,2,4-Trimethylbenzene	27	0.034	5.9
Vinyl Chloride	2.2	0.000065	0.04
Xylenes	580	0.19	4.9
Inorganic Contaminants ^c (Michigan Part 201 Criteria)			
Arsenic	37	4.6	NA
Barium	130,000	13,000	NA
Cadmium	2,100	6	NA
Chromium	9,200	30	NA
Lead	900	700	NA
Selenium	9,600	4.0	NA
Zinc	630,000	2,400	NA

^b Soil Direct Exposure SLs include direct contact and inhalation (volatile and particulate) soil contaminants exposure pathways.

^c Additional criteria for inorganic contaminants provided in Table 1 of February 8, 2017 Human Health Risk Assessment.

SL = Screening Level Concentrations (EPA Regional Screening Levels or MDEQ Part 201 Generic Criteria).

Criteria for soil are expressed in milligrams per kilogram (mg/kg).

NA = Not Available; No Criteria Available for this constituent.

**Table 3: Groundwater Screening Level (SL) Criteria for TPC Risk Assessment
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	SL for Groundwater ^d (ug/L)	Vapor Intrusion SL for Groundwater (ug/L)	GSI/Surface Water Protection SL ^e (ug/L)
Organic Contaminants			
Benzene	4.6	140	200
Chloroethane	760	180,000	1100
Chloroform	2.2	720	350
1,1-Dichloroethane	28	18,000	740
1,1-Dichloroethene	7.0	1600	130
Cis-1,2-Dichloroethene	36	350	620
Trans-1,2-Dichloroethene	100	1500	1500
1,4-Dioxane	4.6	29,000	2800
Ethylbenzene	15	2600	18
Tetrachloroethene	5.0	460	60
Toluene	790	150,000	270
1,1,1-Trichloroethane	200	71,000	89
Trichloroethene	2.8	41	200
1,2,4-Trimethylbenzene	15	7,300	17
Vinyl Chloride	0.19	52	13

Detected Contaminant/COC	SL for Groundwater ^d (ug/L)	Vapor Intrusion SL for Groundwater (ug/L)	GSI/Surface Water Protection SL ^e (ug/L)
Xylenes	190	10,000	41

SL = Screening Level Concentration (EPA Regional Screening Levels or MDEQ Generic Criteria).

Criteria for groundwater are expressed in micrograms per liter (ug/L).

^d Assumes groundwater could be used as drinking water.

^e Based on Levels Protective of Receptors/Pathways at the Wetland (MDEQ default GSI criteria and cleanup goal).

Table 4: Vapor Phase Screening Level (SL) Criteria for TPC Risk Assessment Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Indoor Air SL (ppbv)	Sub-Slab Soil Gas SL (ppbv)	Deep Soil Gas SL (ppbv)
Organic Contaminants			
1,1-Dichloroethane	510	69,000	690,000
1,2-Dichloroethane	1.2	160	1,600
1,1-Dichloroethene	210	28,000	280,000
Cis-1,2-Dichloroethene	7.3	980	9,800
Trans-1,2-Dichloroethene	73	9,800	98,000
Tetrachloroethene	25	3,300	33,000
1,1,1-Trichloroethane	4,600	610,000	6,100,000
Trichloroethene	1.5	210	2,100
Vinyl Chloride	12	1,500	15,000

SL = Screening Level Concentrations (EPA Regional Screening Levels or MDEQ Generic Criteria).

Criteria for vapor phase expressed in parts per billion volume (ppbv).

SLs are from the EPA VISL Calculator or May 2013 MDEQ Final Guidance for the Vapor Intrusion Pathway.

Investigations Conducted

EPA conducted a Preliminary Review/Visual Site Inspection (PA/VSI) at the Facility in 1993, during which 12 SWMUs were identified. During an investigation of the Facility performed between December 2008 and January 2009 related to its potential sale, contamination was identified and TPC approached MDEQ and EPA about addressing the contamination. Under an Administrative Order on Consent (RCRA-05-2010-0012), TPC sampled and analyzed the soil, soil gas, indoor air, and groundwater throughout the Facility and assessed soil gas, indoor air, storm water, surface water, and groundwater off-site. TPC targeted the known SWMUs and incidental site-wide releases to delineate the extent of the contamination. The work was performed in multiple phases, and the results are in reports including but not limited to:

- *Current Conditions Report*, dated September 21, 2009.
- *Current Human Exposures Under Control Environmental Indicator Report*, dated September 29, 2011.

- *Remedial Investigation and Groundwater Environmental Indicator Report*, dated September 28, 2012.
- *Second Quarter 2013 Progress Report*, dated July 15, 2013.
- *Supplement to the Current Human Exposures Environmental Indicator Report and Proposed Extension Pursuant to Paragraph 21 of the AOC*, dated September 30, 2013.
- *Summary of 2014 Passive Soil Gas Survey Activities*, dated June 18, 2014.
- *Third Quarter 2014 Progress Report*, dated October 15, 2014.
- *MIP Investigation Report and Workplan for High Resolution Site Characterization (Revision 2)*, dated April 30, 2015.
- *Supplement to Remedial Investigation and Environmental Indicator Report (Migration of Contaminated Groundwater Under Control)*, dated July 31, 2015.
- *Third Quarter 2015 Progress Report (including 2015 High Resolution Site Characterization Report and Updated Conceptual Site Model)*, dated October 15, 2015.
- *Revised Corrective Measures Proposal*, dated March 6, 2017.
- *Second Quarter 2017 Progress Report*, dated July 17, 2017.
- *Groundwater-Surface Water Interface Performance Monitoring Plan*, revised February 22, 2018.

Through October 2018, TPC installed a network of approximately 288 temporary soil borings (soil borings, source area borings, Geoprobe™ borings, and membrane interface probe (MIP) confirmation borings), 66 MIP borings, 76 permanent groundwater monitoring wells, 26 Soil Gas locations, and 19 PRB wells. These investigative borings and monitoring wells were installed near SWMUs and process areas, at property boundaries, and off-site (shown in Appendix 2, on Figures 1 and 2). Temporary borings and MIP borings were sampled once. Permanent groundwater wells, PRB wells, and soil gas points have been sampled annually from their date of installation (2008-2016) through the present.

The results of the soil investigations were summarized in Table F1 in Appendix F of the CMP (VOCs only). Figures 14, 16, 17 and 18 of the CMP depict the generalized distribution of VOC contamination in the vadose zone soils. Soil sample analytical results for other contaminants were included as tables in the Current Conditions Report. The results of the groundwater investigations are summarized in various tables provided in Quarterly reports, and select VOC data is summarized in Tables F2 through F6 in Appendix F of the CMP. Figures 8, 9, 15, and 19 through 23 of the CMP depict the distribution of groundwater contamination. Additional monitoring well locations have also been installed since the time that the Revised CMP was submitted.

A summary of constituents detected in soil, groundwater, and vapor phase at levels above the respective screening criteria is shown in Tables 5-7 on the pages that follow.

**Table 5: Constituents of Concern Detected Above Screening Level Criteria in Soil
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Range of Detected Concentrations (mg/kg)	Screening Level Criteria Exceeded from Table 2	Evaluation of Health Risk or Remedial Response
Organic Contaminants			
1,1-Dichloroethane	0.037 - 0.75	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
1,1-Dichloroethene	0.24 - 0.36	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Cis-1,2-Dichloroethene ^f	0.031 - 27	Soil Direct Exposure, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Trans-1,2-Dichloroethene	0.04 - 0.62	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Ethylbenzene	0.058 - 1.3	Groundwater Protection	Install SVE systems and RC to prevent Groundwater use
Naphthalene	0.31 - 14	Groundwater Protection and Vapor Intrusion	No detected exceedances in groundwater and RC prevents Groundwater use.
Tetrachloroethene ¹	0.032 - 520	Soil Direct Exposure, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems and RC to prevent Groundwater use
Toluene	0.086 - 0.92	Groundwater Protection	Install SVE systems and RC to prevent Groundwater use
1,1,1-Trichloroethane	0.033 - 17	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Trichloroethene ^f	0.038 - 140	Soil Direct Exposure, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems and RC to prevent Groundwater use
1,2,4-Trimethylbenzene ^f	0.037 - 34	Soil Direct Exposure, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems and RC to prevent Groundwater use
Vinyl Chloride	0.041 - 0.55	Groundwater Protection and Vapor Intrusion	Install SVE systems and RC to prevent Groundwater use
Xylenes	0.22 - 9.4	Groundwater Protection and Vapor Intrusion	Install SVE systems and RC to prevent Groundwater use
Inorganic Contaminants			
Arsenic	5.6 - 8.3	Groundwater Protection	No detected exceedances in groundwater; RC prevents Groundwater use
Barium	130 - 260	None	None
Cadmium	0.22 - 9	Groundwater Protection	No detected exceedances in groundwater; RC prevents Groundwater use
Chromium	6.8 - 24	None	None
Lead	27 - 140	None	None
Selenium	1.2 - 1.8	None	None
Zinc	160 - 260	None	None

^f Concentration in soils below existing slab exceeds soil volatilization to ambient air criteria.

Detections in soil are expressed in milligrams per kilogram (mg/kg).

SVE = Soil Vapor Extraction system.

RC = Declaration of Restrictive Covenant, see Appendix 3 of FD/RC.

Table 6: Constituents of Concern Detected Above Screening Level Criteria in Groundwater, Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Range of Detected Concentrations (ug/L)	Screening Level Criteria Exceeded from Table 3	Evaluation of Health Risk or Remedial Response
Organic Contaminants			
Benzene	1 - 9	Groundwater Use	RC to prevent Groundwater use
Chloroethane	5 - 43	None	None
Chloroform	1.1 - 3	Groundwater Use	RC to prevent Groundwater use
1,1-Dichloroethane	3 - 280	Groundwater Use & GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
1,1-Dichloroethene	2 - 920	Groundwater Use & GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Cis-1,2-Dichloroethene	1 – 8,300	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Trans-1,2-Dichloroethene	1 - 270	Groundwater Use	RC to prevent Groundwater use
1,4-Dioxane	1.5 - 1.7	None	None
Ethylbenzene	0.5 - 3	None	None
Tetrachloroethene	0.9 - 76,000	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable Reactive Barriers and/or In-Situ Bioremediation to reduce concentrations
Toluene	3 - 62	None	None
1,1,1-Trichloroethane	1.4 – 8,500	Groundwater Use and GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Trichloroethene	3.0 - 12,000	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
1,2,4-Trimethylbenzene	4.0 - 64	Groundwater Use and GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers and/or In-Situ Bioremediation to reduce concentrations
Vinyl Chloride	1.8 – 1,900	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Xylenes	ND	None	None

Detections in groundwater are expressed in micrograms per liter (ug/L).

RC = Declaration of Restrictive Covenant, Appendix 3.

SSD = Sub Slab Depressurization system.

ND = Not Detected. The concentration of this constituent was below the analytical reporting limit in all samples.

Table 7: Constituents of Concern Detected Above Screening Level Criteria in Vapor Phase, Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Range of Detected Concentrations in Indoor Air (ppbv)	Range of Detected Concentrations in Sub-Slab Soil Gas (ppbv)	Range of Detected Concentrations in Deep Soil Gas (ppbv)	Screening Level Criteria Exceeded from Table 4	Evaluation of Health Risk or Remedial Response
Organic Contaminants					
1,1-Dichloroethane	ND	2.3 - 468	0.73 - 200	None	None
1,2-Dichloroethane	0.65 - 1.5	17.8 - 474	1.6 to 166	SLs for Indoor Air and Sub-Slab Soil Gas	Potential for the constituent to cause unacceptable inhalation risk is addressed through installation of SVE and/or SSD Systems to protect current or future building occupants, monitoring, and groundwater treatment to reduce the generation of vapors
1,1-Dichloroethene	ND	29.9 - 4,360	2.1 - 31	None	None
Cis-1,2-Dichloroethene	ND	49.3 – 1,030	1.0 - 1,300	SL for Sub-Slab Soil Gas	Potential for the constituent to cause unacceptable inhalation risk is addressed through installation of SVE and/or SSD Systems to protect current or future building occupants, monitoring, and groundwater treatment to reduce the generation of vapors
Trans-1,2-dichloroethene	ND	6.4 – 1,730	2.5 - 90.3	None	None
Tetrachloroethene	0.17 -0.80	8.4 - 344	0.77 - 5,400	None	None
1,1,1-Trichloroethane	2.5 - 19.2	13.0 – 436,000	0.81 - 12,000	None	None
Trichloroethene	2.2 - 19.8	25.9 – 118,000	1.1 – 110,000	SLs for Indoor Air and Sub-Slab and Deep Soil Gas	Potential for the constituent to cause unacceptable inhalation risk is addressed through installation of SVE and/or SSD Systems to protect current or future building occupants, monitoring, and groundwater treatment to reduce the generation of vapors
Vinyl Chloride	ND	ND	1.0 – 3.3	None	None

Detections in vapor phase expressed in parts per billion volume (ppbv).

ND = Not Detected. The concentration of this constituent was below the analytical reporting limit in all samples.

Investigation Results

TPC analyzed soil samples throughout the Facility and at each SWMU to delineate the lateral and vertical extent of soil contaminant concentrations and to compare contaminant levels to the site screening levels. TPC's soil investigation targeted known process areas, and areas identified through passive soil gas surveys (Appendix 2, Figures 3 through 5) and MIP investigations (Appendix 2, Figures 6 and 7) as impacted. TPC assessed and delineated groundwater contamination through the installation of temporary borings, permanent groundwater wells, MIP sampling, and high-resolution site characterization (HRSC) groundwater sampling (Appendix 2, Figures 8 through 12) both on-site and off-site. Based on the soil and groundwater results, TPC also performed sampling to determine contaminant levels in soil gas, indoor air, sediment pore water, and surface water in areas where potential concerns were identified.

Investigation in 2009 identified contamination on-site and at the property lines. TPC identified the primary COCs as chlorinated hydrocarbon solvents that were used in TPC's past operations and related degradation products, specifically, 1,1,1-TCA, TCE, cis-1,2-DCE, PCE and vinyl chloride. Semivolatile organic compounds (SVOCs) and metals were also present, but not at significantly elevated levels. Additional investigation through the current time identified elevated levels of impacts in the following general areas:

1. The former Steam Cleaning Room, Chemical Stock Room, and Degreaser in the northern portion of the building contained TCE levels in soil up to 140 milligrams per kilogram (mg/kg) at NS-29. Groundwater contamination is highest downgradient from these areas near the northeast corner of the Building where TCE levels up to 12,000 micrograms per liter (ug/L) were found at SB-MIP-57. Contamination extends off-site to the northeast. TCE concentrations in soil gas up to 17,100 parts per billion volume (ppbv) were measured beneath the building in the area at SV-01 and were as high as 1,320 ppbv off-site at SG-05.
2. The former Wastewater Treatment System and Parts Degreaser adjacent to the central portion of the building contained TCE up to 23 mg/kg in soil at NS-34. Groundwater is only moderately contaminated, but TCE concentrations in soil gas were detected at levels up to 118,000 ppbv in the area at SV-11.
3. The former Compressor Washer and Paint Line and SWMUs 4, 5, 7, and 9 (the Final Holding Tank, Distillation Solvent Recovery System, Citric Acid and Iron Phosphate Solution Accumulation Area, and Paint Waste Accumulation Area, respectively) in the Southern portion of the building contained 1,1,1-TCA levels in soil up to 17 mg/kg. TCE and 1,1,1-TCA in groundwater were generally within the range of 1,000-2,000 ug/L at MW-34s. TCE concentrations in soil gas up to 103,000 ppbv were measured in the area at SV-15, and up to 110,000 ppbv at SG-01.

4. The grassy area in the far southeastern portion of the property contained concentrations of PCE up to 520 mg/kg in soil. This area (Soil-S4, Appendix 2, Figure 13) is considered a previously unknown Area of Concern (AOC-1). Groundwater contamination is highest at AOC-1 and at the east property line, where PCE up to 76,000 ug/L and TCE up to 8,900 ug/L were identified, extending off-site at lower levels. Soil gas concentrations were highest at SG-2 and SG-22 overlapping with the groundwater contamination in AOC-1 (Appendix 2, Figure 7).

TPC's investigation identified contaminated groundwater present near the River Raisin east of the southern plume, leading to the collection of pore-water samples that contained low levels of TCE degradation products (vinyl chloride, cis-DCE and trans-DCE at PW-07), and also identified direct venting groundwater discharge to the surface water through groundwater seeps in the wetland area (SP-01, SP-02, and SP-03), which extend to the River Raisin (Appendix 2, Figures 8 through 12) in small channels (rivulets).

The potential for vapor intrusion into structures located east of the property was identified early in TPC's initial investigation work. By May 2011, TPC installed a PRB to treat the contaminated shallow groundwater leaving the Facility. The purpose was to treat shallow off-site groundwater and thereby minimize the potential for vapor intrusion at off-site locations. TPC's sampling of indoor air at properties east of the TPC Facility identified a home that required the installation of a sub slab depressurization (SSD) system to eliminate exposures through vapor intrusion. By June 2011, the City of Tecumseh had passed a Groundwater Use Ordinance, restricting the use of groundwater in the area near the former TPC Facility and within a 1-block buffer zone around the area of affected groundwater. Properties with existing private wells within the restricted area were connected to the municipal water supply by TPC, which also abandoned all 12 of the existing/historical private water wells identified on the 272 properties affected by the ordinance. TPC began operation of an SVE system in the northeastern P-Building of the former Facility in April 2012, expanding to full-scale operation in October 2012. These had the combined purposes of reducing the high levels of TCE in the soil in that area, controlling the migration of soil vapors off-site, and preventing soil vapors from entering the portion of the building that was intended for reuse. By March 2014, TPC had installed and began operation of a Perimeter SVE system at the southern boundary of the property to reduce the potential for the lateral migration of VOCs in soil vapor onto the adjacent site, in addition to reducing concentrations of VOCs in the soil near southern source areas. To date, TPC's has removed approximately 700 kilograms (kg) of TCE from soils under the P-Building and approximately 220 kg of TCE, approximately 95 kg of PCE, and approximately 30 kg of 1,1,1-TCA from soil at the south perimeter of the property during operation of the SVE systems as Interim Measures (total of approximately 1,045 kg, or 2,300 pounds of contamination). In 2014, during evaluation of TPC's revised Human Health exposure evaluation, EPA also requested that TPC install SSD systems or sample indoor air (depending on the residents' wishes) at several properties located north of the TPC facility.

These cumulative activities were performed as Interim Measures, which are intended to supplement the final remedies selected herein.

IV. SUMMARY OF FACILITY RISKS

Potential Risks to Human Health

People on-site (human receptors) who may have contact with contamination include environmental workers, trespassers, non-routine outdoor workers, routine outdoor workers, and routine indoor workers.

For on-site environmental workers, exposure to contamination may occur from:

- Direct contact (incidental ingestion and dermal (skin) contact) with surface and sub-surface soils;
- Inhalation of soil particulates and volatiles in ambient air; and,
- Direct contact with affected on-site groundwater by incidental ingestion and dermal contact.

For non-routine outdoor workers (one-time building construction workers, occasional excavation/maintenance workers, and redevelopment workers) exposure may occur from:

- Direct contact with surface and sub-surface soils;
- Inhalation of soil particulates and volatiles in ambient air;
- Direct contact with affected on-site groundwater by incidental ingestion and dermal contact; and,
- Inhalation of groundwater volatiles in trench air.

Routine outdoor workers (e.g., lawn service or maintenance worker) may be exposed to contamination because of:

- Direct contact with soil;
- Inhalation of soil particulates and volatiles in ambient air; and,
- Hypothetical ingestion and dermal contact with groundwater as tap water.

For Routine Indoor Workers, including occupants of future on-site commercial or industrial buildings, exposure may occur from:

- Inhalation of indoor air impacted by volatile contaminants migrating into a building from affected subsurface soils or groundwater (vapor intrusion); and,
- Hypothetical ingestion and dermal contact with groundwater as tap water.

A trespasser could enter the facility and be exposed to contamination by:

- Direct contact (incidental ingestion and dermal contact) with surface soils; and,
- Inhalation of soil particulates and volatiles in ambient air.

Surface soil risks are determined to be acceptable for all on-site receptors, except for the on-site routine worker and on-site redevelopment worker. The risk for the on-site routine worker is related to the potential for inhalation of TCE in ambient air due to volatilization from soils with TCE concentrations above a calculated cleanup objective of 27 mg/kg. The most stringent SL for this COC and pathway is 14 ppm pursuant to MDEQ's Part 201 regulations. Soil sample locations with TCE concentrations above 27 mg/kg are all located beneath the existing building slab, or were collected below the groundwater surface. The potential for exposure would increase if the existing building slab were removed. Subsurface soil does not pose risks for any receptor. As a result, direct contact (incidental ingestion and dermal contact) with surface and sub-surface soils, and inhalation of soil particulates and volatiles in ambient air represent minimal risk at the Facility.

Groundwater risks for on-site receptors are acceptable for the construction worker volatile inhalation in trench scenario. A risk from the hypothetical ingestion of contaminated groundwater is driven by TCE, PCE, 1,1-DCE, vinyl chloride, xylenes 1,4-dioxane, and 1,1-dichloroethane; however, that risk is eliminated by the City Groundwater Ordinance, which prohibits the installation or use of groundwater on-site and within an off-site restricted area. There is a slightly elevated noncancer risk for the on-site occasional excavation/maintenance worker from dermal contact with PCE in groundwater. Safety precautions will be needed for excavation work in the southeast corner of the property at AOC-1 (if performed prior to groundwater remediation). In addition, the risk for future on-site indoor workers is unacceptable due to the potential for vapor intrusion from elevated concentrations of PCE, TCE, and vinyl chloride.

People off-site who may contact affected media include environmental workers, non-routine outdoor workers, routine outdoor workers, routine indoor workers, residents, and recreational users. Of those, the most significant potential for exposure is to routine indoor workers and residents, both of which may be exposed to contamination from:

- Inhalation of indoor air impacted by vapor intrusion from affected groundwater; and,
- Hypothetical ingestion or dermal contact with groundwater as tap water or for domestic purposes.

For recreational users (outdoors), potential exposure can occur from:

- Direct contact with affected surface water via incidental ingestion and dermal contact.

Off-site surface and subsurface soils are not impacted and there are no related risks. However, unacceptable risks for off-site residents exist due to elevated concentrations of TCE, cis-DCE, and vinyl chloride in groundwater via the vapor intrusion exposure route and via the hypothetical groundwater ingestion exposure route. Risks for off-site routine workers are driven by TCE, cis-DCE, and vinyl chloride for hypothetical groundwater use, and by TCE and vinyl chloride for the

vapor intrusion pathway. Off-site vapor intrusion risks were further evaluated by sampling soil gas and indoor air.

A survey of existing and out-of-use wells was conducted to identify any potential users of groundwater within the area of known contamination; TPC abandoned all wells that could be located to prevent their future use. Groundwater on-site is not used, and a Groundwater Ordinance was passed to eliminate the potential for on-site and off-site workers and/or residents to ingest contaminated groundwater in the affected area in the future. The closest municipal wells are located over one-quarter mile west of the Facility, at depths of between 82 and 85 feet bgs and are not impacted by releases from the TPC Facility. There is no contamination in groundwater migrating off-site in the direction of the well. For these reasons, human exposure to contaminated groundwater by ingestion or direct contact is highly improbable, and the hypothetical groundwater ingestion pathway is an incomplete pathway.

To address off-site groundwater impacts that could contribute to potential vapor intrusion into off-site buildings and homes, TPC implemented quarterly soil gas monitoring. At the east side of the property, a PRB was installed to treat the shallow groundwater beyond the east property line, and create a layer of less contaminated groundwater at the water table surface that would reduce the risk of vapor intrusion. In addition, indoor air monitoring was conducted; results identified one property that required an SSD mitigation system to eliminate the vapor intrusion pathway. North of the Facility, an on-site SVE system was used to reduce the potential for the lateral migration of soil vapors off-site from the Facility. Monitoring of soil gas also occurred north, west, and east of the Facility, at those properties within 100 feet of the groundwater plume having the potential to be affected by vapor intrusion pathway. Indoor air testing was performed to verify that the vapor intrusion concern was not present or, alternatively, homeowners agreed to the installation of SSD mitigation systems as presumptive remedies to eliminate the vapor intrusion pathway.

On-site engineered and institutional controls will be used to prevent human exposure while contaminated soil and groundwater are being treated. Off-site sampling will be performed to ensure conditions do not change during the treatment process.

Potential Risks to the Environment

Storm water is discharged from the Facility to the River Raisin via Patterson Street under an EPA National Pollutant Discharge Elimination System (NPDES) permit. TCE and degradation products were found in the sewers, but at low levels below the MCLs. Since there are no viable ecosystems on-site, there is no potential for on-site contamination to impact environmental or ecological receptors. Off-site, groundwater contamination has been detected at unacceptable levels, discharging venting groundwater to the River Raisin, as identified during the GSI investigation. Based on that information, EPA and MDEQ have determined that operations at the

Facility have adversely impacted the ecology of the wetland adjacent to the River Raisin. Remedial measures on-site are intended to correct these adverse impacts over the long-term as a goal for the cleanup.

V. SCOPE OF CORRECTIVE ACTION

EPA's short-term goals for the Facility are:

1. Control all current human exposures to contamination at and from the Facility for which there are complete risk/exposure pathways by eliminating significant or unacceptable exposures for all media known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above risk-based levels; and,
2. Stabilize migration of contaminated groundwater at and from the Facility. The migration of all groundwater known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above acceptable levels must be stabilized to remain within any existing areas of contamination. In addition, any venting groundwater discharge to surface water must not pose an unacceptable risk, or must be currently acceptable according to an appropriate interim assessment of surface water.

The first of EPA's short-term goals has already been achieved. On August 14, 2017, EPA determined that the Facility met the criteria for Human Exposures Under Control (CA725), superseding EPA's prior "Incomplete" determination made on October 5, 2015. The favorable determination was based on a combination of available indoor air sampling data and the elimination of exposure pathway through SSD systems and the groundwater ordinance.

EPA determined on October 5, 2015 that the criteria for Migration of Contaminated Groundwater Under Control (CA750) had not been achieved. Achievement of a CA750 determination for the TPC Facility is contingent on 1) treating groundwater to reduce and stabilize groundwater contaminant levels and 2) eliminating unacceptable ongoing venting groundwater discharge to the wetland and River Raisin. Treatment of the groundwater will reduce concentrations of COCs in the groundwater, while treatment of the soil in key areas will prevent the potential for the soil to re-contaminate groundwater in the future.

EPA's long-term goals for the Facility are:

1. Protecting human health and the environment by assuring that the Facility poses no unacceptable risk; and,
2. Establishing and maintaining institutional controls.

Final corrective measures for the TPC Facility must ensure that:

1. Soil and groundwater contamination on-site will neither endanger human health nor continue to migrate off-site at levels that represent a continuing potential concern for residential vapor intrusion;
2. Contamination that has migrated off-site by transport in groundwater is reduced in concentration so it does not endanger human health or require land use restrictions for off-site properties;
3. Institutional and engineered controls to protect human health and the environment on-site will be recorded as RCs in the property deed and will be binding on all future owners of the Facility property, to ensure that those who visit the property will be protected from unacceptable exposure to contamination, including unacceptable exposure to vapor-phase COCs in indoor air within buildings on the property now and in the future;
4. Construction workers who may perform excavations in areas with remaining contamination will be protected from unacceptable exposure to that contamination and will properly handle contaminated soil in accordance with applicable state and federal regulations by use of a Soil Management Plan, as required by the RC recorded with property deed. Once developed, the most-recent plan must be referenced and memorialized in annual long-term care certification reporting; and,
5. Contamination is reduced to a concentration that promotes the natural degradation of contamination, leading to the eventual long-term restoration of the aquifer, and/or elimination of off-site vapor intrusion restrictions related to groundwater. On-site vapor intrusion risks will be addressed using vapor mitigation controls in perpetuity with annual certification reporting, or until such time that a site-specific vapor intrusion assessment can be used to determine that on-site cleanup criteria have been achieved [note: at present, default soil screening criteria are used for comparison].

VI. SELECTED FINAL REMEDY

Current conditions at the Facility indicate that the following exposure pathways exist:

1. Hypothetical groundwater ingestion pathway (on-site and off-site);
2. On-site non-residential vapor intrusion pathway;
3. Off-site residential vapor intrusion pathway;
4. On-site volatilization to ambient air pathway;
5. On-site occasional worker groundwater direct contact pathway; and,
6. On-site migration to groundwater (above off-site residential vapor intrusion) pathway.

EPA has selected the following remedy components for the Facility.

Soil and Groundwater Remedies

TPC has proposed active on-site remediation of soil and groundwater to address impacts above the media cleanup standards. The two forms of treatment selected are intended to work in conjunction with the existing on-site Restrictive Covenant and Groundwater Use Ordinance to eliminate potential future unacceptable risks, and eliminate the need for ongoing engineering and institutional controls at all off-site properties in the future.

EPA has selected TPC's proposal to remediate soil in areas Soil-N1, Soil-N2, Soil-S1, and Soil-S3 (Appendix 2, Figure 13), in conjunction with the use of the existing RC (Appendix 3) as an Institutional Control (IC) which also includes Engineering Controls (ECs). The purpose of the selected soil remedy is 1) to reduce soil contaminants where concentrations exceed criteria related to direct human exposure via the ambient air inhalation and/or direct exposure pathways (limited to areas under the existing slab) and 2) to prevent contaminants in on-site soil from leaching to the groundwater, and re-contaminating groundwater at levels above the most stringent groundwater cleanup goal for residential vapor intrusion in off-site areas. A secondary goal is to reduce levels of contaminants in on-site soil to levels that eliminate the on-site vapor intrusion risks at nonresidential properties, and where practical/practicable, to eliminate or reduce the need for on-site vapor intrusion controls in the long-term.

The remedies selected for soil include a combination of:

1. Operation of the existing Soil Vapor Extraction (SVE) systems and expansion of the systems to additional areas of soil contamination;
2. Maintenance of existing impermeable concrete/asphalt or placement and maintenance of similar cover as ECs over contaminated soils;
3. Source area soil excavation and placement in a permitted off-site landfill and/or contingent chemical treatment (in situ chemical oxidation or reductive dechlorination); and,
4. Use of a RC as an IC to maintain protections and to address residual soil contamination above non-residential cleanup levels.

The following factors were taken into consideration in selecting remedies for soil:

- Interim corrective measures including the use of SVE are ongoing, and based on an evaluation of the options, EPA selected SVE for treatment of areas Soil-N1, Soil-S1 and Soil-S3. Contingent on concrete removal and waste classification for soil in area Soil-N2, EPA recommends either excavation and disposal, or chemical treatment by in-situ chemical oxidation or reductive dechlorination as the treatment options, as discussed below. EPA's selections are based on effectiveness, implementability, sustainability and cost. Continued operation and expansion of the Facility's two SVE systems will remove

volatile organic compounds (VOCs) in the additional targeted areas of the Facility (Areas Soil-N1, Soil-S1 and Soil-S3) where soil contamination has the potential to leach to groundwater and migrate to off-site areas at levels above the site-specific cleanup objectives. The calculated site-specific screening level for cleanup of TCE (the primary contaminant of concern, or COC), in on-site soil is 2,600 parts per billion (ppb)². This concentration is predicted to prevent the off-site migration of groundwater contamination at levels above the site-specific cleanup value for TCE in off-site groundwater of 130 ppb for the residential vapor intrusion pathway. Due to the anticipated variability in the leaching potential of soils based on soil type, achievement of the soil cleanup objective will be performance based. As such, discrete soil sample concentrations may be different than the modeled cleanup level. Instead, a combination of groundwater data, soil data, and laboratory and field measurements/observations of leaching potential will be used to demonstrate that the soil cleanup objectives have been met and that the soil leaching potential is acceptable.

- The primary objectives of the soil cleanup are to reduce soil contaminants in sub-slab soils where concentrations exceed criteria related to direct exposure pathways (e.g. volatilization to ambient air inhalation) and to reduce the leaching of contamination from soil to groundwater. Appropriate engineering controls (ECs) will need to be maintained under the RC to address COCs that remain in the soil above the cleanup goals for other applicable exposure pathways. The use of barriers as ECs, including existing/future asphalt (e.g., a parking lots) or concrete (e.g., building foundations, etc.) serve to limit soil leaching and will mitigate human exposure to contaminants via the ambient air inhalation and/or direct exposure pathways in areas where soil impacts exceed related criteria until concentrations have been reduced below risk-based levels. Under the RC, if any of the current asphalt or concrete barriers are removed, a similarly impervious material must be installed that does not compromise the effectiveness of existing/proposed remedial components. A demonstration must be provided to EPA/EGLE that modifications are compatible with remedial components and effectively eliminate all applicable exposure pathways being addressed by barriers in those areas (for example, the soil volatilization to ambient air inhalation pathway). The locations and types of current barriers need to be surveyed, and general construction specifications for the barriers must be included in a Construction Completion Report, along with a discussion of the pathway-specific exceedances and areal extent of those exceedances being addressed by the barriers. A revised survey showing the locations and types of barriers must be recorded as an addendum to the existing RC to prevent damage or removal of ECs during any future construction or demolition. Following treatment TPC and/or the site owner may demonstrate that portions of these impermeable barriers are no

² *Evaluation of Risk Associated with Areas of Interest and Development of Approximate Soil Cleanup Effort using a Soil Leaching Model*, TRC, November 11, 2016.

longer needed to control human exposures or soil leaching. If such a demonstration is made, a revised survey may be prepared and approved by EPA/EGLE as an amendment to the RC.

- Approximately 3,250 tons of contaminated soil were excavated from a PCE source area³ in 2016. Excavated soil was properly disposed off-site at a licensed landfill and replaced with clean soil backfill. These actions were considered an Interim Measure that reduced the potential for PCE leaching into groundwater. EPA estimates an additional 2,900 cubic yards (cu. yd.) of TCE-contaminated shallow soil must either be properly excavated and disposed or chemically treated by in-situ chemical oxidation (ISCO) or reductive dechlorination in the Soil-N2 area. Contingent on waste classification and concrete removal or redevelopment plans, EPA recommends the additional excavation and disposal of impacted soil as the treatment option for area Soil-N2. If concrete is left in place, soil treatment would be completed in-situ through chemical oxidation, reductive dechlorination, or soil vapor extraction. Similarly, if waste classification (e.g. hazardous) proves excavation to be cost-prohibitive, cleanup will be achieved through ISCO. Options for treatment were summarized in the 2017 CMP, and are further evaluated in the May 10, 2019, *Re-Evaluation of Soil Treatment Options for Northern Soil Area 2*, dated May 10, 2019. Cleanup in this area will mitigate the potential for leaching of contaminants of concern (COCs) from on-site soil to groundwater and reduce the mass of COCs above cleanup objectives in the source area, preventing further off-site migration of TCE in groundwater and achieving source removal required under EPA guidance.
- An IC in the form of the existing approved RC will be used to address soil contamination that remains at the site following cleanup. Vapor intrusion controls must be implemented to address the primary exposure pathway of concern for all current/future buildings at the property in accordance with the RC recorded with the Lenawee County Register of Deeds on September 27, 2016 at Liber 2533 and Page 0341. Mitigation controls will be required in perpetuity, or until the on-site remediation of soil and groundwater achieve the media cleanup standards and a site-specific or building-specific vapor intrusion assessment is performed that demonstrates the on-site vapor risk has been eliminated in that building or area of the site. The risk of inhalation of TCE in ambient air and/or direct contact with contaminants is addressed using the RC to require the maintenance of existing ECs, or installation of a similarly protective barrier if the existing concrete or asphalt is removed in the future. Further, the RC requires that if contaminated soil is excavated at the Facility, it must be handled according to local, state, and federal laws, and through the development of an EPA/MDEQ-approved Soil Management Plan.

³ PCE levels exceeded 88,000 parts per million (ppm), the soil saturation limit for PCE, in a hot spot identified in the southeastern portion of the site.

EPA proposes different groundwater remedies for four general areas: North On-site, North Off-site, South On-site and South Off-site (Appendix 2, Figure 14). The primary purpose of the selected groundwater remedies is to achieve the most stringent groundwater cleanup objective for the vapor intrusion pathway for residential properties at all off-site locations and achieve the MDEQ/EPA-approved GSI cleanup criteria for off-site areas, which will eventually eliminate the need for mitigation systems and vapor intrusion restrictions in off-site areas. A secondary, aspirational goal is restoration of the aquifer. Cleanup goals for on-site groundwater contamination are established in Table 9, but vapor mitigation controls will be implemented at the site as a long-term control. Cleanup goals for off-site groundwater are established in Tables 10 and 11, and must be met to eliminate off-site vapor intrusion restrictions and achieve the GSI criteria. The remedies selected for groundwater include a combination of: 1) enhanced in-situ bioremediation via recirculation cells; 2) monitored natural attenuation; 3) use of a permeable reactive barrier (PRB); 4) potable well decommissioning; 5) use of a municipal groundwater ordinance; and 6) the use of RCs.

- After evaluating the options, EPA selected Enhanced In-Situ Bioremediation (EISB) for treatment of the North On-site and South On-site areas, based on effectiveness, implementability, sustainability and cost, and considering that interim corrective measures (PRB and SVE) are ongoing and provide a complementary strategy to meet the groundwater cleanup levels. On-site EISB will improve the natural biological degradation process and reduce the mass, toxicity, mobility and/or volume of organic contaminants in groundwater. The primary objective is to reduce groundwater contaminant mass and achieve media cleanup standards by treating groundwater to levels that are protective of the off-site residential vapor intrusion pathway and groundwater to surface water interface pathway. The cleanup goals for groundwater are identified in Tables 10 and 11, and the most-stringent of the values listed for GW Volatilization to Indoor Air for Off-site Residential Groundwater in Table 10, or All Wetland Receptors/Pathways for Groundwater to Surface Water in Table 11 becomes the cleanup objective for groundwater in all off-site areas. A secondary goal is to reduce groundwater contamination to levels on-site that are protective of the non-residential vapor intrusion pathway (Table 9). Groundwater treatment, coupled with soil remediation, may allow for the eventual termination of on-site vapor mitigation systems through a site-specific vapor intrusion assessment.
- EPA selected monitored natural attenuation (MNA) for the North Off-site and South Off-site areas. Following on-site treatment, the groundwater is expected to remain contaminated above maximum contaminant levels (MCLs), e.g. the Drinking Water Criteria provided in Table 10. VOC concentrations and MNA parameters will be monitored to ensure that groundwater continues to meet the site-specific cleanup criteria, and concentrations continue to reduce via MNA in both on-site and off-site areas.

Monitoring will occur for several media under a site-wide Performance Monitoring Program (PMP) for remedial activities. The cleanup goals for off-site groundwater are identified in Tables 10 and 11, along with the timeframes for achieving the short-term and long-term cleanup goals.

- A permeable reactive barrier (PRB) was installed as an interim remedy to reduce levels of contamination migrating off-site in the shallow groundwater plume beneath structures located east of the property. The earlier use of a PRB to reduce off-site groundwater concentrations to levels below the cleanup goals for residential volatilization to indoor air will be supplemented by the implementation of on-site EISB treatment for groundwater. The PRB was installed as an interim measure in 2011 and will continue to operate until active components of the PRB have been depleted. Monitoring of groundwater, soil gas and indoor air will continue during the treatment period, and beyond, to ensure conditions remain protective.
- To prevent the ingestion of contaminated groundwater, the City of Tecumseh groundwater use ordinance (Ordinance #4-11) was put in place, prohibiting the installation of wells for potable purposes within the affected area. The Ordinance was recorded with Lenawee County on September 21, 2016. The Ordinance requires that homes within the area of affected groundwater be connected to municipal water supplies and it prohibits permits from being issued for potable water well installation within that area in the future. No further work is planned. Annual verification reporting will confirm that the municipal Ordinance remains in-place, or if there is a need to revise the ordinance or area of impacted groundwater in the ordinance.
- To prevent the ingestion of contaminated groundwater within the area of affected groundwater, potable wells within approximately 0.65 square miles surrounding the Facility have been identified and decommissioned. The abandonment work had been performed as an interim remedy within the area subject to the City of Tecumseh groundwater use ordinance (Ordinance #4-11). No further work is planned. Annual verification reporting will confirm that the municipal Ordinance remains in-place and its requirements are met.
- ICs in the form of an RC were developed to eliminate the risk of exposure to contamination at the Facility and in the surrounding area. An RC⁴ is in-place for the on-site area, but additional RCs will need to be developed for affected off-site properties where vapor mitigation controls are currently operating to eliminate exposure via the vapor intrusion pathway, or where new unacceptable risks via the vapor intrusion

⁴ Declaration of Restrictive Covenant recorded with the Lenawee County Register of Deeds on September 27, 2016 at Liber 2533 and Page 0341

pathway are identified in future co-located samples collected under the Performance Monitoring Program. The on-site RC is described further in the Institutional Controls paragraph below.

Surface water has been impacted in the wetland area east of the Facility. The remedy selected to address surface water contamination includes the combined on-site groundwater treatment and off-site MNA.

- A Groundwater-Surface Water Interface Performance Monitoring Program (GSI PMP)⁵ will be implemented to monitor surface water conditions. Monitoring of groundwater, pore water, and surface water will be performed until on-site groundwater treatment achieves and maintains the cleanup goals for venting groundwater discharge to the wetland (in addition to the cleanup goal for off-site residential vapor intrusion and surface water protection) and off-site MNA is demonstrated. The cleanup goals for the groundwater to surface water pathway in the wetland area are shown in Table 11. Additional monitoring of various media will be completed as part of a broader remediation Performance Monitoring Plan, the framework for which was outlined in the 2016 Restrictive Covenant. A decision tree will be developed by TPC to outline a course of actions if groundwater treatment fails to achieve the most-stringent of the GSI criteria (Table 11) or residential vapor intrusion criteria (Table 10) in off-site groundwater within the projected timeframe for treatment. This decision tree will be included in the Construction Completion Report (CCR).

EPA has selected the use of Institutional Controls (ICs) as a component of the proposed remedy. TPC and property owners will maintain the Michigan Department of Environmental Quality (MDEQ)/EPA-approved institutional controls to ensure the Facility's land use remains consistent with the remedial endpoints and risk assessments.

- ICs are identified in an RC that includes an on-site nonresidential property use restriction, a requirement to protect and maintain investigation and cleanup wells and systems, a (municipal) prohibition on the installation or use of drinking water or groundwater extraction wells within the area of affected groundwater, a restriction against the relocation of contaminated soil on the property except under an EPA/EGLE-approved soil management plan, a requirement for vapor intrusion testing or for vapor intrusion controls using SSD systems for all current/future on-site buildings, and a requirement for the maintenance or post-removal replacement of impervious surfaces at the property. Any

⁵ The GSI PMP is a subset of the network of media monitoring discussed in: 1) the December 18, 2017 *Conditional Approval of Revised Corrective Measures Proposal* by EPA; 2) the January 23, 2018 *EPA Conditional Approval of the Groundwater-Surface Water Interface Performance Monitoring Plan* by EPA and MDEQ; 3) the February 22, 2018 *Response to EPA Conditional Approval of Groundwater-Surface Water Interface Performance Monitoring Plan* by TRC; and, 4) and the February 20, 2019 *Review of the Fourth Quarter 2018 Progress Report* by EPA.

proposed modifications to the RC or conditions require EPA and EGLE approval. The RC was reviewed and approved by MDEQ and EPA then recorded with the Lenawee County Register of Deeds on September 27, 2016. The RC is enforceable under Part 111, Hazardous Waste Management, Michigan Compiled Laws (MCL) 324.11101 *et seq.* (Part 111) and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101 *et seq.* (Part 201) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.11101, *et seq.*, (Part 111) and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101, *et seq.*, (Part 201) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.101, *et seq.*, and the administrative rules promulgated pursuant to those Parts, MAC R 299.9101, *et seq.*, and MAC R 299.5101, *et seq.*, and the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 United States Code (U.S.C.) §§ 6901, *et seq.* The RC will ensure continued protection of human health and the environment. In addition, a municipal groundwater use restriction (City of Tecumseh Ordinance #4-11) was recorded with the Lenawee County Register of Deeds on September 21, 2017, which prohibits the use or installation of private water wells within a defined area of the City of Tecumseh.

- TPC will use existing ECs and ICs to prevent on-site and off-site exposures during and after soil and groundwater remediation. TPC will provide the EPA with annual written verification that the ECs and ICs described in this Final Decision remain in place and are being complied with until such a time that they are no longer necessary, as discussed below.

A component of TPC's cleanup includes Financial Assurance to ensure that funds are available to complete the remedy, including long-term operations & maintenance (O&M).

- TPC will continue to provide Financial Assurance in accordance with the provisions of the Administrative Order on Consent (RCRA-05-2010-0012) for the Facility. A cost estimate of \$5,441,650.00 was provided in the March 6, 2017, *Revised Corrective Measures Proposal*. Revisions in the cost estimates occur annually, and may increase to account for activities that are not described in the CMP, including the on-site and off-site vapor intrusion performance monitoring over the lifetime of the active cleanup, and up to 55 years of periodic, long-term, MNA and VOC monitoring from certain wells. The annual cost estimate may also be reduced to account for work that is completed over the year. The most-recent Cost Estimate was submitted on March 8, 2019, in the amount of \$4,805,300, which accounts for revisions in the cleanup plan and work performed after the CMP was completed. The estimate and related financial assurance reduction were approved by EPA on April 4, 2019.

Performance Monitoring, Operations & Maintenance, Annual Certifications and Five-Year Remedy Reviews are included in the proposed remedy, and will be implemented to verify effective site controls and evaluate the remedy.

- Monitoring of groundwater, surface water, pore water, soil gas, and sub-slab/indoor air will be performed during the treatment period, and beyond, to ensure conditions remain protective. A *Groundwater-Surface Water Interface Monitoring Program (GSI/PMP)*⁶ will be implemented which will monitor surface water conditions. The overall Performance Monitoring Program (PMP) has been partially developed for groundwater monitoring, and TPC will revise the PMP to include the groundwater, soil gas, and co-located indoor air and sub-slab sampling. PMP revisions will be considerate of comments provided by MDEQ and EPA on September 13, 2017 (email), February 21, 2019 (email), and subsequent discussions. The final PMP for all media will be included in the CCR for reference. Additional, building-specific vapor intrusion monitoring must be added to the PMP at individual parcels as redevelopment occurs (see Operations and Maintenance Reporting below).
- An Operations and Maintenance (O&M) plan(s) will be developed for monitoring remedial system components, including groundwater treatment systems, SVE systems, and all individual SSD systems. An O&M plan must be prepared for each existing and new building with a SSD. The O&M plan(s) and any associated revisions must be developed and submitted to EPA and EGLE for approval of proposed verification monitoring and inspection methods. O&M plans will require verification testing to document that unacceptable health risks from the vapor intrusion pathway have been eliminated. Verification testing for on-site SSD systems will typically include co-located sub-slab and indoor air sampling on a quarterly basis for at least two years. If warranted, co-located sampling may be modified to include only pressure differential readings. Once sub-surface conditions have stabilized, the reporting frequency may be reduced to a frequency not less than annually. O&M reporting will be required to be performed in perpetuity, or until the remedial activities are complete for all media and mitigation controls are no longer necessary (see Annual Reporting below).
- Annual certifications will document that existing ECs and ICs remain in-place and are preventing exposure for each parcel affected, and will include the analytical results for PMP and/or O&M sampling over the course of each year. This will include verification

⁶ A *Groundwater-Surface Water Interface Monitoring Program (GSI/PMP)* was submitted September 11, 2017, with a *Conditional Approval of Groundwater-Surface Water Interface Monitoring Program* issued by EPA and MDEQ on January 23, 2018, and a *Revised Groundwater-Surface Water Interface Monitoring Program* submitted February 22, 2018.

with on-site and off-site property owners that SSD systems continue to be operated where required until groundwater cleanup levels are met, verification with the property owner (100 E. Patterson, LLC or successors) that the requirements of the License Agreement and the RC are being met, and verification with the City of Tecumseh that the Groundwater Use Ordinance (Appendix 3) remains in effect. To verify the provisions for the existing on-site RC, documentation will include: 1) confirmation that on-site vapor intrusion requirements are being met, including the use of vapor mitigation controls or site specific vapor intrusion assessment in connection with the reuse of the Facility; 2) documentation that impervious surfaces used as ECs to eliminate inhalation to ambient air or other pathways have been maintained; and, 3) documentation that a Soil Management Plan approved by EPA and EGLE is in place to prevent the potential redistribution of contaminated soil to less contaminated areas during future excavation or disturbance of the existing ECs (barriers). The initial Certification should be included in the CCR, and should be submitted annually based on the date of the CCR.

- Periodic (5-year) remedy reviews will be conducted and the results will be used to evaluate reductions in chemical concentrations, the success of MNA, remedy efficacy, adjustments to the conceptual site model (CSM), and modifications to the remedy, if necessary. The initial Remedy Review should be submitted every five years, beginning five years from the date of the CCR.

EPA will re-evaluate its remedy decision if it learns that conditions have changed in ways which may increase risk of human and/or environmental exposure to contamination, or if any vapor intrusion investigation identifies a complete vapor intrusion pathway. If cleanup goals are not achieved in a reasonable timeframe⁷, modifications to the selected remedies may be required. The RC is enforceable by MDEQ (EGLE) and by EPA, and requires that if any concrete slabs or asphalt pavement are demolished or removed from the Facility, they must be replaced with a comparable impervious surface or barrier to prevent exposure via applicable pathways. If such a replacement is not made, EPA will revisit the RC and may request modifications based on current conditions and sampling results. An updated survey of the barrier locations must be provided as an amendment to the RC. If the use of the property is changed or contamination is identified that requires additional corrective measures, EPA may need to revisit the decisions made regarding the selected remedy. The RC requires that any modifications be approved in advance by EPA and EGLE.

EPA developed cleanup goals to address contaminants with concentrations above the media cleanup standards for applicable exposure pathways. The cleanup goals include site-specific values developed by TPC using third-party Risk Based Corrective Action (RBCA) software and spreadsheet calculations, a Seasonal Soil Compartment (SESOIL) model for contaminant

⁷ Short-term and long-term timeframes to achieve cleanup goals are identified in Tables 9-11.

migration, and generic MDEQ Part 201 cleanup criteria. Those criteria are identified below with the respective media and timeframe for cleanup, to identify the requirements and related controls. EPA considers these site-specific levels to be appropriate to protect the public and workers.

Table 8: Cleanup Goals for On-Site Volatilization from Soil to Air (Routine Site Worker) Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Cleanup Goals for Soil Volatilization to Ambient Air ^g (mg/kg)	Screening Levels for Soil Volatilization to Indoor Air ^h (mg/kg)
Cis-1,2-Dichloroethene	3,360	0.17
Tetrachloroethene	559	1.0
Trichloroethene	27	0.050
1,2,4-Trimethylbenzene	348	5.9

^g Calculated Site-Specific Cleanup Level.

^h Default Screening Criteria. Site specific cleanup level is dependent upon the various parameters of buildings that have not yet been constructed; a site-specific cleanup level may be calculated in the future to determine an appropriate time for SSD system shutdown.

Cleanup levels in mg/kg (milligrams per kilogram, also indicated as parts per million, ppm).

Refer to Table 4 of the CMP for further details.

Contaminant concentrations above the levels outlined above require appropriate controls, or cleanup, to be protective of pathway.

Primary cleanup goal for TCE

Table 9: Cleanup Goals for On-Site Non-Residential Groundwater Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Cleanup Goals for GW Volatilization to Indoor Air ⁱ (ug/L)	Cleanup Goals for Hypothetical Drinking Water Pathway ⁱ (ug/L)
1,1-Dichloroethane	18,000	441
1,1-Dichloroethene	42,000	7
Cis-1,2-Dichloroethene	32,000	70
Trans-1,2-Dichloroethene	36,000	100
Tetrachloroethene	1,400	5
1,1,1-Trichloroethane	71,000	200
Trichloroethene	1,100	5
Vinyl Chloride	* 1,100	2
Xylenes	79,000	10,000
1,4-Dioxane	NA	25
Years to achieve	2-3	55

ⁱ Calculated Site-Specific Cleanup Level.

^j Default Screening Criteria. Site specific cleanup level is based on hypothetical drinking water criteria for MNA demonstration. Cleanup levels in ug/L (micrograms per liter, also indicated as parts per billion, ppb). Refer to Table 5 of the CMP for further details.

* Although a cleanup goal was calculated for vapor intrusion for vinyl chloride in groundwater, vinyl chloride has been absent in soil gas samples. As a result, the cleanup goal for vinyl chloride via vapor intrusion will be the criteria for soil vapor/indoor air. NA = Not applicable.

Contaminant concentrations above the levels outlined above require appropriate controls until the cleanup goals are achieved,

Primary cleanup goal for TCE

**Table 10: Site-Specific Cleanups Goal for Off-Site Residential Groundwater
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Cleanup Goals for GW Volatilization to Indoor Air ^k (ug/L)	Cleanup Goals for Hypothetical Drinking Water Pathway ^l (ug/L)
1,1-Dichloroethane	4,300	205
1,1-Dichloroethene	4,700	7
Cis-1,2-Dichloroethene	3,600	70
Trans-1,2-Dichloroethene	4,000	100
Tetrachloroethene	165	5
1,1,1-Trichloroethane	17,000	200
Trichloroethene	130	5
Vinyl Chloride	* NA	2
Years to achieve	7-15	55

^k Calculated Site-Specific Cleanup Level.

^l Default Screening Criteria. Site specific cleanup level is based on hypothetical drinking water criteria for MNA demonstration. Cleanup levels in ug/L (micrograms per liter, also indicated as parts per billion, ppb). Refer to Table 6 of the CMP for further details.

* Vinyl chloride has been present in groundwater but absent in soil gas samples. As a result, the cleanup goal for vinyl chloride via vapor intrusion will be the criteria for soil vapor/indoor air.

NA = Not Applicable.

Contaminant concentrations above the levels outlined above require appropriate controls until the cleanup goals are achieved

Primary cleanup goal for TCE in off-site groundwater

**Table 11: Site-Specific Cleanup Goals for Groundwater to Surface Water
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Recreational User Direct Contact ^m (ug/l)	All Surface Water Receptors/Pathways ⁿ (ug/l)	All Wetland Receptors/Pathways ⁿ (ug/l)
Acetone	NA	NA	1,700
2-Butanone	NA	40,000	2,200
1,1-Dichloroethane	NA	13,000	740
1,1-Dichloroethene	198,000	2,300	130
Cis-1,2-Dichloroethene	11,600	11,000	620
Ethylbenzene	NA	320	18
Tetrachloroethene	5,740	2,900	60
Toluene	NA	2,600	270
Trans-1,2-Dichloroethene	83,600	28,000	1,500
1,1,1-Trichloroethane	NA	1,600	89
Trichloroethene	1,570	3,500	200
1,2,4-Trimethylbenzene	NA	310	17
Xylenes	NA	NA	49
Vinyl Chloride	263	NA	13
Years to achieve	7-15	7-15	7-15

^m Calculated Site-Specific Cleanup Level.

ⁿ Mixing zone-based, site-specific cleanup level approved by MDEQ in letter titled "Implementation of the Mixing Zone - Clarification; Former Tecumseh Products Company; MID 005 049 440," dated June 27, 2017, as amended via email August 1, 2017 and September 5, 2017. Refer to Revised Table 7 of the CMP for further details.

NA = Not Applicable.

Contaminant concentrations above the levels outlined above require active cleanup until the cleanup goals are achieved.

Highlighted cleanup goals are more stringent than those for vapor intrusion, and thus, represent off-site groundwater cleanup goal

**Table 12: Cleanup Goal for Soil Vapor/Indoor Air
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Cleanup Goals for On-Site Indoor Air ^o (ppbv)	Cleanup Goals for Off-Site Indoor Air ^o (ppbv)	Screening Levels for On-site Soil Vapor ^p (ppbv)	Screening Levels for Off-site Soil Vapor ^p (ppbv)
1,1-Dichloroethane	510	120	690,000	41,000
1,2-Dichloroethane	1.2	0.24	1,600	82
1,1-Dichloroethene	210	50	280,000	17,000
Cis-1,2-Dichloroethene	7.3	1.7	9,800	580
Trans-1,2-Dichloroethene	73	17	98,000	5,800
Tetrachloroethene	25	5	33,000	1,700
1,1,1-Trichloroethane	4,600	1,100	6,100,000	360,000

Detected Contaminant/COC	Cleanup Goals for On-Site Indoor Air ^o (ppbv)	Cleanup Goals for Off-Site Indoor Air ^o (ppbv)	Screening Levels for On-site Soil Vapor ^p (ppbv)	Screening Levels for Off-site Soil Vapor ^p (ppbv)
Trichloroethene	1.5	0.37	2,100	120
Vinyl Chloride	12	0.62	* 15,000	210*

^o Indoor Air Screening Levels taken from May 2013 MDEQ Final Guidance Document for the Vapor Intrusion Pathway.

^p Default Residential and Non-Residential Deep Soil Gas Screening Levels (SGSLs) taken from May 2013 MDEQ Final Guidance Document for the Vapor Intrusion Pathway; not applicable for sub slab performance monitoring using vapor pins during the performance monitoring period.

* Vinyl chloride has been absent in soil gas samples but will be monitored during cleanup with respect to soil vapor/indoor air.

NA = Not applicable.

Contaminant concentrations above the levels outlined above require appropriate controls/cleanup until cleanup goals are achieved.

Primary cleanup goals for TCE

VII. CRITERIA ON WHICH THE FINAL REMEDY SELECTION IS BASED

As explained in EPA's Statement of Basis for this proposed Final Remedy Decision, EPA has evaluated its Final Remedy using the following criteria:

1. Overall protection of human health and the environment;
2. Attainment of media cleanup standards;
3. Controlling the sources of releases;
4. Compliance with waste management standards;
5. Long-term reliability and effectiveness;
6. Reduction of toxicity, mobility, or volume of wastes;
7. Short-term effectiveness;
8. Implementability; and,
9. Cost.

VIII. EVALUATION OF THE SELECTED REMEDY

The remedies proposed by TPC were evaluated against these criteria to determine whether those criteria will be sufficiently addressed, as described below.

Criteria 1 and 7 will be achieved by implementation of the selected remedies for soil and groundwater. TPC removed contaminated soils and wastes from the facility during prior RCRA closure and interim corrective action activities. The selected remedies will further protect human health and the environment by reducing contamination to acceptable levels and by preventing exposure to residual contamination. Short-term effectiveness will be measured through monitoring activities, and the proposed technologies have been demonstrated to be effective. Therefore, these criteria will be adequately addressed.

Criteria 2, 3, and 6 will be achieved by installing the SVE systems, implementing excavation and removal of contaminated soil or in-situ treatment, and installing EISB groundwater treatment cells. These remedies will allow conditions at the former TPC to meet the criteria by reducing the volume and mobility of wastes, removing sources of contamination, and attaining media cleanup standards.

Criterion 4 will be achieved by a combination of previous Interim Measures and closure of the Spent Solvent Storage Tank and a Hazardous Waste Drum Storage Area, and by complying with the RC, the Soil Management Plan for excavation within the areas of contaminated soil, and with State and Federal regulations related to the handling and management of wastes.

Criterion 8 will be achieved since past Interim Measures at the Facility were implemented successfully and other components of the selected remedies can be easily implemented based on their extensive history of use in environmental cleanups.

Criteria 5 and 9 are met because the remedies selected are proven, cost-effective and implementable technologies with long-term effectiveness. The SVE system is expected to remove TCE from new target treatment areas within approximately 4 years. Results from soil samples in the area treated by the current SVE have demonstrated a reduction in contaminant levels. Excavation and disposal would achieve the criteria more rapidly, but at higher costs. EISB for groundwater treatment is also implementable, at reasonable costs, and compatible with the existing microbial degradation in both the treatment area and downgradient through recirculation cells. Maintenance of engineered barriers and adherence to a RC recorded on the property deed will effectively control risks. Monitoring will demonstrate that MNA is and will continue occurring off-site. Financial assurance will ensure that the remedy is completed and the controls remain in place.

The evaluation described in this Final Decision demonstrates that the engineered and institutional controls prescribed by the remedy, along with past remedial efforts, will be effective in preventing further off-site releases above the media cleanup standards or other allowable exposure limits, and in achieving these threshold criteria.

Compliance with all criteria will be ensured by establishment and adherence to the RC recorded on the property deed. The covenant will be enforceable by EGLE and, as a third-party beneficiary, by EPA.

IX. PUBLIC PARTICIPATION ACTIVITIES

EPA held a 30-day public comment period for the proposed remedy from October 25, 2018, to November 28, 2018. On October 25, 2018, EPA gave notice of the comment period through the *Tecumseh Herald*. EPA also held a public meeting on November 7, 2018, for concerned parties.

TPC requested an extension to provide comments on the Statement of Basis, and the extension was granted through December 12, 2018.

During the public comment period, the Statement of Basis, Public Notice, and Administrative Record were available for public inspection in the Tecumseh District Library, 215 N. Ottawa Street, Tecumseh, Michigan, and at the EPA Region 5 Records Center, 77 West Jackson Boulevard, Chicago, Illinois.

X. PUBLIC COMMENTS AND EPA'S RESPONSE TO COMMENTS

EPA received no comments from the public outside of TPC during the public comment period. Comments received from TPC are included herein. TPC's comments and EPA's responses are as follows.

TPC Comment 1: TPC requested clarifying text related to descriptions of institutional controls to indicate that restrictions related to the municipal groundwater ordinance applied only "within the area of affected groundwater" and specifying that vapor intrusion controls using Sub-Slab Depressurization (SSD) systems would be required for all current/future "on-site" buildings.

EPA Response: EPA modified language regarding the municipal groundwater ordinance to indicate that the restriction applied only "within the area of affected groundwater" in the referenced section of the FD/RC, but did not modify the language regarding SSD systems to include the word "on-site"; there is currently one off-site property for which a Restrictive Covenant is required to ensure that exposure continues to be mitigated with a SSD system, and a RC needs to be recorded against the deed for that property to ensure access and mitigation efforts are maintained. If SSD systems are found to be necessary at additional off-site properties when PMP monitoring is initiated, RCs would also be required for those affected properties. As a result, the term "on-site" was not specified in revisions.

TPC Comment 2: TPC requested the use of the term "vent" rather than "discharge" for contaminated groundwater affecting the wetland area.

EPA Response: EPA consulted with MDEQ Water Resources Division, which recommended the use of the phrase "venting groundwater discharge" or "discharge of venting groundwater" under MDEQ regulations, and language was revised where applicable.

TPC Comment 3: TPC requested elimination of language regarding the surveying of engineered barriers and related modifications to the Restrictive Covenant.

EPA Response: EPA discussed with TPC that a survey of all current/future engineered barrier locations must be recorded against the deed to the property to prevent removal or damage to existing barriers. EPA included a request to provide (general) construction specifications for existing barriers to confirm their effectiveness in eliminating exposure pathways for which the

barriers are being used, and to facilitate the selection of barriers that may be installed to exclude pathways in connection with the future redevelopment.

TPC Comment 4: TPC requested use of the term “screening levels” in text rather than “criteria”.

EPA Response: The language has been revised consistent with the comment.

TPC Comment 5: TPC requested a clarification related to well abandonment activities.

EPA Response: The language was revised to address the comment.

TPC Comment 6: TPC requested a modification in text for Routine Indoor Worker exposures to include “hypothetical ingestion and dermal contact with groundwater as tap water”.

EPA Response: The language was revised.

TPC Comment 7: TPC requested that potential Trespasser exposures be specified for “surface” soils.

EPA Response: The language has been revised.

TPC Comment 8: TPC expressed concern that a modification of the RC to include the Soil Management Plan (SMP) is burdensome and discourages regular review.

EPA Response: EPA and TPC discussed an alternative to a revision of the RC to account for the SMP. The most-recently developed SMP for the Facility, once developed, will be referenced in annual certifications, will require TPC to ensure that the plan and anticipated updates are followed. Related language has been modified throughout the FD/RC. EPA notes that new constructions will require revisions to the site RC(s) with language preventing penetrations of vapor mitigation systems and related vapor barriers after installation.

TPC Comment 9: TPC requested a revision of the term “on-site” to “off-site” in a statement referenced on page 25 of the SB related to final corrective measures.

EPA Response: EPA provided clarifying statements regarding the goals for off-site and on-site cleanup to address vapor intrusion risks in Section V of this FD/RC, including the eventual long-term restoration of the aquifer, elimination of off-site vapor intrusion restrictions, and maintenance of on-site vapor mitigation controls in perpetuity or until it is determined that on-site cleanup criteria have been achieved.

TPC Comment 10: TPC requested the removal of language indicating the purpose of on-site soil cleanup was to “reduce levels of contaminants of concern in soil to below cleanup goal for vapor intrusion at nonresidential properties”. TPC expressed concern that areas beyond the proposed limits of the soil remediation will remain above the cleanup goals for soils, though cleanup anticipates that SSD systems will be used on-site in perpetuity.

EPA Response: The language was revised to indicate the primary purpose of the soil remedy is to prevent leaching to the groundwater and re-contamination of groundwater, and the secondary goal is to eliminate the on-site vapor intrusion risks, where possible, to allow for the termination of on-site vapor intrusion controls through site-specific assessment.

TPC Comment 11: TPC requested that language regarding likely modifications to ECs and ICs be modified or deleted.

EPA Response: The language has been revised to indicate that mitigation controls will be required in perpetuity, or until the on-site remediation of soil and groundwater achieve the media cleanup standards and a site-specific vapor intrusion assessment demonstrates that on-site risk has been eliminated, that risks from inhalation of TCE in ambient air and/or direct contact with contaminants requires the maintenance of existing ECs or installation of a similarly protective barriers, and that if contaminated soil is excavated at the Facility, it must be handled according to local, State, and Federal laws, and through the development of an EPA/EGLE-approved Soil Management Plan.

TPC Comment 12: TPC requested modifications to language regarding the financial assurance requirements.

EPA Response: The language has been revised to be consistent with language in the March 29, 2010 Administrative Order on Consent.

TPC Comment 13: TPC requested modifications to language related to the removal of existing concrete or asphalt surfaces under the RC.

EPA Response: EPA revised the language regarding RCs to address the need for a current survey of barriers, and the need for other information in the event those materials are removed in the future, clarifying that any modifications to the RC requires EGLE and EPA approval. By default, this will include any proposed modifications to the existing barriers.

TPC Comment 14: TPC requested modifications to Table 1 to be consistent with the Human Health Risk Assessment regarding “On-site Non-routine Outdoor Workers” and “Off-site Recreational Users”.

EPA Response: The language was revised consistent with the comment.

TPC Comment 15: TPC requested modifications in Table 2 to headings, notes, and cleanup objectives for inorganic contaminants.

EPA Response: Consistent with the request, EPA revised the notes and comments of the table, and revised the criteria in the table for Trespassers. However, the screening levels for groundwater protection were not changed. A note was added to indicate that the values listed are based on MDEQ Part 201 criteria.

TPC Comment 16: TPC noted duplicative values for 1,1-DCA in Table 3.

EPA Response: The table was revised with corrected values.

TPC Comment 17: TPC noted a typographical error in a value for tetrachloroethene in Table 4.

EPA Response: EPA corrected the error.

TPC Comment 18: TPC requested that Table 5 be revised to indicate that no remedial response was needed for contaminants in soil above the screening criteria for groundwater protection and requested that compounds above the screening levels for volatilization to ambient air be addressed with a heading change in the table and a note.

EPA Response: The table was revised with a heading change and a footnote to address contaminants exceeding the soil volatilization to ambient air levels. Contaminants in the soil above the screening criteria for groundwater protection were not considered unwarranted for further action by EPA, so the “Evaluation of Health Risk or Remedial Response” portion of the table simply identifies that no exceedances were found in groundwater for those contaminants.

TPC Comment 19: TPC requested certain modifications and additional footnotes to use the terms “Cleanup Goals”, “Screening Levels”, and “Criteria for Hypothetical [drinking water pathway]” in Tables 8, 9, 10, and 12.

EPA Response: Consistent with TPC’s request, EPA distinguished between Cleanup Goals and Screening Levels in Table 8 and Table 12. However, EPA retained the term “cleanup goal” for the hypothetical drinking water pathway in tables 9 and 10, and added a footnote to the table for further clarification that the aspirational long-term goal of groundwater treatment is to demonstrate that concentrations of contaminants in groundwater are decreasing at a degradation rate projected to achieve the goal of restoring groundwater within the 55-year timeframe projected in the tables.

TPC Comment 20: TPC requested clarifications to footnotes in Table 11.

EPA Response: Two footnotes were deleted from Table 11 and a revision was made in the footnote referring to the approval for TPC’s mixing zone request as the basis for cleanup levels.

XI. ADMINISTRATIVE RECORD

A copy of the Administrative Record for the selected remedy and determination in this Final Decision and Response to Comments is available for review at the Tecumseh District Library, 215 N. Ottawa Street, Tecumseh, Michigan, and at the EPA Region 5 Records Center, 77 West Jackson Boulevard, Chicago, Illinois. An index to the Administrative Record is provided in Appendix 4. The Administrative Record for this FD/RC includes, among other documents:

- *Preliminary Assessment/Visual Site Inspection*, dated March 30, 1993.
- *Current Conditions Report*, dated September 21, 2009.

- *Administrative Order on Consent RCRA-05-2010-0012*, dated March 29, 2010.
- *Current Human Exposures Under Control Environmental Indicator Report*, dated September 29, 2011.
- *Construction Documentation Report, Permeable Reactive Barrier Downgradient of the Southern Source Area*, dated February 20, 2012.
- *Remedial Investigation and Groundwater Environmental Indicator Report*, dated September 28, 2012.
- *Full-Scale Soil Vapor Extraction System Construction Documentation Report, P-Building at 100 East Patterson Street*, dated February 13, 2013.
- *Supplement to the Current Human Exposures Environmental Indicator Report and Proposed Extension Pursuant to Paragraph 21 of the AOC*, dated September 30, 2013.
- *Vapor Intrusion Fact Sheet*, dated August 14, 2014.
- *Membrane Interface Probe (MIP) and Hydraulic Profiling Testing (HPT) Investigation Report*, dated December 5, 2014 and revised December 23, 2014.
- *MIP Investigation Report and Workplan for High Resolution Site Characterization (Revision 2)*, dated April 30, 2015.
- *Supplement to Remedial Investigation and Environmental Indicator Report (Migration of Contaminated Groundwater Under Control)*, dated July 31, 2015.
- *Notice of Violation*, dated October 1, 2015.
- *Summary of 2016 Soil Investigation Activities*, dated August 24, 2016.
- *City of Tecumseh Groundwater Use Ordinance*, recorded September 21, 2016.
- *Declaration of Restrictive Covenant*, recorded September 27, 2016.
- *Construction Documentation Report 2016 PCE Source Removal*, dated January 16, 2017.
- *Revised Corrective Measures Proposal*, dated March 6, 2017.
- *Response to EPA Conditional Approval of Groundwater-Surface Water Interface Performance Monitoring Plan*, dated February 22, 2018.
- *U.S. Environmental Protection Agency Statement of Basis*, dated September 18, 2018.
- *Comments on Statement of Basis*, dated December 12, 2018.
- *Re-Evaluation of Soil Treatment Options for Northern Soil Area 2*, dated May 10, 2019.

XII. FUTURE ACTIONS

EPA will implement and oversee this Final Decision through the Administrative Order on Consent or otherwise through the exercise of its enforcement authorities under RCRA. EPA expects that TPC will comply with the terms and conditions set forth in this FD/RC and implement corrective actions under paragraph 19. of the Administrative Order on Consent according to the following schedule for deliverables under the FD/RC.

**Table 13: Schedule for Completion of Remedies
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Task	Deadline		
Submit Sampling & Analysis Plan (SAP)	8/26/2019		
Implement SAP Sampling	11/5/2019		
Quality Assurance Project Plan (QAPP)	12/30/2019		
Task	Deadline for Groundwater Treatment Remedy	Deadline for Soil-N1, -S1, and -S3 Treatment Remedy	Deadline for Soil-N2 Area Remedy
90% Design Document with Construction QAPP	8/26/2019	1/13/2020	11/20/2020
Final Design Document	11/18/2019	4/6/2020	2/12/2021
Draft O&M Plan	12/30/2019	5/18/2020	3/26/2021
Final O&M Plan	2/24/2020	7/13/2020	5/21/2021
Construct Remedy	7/24/2020	10/30/2020	6/4/2021
Construction Complete Report	10/7/2020	1/13/2021	8/11/2021
Task	Deadline		
Revise Restrictive Covenant	9/27/2021		

Within less than 90 days of the date construction is completed according to the schedule above, TPC will provide Final Remedy Construction Completion Reports, which will include O&M plans as attachments for the related and existing operating remediation systems under paragraph 20.e. of the Order. In addition, the complete Performance Monitoring Program for sampling of soil gas, sub slab/indoor air, groundwater, pore water, and surface water will also be attached to each Final Remedy Construction Completion Report as required under paragraph 20.e. of the Order. Under paragraph 20.d. of the Order, Quarterly Progress reports will continue to be submitted by the 15th day of month following the end of each quarter. An updated QAPP is required under paragraph 20.g. of the Order, since the existing QAPP will be more than 10 years old in August 2020. The QAPP will be submitted according to the schedule above, or no later than May 2020, and revised at a frequency of no greater than 5 years after that for the duration of the monitoring period. Deadlines for submittals of Final Design Documents and Final O&M Plans are dependent upon timely review and approval of Draft documents by EPA, and TPC will not be held responsible for delays caused by EPA.

TPC will comply with current/future RCs recorded with the property deed, which will be enforceable under Part 111, Hazardous Waste Management, Michigan Compiled Laws (MCL) 324.11101 *et seq.* (Part 111), the applicable sections of Part 201, Environmental Remediation, MCL 324.20101 *et seq.* (Part 201) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.101 *et seq.*, the administrative rules promulgated pursuant to those Parts, MAC R 299.9101 *et seq.* and MAC R 299.5101 *et seq.*, and the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of

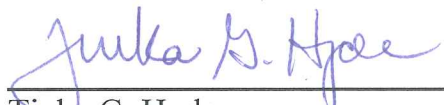
1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 United States Code (U.S.C.) §§ 6901 *et seq.* The RC has been recorded in Lenawee County; however, should conditions at the Facility change in ways that are contrary to the requirements of the RC, EPA will revisit all exposure scenarios and the potential need for corrective measures.

XIII. CORRECTIVE ACTION COMPLETE DETERMINATION


Once Tecumseh Products Company believes it has met its Corrective Action Obligations, it may submit a request to EPA Region 5, with reference to the cleanup goals specified herein and supporting information, for a Corrective Action Complete Determination With Controls. The request should include a written explanation and supporting documentation demonstrating that the Facility satisfies the criteria for such a determination; the selected measures, contaminant cleanup goals, and other conditions specified in the FD/RC; and, any and all additional measures, criteria and conditions specified in any Order, Permit, or Consent Decree implementing this FD/RC. At a minimum, the Facility's Corrective Action Complete Determination must: 1) demonstrate that all remedy construction activities are complete; 2) demonstrate that all required Institutional Controls have been implemented; 3) demonstrate that the cleanup goals and/or remediation objectives have been achieved; and, 4) where the Corrective Action Complete Determination provides for continuing remedial activities such as groundwater treatment, SSD system operation, or media monitoring: (i) identify the criteria that would confirm that long-term remedial activities are functioning as intended, or would be the basis for additional work; and (ii) identify the criteria for satisfaction and termination of the post-determination activities.

XIV. DECLARATION

Based on the information in this Final Decision and Response to Comments and the Administrative Record compiled for this corrective action decision at the former Tecumseh Products Company Facility in Tecumseh, Michigan, EPA has determined that the selected remedies for the former Tecumseh Products Company Facility are appropriate for the protection of human health and the environment.



Tinka G. Hyde
Division Director
Land, Chemicals & Redevelopment Division



Date

APPENDIX 1

**STATEMENT OF BASIS
DATED SEPTEMBER 18, 2018**

FINAL DECISION & RESPONSE TO COMMENTS
TECUMSEH PRODUCTS COMPANY
TECUMSEH, MICHIGAN
EPA ID: MID 005 049 440



U.S. ENVIRONMENTAL PROTECTION AGENCY

STATEMENT OF BASIS

for

Former Tecumseh Products Company Facility

**100 East Patterson Street
Tecumseh, Michigan**

EPA ID: MID 005 049 440

September 18, 2018

LIST OF ABBREVIATIONS

1,1,1-TCA - 1,1,1-trichloroethane
AOC – Area of Concern
cis-DCE – Cis-1,2-Dichloroethene
CMP – Corrective Measures Proposal
cm/s – centimeters per second
COC(s) – Contaminant(s) of Concern
CSM – Conceptual Site Model
CSCR - Cumulative Site-Related Cancer Risk
EC – Engineering Control
EISB – Enhanced In-Situ Biodegradation
FD/RC – Final Decision & Response to Comments
ft bgs – Feet Below Ground Surface
GSI – Groundwater Surface Water Interface
HI – Hazard Index
HPT - Hydraulic Profiling Testing
HRSC – High Resolution Site Characterization
IC – Institutional Control
ISCO – In-Situ Chemical Oxidation
MDEQ – Michigan Department of Environmental Quality
MIP – Membrane Interface Probe
MNA – Monitored Natural Attenuation
NPDES – National Pollutant Discharge Elimination System
O&M – Operations and Maintenance
PA/VSI – Preliminary Assessment / Visual Site Inspection
PCE - Tetrachloroethene
POTW – Publicly-Owned Treatment Works
PRB – Permeable Reactive Barrier
RBCA – Risk-Based Corrective Action
RC – Restrictive Covenant
RCRA – Resource Conservation & Recovery Act
RSL – Regional Screening Level
SB – Statement of Basis
SSD – Sub Slab Depressurization
SSL – Soil Screening Level
SVE – Soil Vapor Extraction
SVOCs – Semivolatile Organic Compounds
SWMU(s) – Solid Waste Management Unit(s)
TCE - Trichloroethene
TPC – Tecumseh Products Company, Inc.
trans-DCE – Trans-1,2-Dichloroethene
UST(s) – Underground Storage Tank(s)
VOC(s) – Volatile Organic Compound(s)
VISL – Vapor Intrusion Screening Level

U. S. ENVIRONMENTAL PROTECTION AGENCY
Statement of Basis

Former Tecumseh Products Company Facility
100 East Patterson Street
Tecumseh, Michigan
EPA ID: MID 005 049 440

INTRODUCTION

This Statement of Basis (SB) for the former Tecumseh Products Company (TPC) Facility, also known as Tecumseh Compressor Company, 100 Patterson LLC, and Revival Commons, explains the U.S. Environmental Protection Agency's proposed soil and groundwater remedies and institutional controls required at the Facility to protect human health and the environment. EPA will make a final decision on the TPC Facility remedy only after the public comment period has ended and the information submitted during this time has been reviewed and considered. As such, EPA is issuing this SB as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA).

This document summarizes information that can be found in greater detail in the following listed documents and other documents contained in the administrative record (Appendix A) for the Corrective Action Statement of Basis for the TPC Facility:

- *Revised Corrective Measures Proposal*, dated March 6, 2017.
- *Preliminary Assessment/Visual Site Inspection*, dated March 30, 1993.
- *Current Conditions Report*, dated September 21, 2009.
- *Administrative Order on Consent RCRA-05-2010-0012*, dated March 29, 2010.
- *Current Human Exposures Under Control Environmental Indicator Report*, dated September 29, 2011.
- *Construction Documentation Report, Permeable Reactive Barrier Downgradient of the Southern Source Area*, dated February 20, 2012.
- *Remedial Investigation and Groundwater Environmental Indicator Report*, dated September 28, 2012.
- *Full-Scale Soil Vapor Extraction System Construction Documentation Report, P-Building at 100 East Patterson Street*, dated February 13, 2013.
- *Supplement to the Current Human Exposures Environmental Indicator Report and Proposed Extension Pursuant to Paragraph 21 of the AOC*, dated September 30, 2013.
- *Vapor Intrusion Fact Sheet*, dated August 14, 2014.
- *Membrane Interface Probe (MIP) and Hydraulic Profiling Testing (HPT) Investigation Report*, dated December 5, 2014 and revised December 23, 2014.

- *MIP Investigation Report and Workplan for High Resolution Site Characterization (Revision 2)*, dated April 30, 2015.
- *Supplement to Remedial Investigation and Environmental Indicator Report (Migration of Contaminated Groundwater Under Control)*, dated July 31, 2015.
- *Notice of Violation*, dated October 1, 2015.
- *Summary of 2016 Soil Investigation Activities*, dated August 24, 2016.
- *City of Tecumseh Groundwater Use Ordinance*, recorded September 21, 2016.
- *Declaration of Restrictive Covenant*, recorded September 27, 2016.
- *Construction Documentation Report 2016 PCE Source Removal*, dated January 16, 2017.
- *Response to EPA Conditional Approval of Groundwater-Surface Water Interface Performance Monitoring Plan*, dated February 22, 2018.

EPA may modify this proposed decision or make another decision based on new information or public comments. Therefore, the public is encouraged to review and comment on this decision. The public can be involved in this process by reviewing this document and the documents contained in the administrative record file, and submitting comments to EPA during the public comment period set for October 29, 2018 to November 28, 2018. Although no public meeting has been scheduled as of the start date of the public comment period, members of the public may request a public meeting during the open public comment period. After the close of the public comment period, EPA will evaluate all written comments received from the public and will issue a Notification of Final Decision and Response to Comments (FD/RC).

PROPOSED REMEDY

Based on a comparative analysis of alternatives provided in the March 6, 2017 *Revised Corrective Measures Proposal* (CMP), EPA proposes the following remedy for public comment to address contaminated soil, groundwater, and soil vapor at the former TPC Facility.

- *Soil - A combination of: 1) maintenance of impermeable concrete/asphalt or placement and maintenance of similar cover over soils with contaminant concentrations above non-residential cleanup levels; 2) operation of the existing Soil Vapor Extraction (SVE) systems and expansion of the systems to additional areas of soil contamination; and, 3) source area soil excavation(s) and placement in a permitted off-site landfill.*

The use of barriers such as existing/future asphalt (e.g., a parking lot) or concrete (e.g., building foundations, etc.) will be used to mitigate human exposure to contaminants via the inhalation pathway. Continued operation of the Facility's two SVE systems will remove volatile organic compounds (VOCs) in additional targeted areas of the Facility (Areas Soil-N1, Soil-S1 and Soil-S3) where soil contamination has the potential to leach to groundwater and migrate to off-site areas at levels above the residential screening criteria for vapor intrusion (a site-specific value of 130 parts per billion for trichloroethene, or TCE, the primary contaminant of concern, or COC). Approximately 3,250 tons of contaminated soil was excavated from one source area where tetrachloroethene (also called perchloroethylene or PCE) levels exceeded 88,000 parts

per million (the soil saturation limit for PCE) and replaced with clean soil backfill. These actions were considered an Interim Measure that reduced the potential for PCE leaching into groundwater. EPA estimates that an additional 2,900 cubic yards (cu. yd.) of contaminated shallow soil must either be properly excavated and disposed, or treated by in-situ chemical oxidation (ISCO) in the Soil N-2 area. Cleanup in this area will mitigate the migration of contaminants of concern (COCs) from on-site soil to groundwater by soil leaching and reduce the mass of COCs in the source area, preventing further off-site migration of TCE in groundwater. Since the cleanup is primarily intended to target concerns related to contaminated soil leaching to groundwater, appropriate controls will need to be proposed, installed, maintained and recorded on the Restrictive Covenant (RC) to address any COCs remaining which exceed the cleanup goals for any applicable exposure pathways.

- *Groundwater – A combination of: 1) potable well decommissioning; 2) use of a municipal groundwater ordinance; 3) use of a permeable reactive barrier (PRB); 4) enhanced in-situ bioremediation via recirculation cells; and, 5) monitored natural attenuation.*

To prevent the ingestion of contaminated groundwater, potable wells within approximately 0.65 square miles surrounding the facility have been located and decommissioned, and a City Groundwater Ordinance was put in place to prevent the installation of wells for potable purposes within the affected area. A PRB was constructed as an Interim Measure to reduce the shallow groundwater concentrations beneath structures above the plume. On-site Enhanced In-Situ Bioremediation (EISB) will improve the natural biological degradation process and reduce the mass, toxicity, mobility and/or volume of organic contaminants in groundwater. The objective is to be protective of the on-site non-residential and off-site residential vapor intrusion pathways by reducing groundwater contaminant mass and achieving media cleanup standards. Monitoring of groundwater, soil gas and indoor air will continue during the treatment period and beyond to ensure conditions remain protective. Following treatment, the groundwater will remain contaminated above maximum contaminant levels (MCLs), and will be monitored to ensure that groundwater continues to meet the site-specific cleanup criteria, and concentrations continue to reduce via monitored natural attenuation (MNA) in on-site and off-site areas.

- *Surface Water – Surface water will be monitored via implementation of a Groundwater Surface Water Interface Monitoring Program.*

Monitoring will be performed under a Groundwater Surface Water Interface Monitoring Program until on-site groundwater treatment achieves and maintains the Cleanup Goal for discharges to the wetland (in addition to the cleanup goal for off-site residential vapor

intrusion and surface water protection), via on-site groundwater treatment and off-site MNA.

- *Institutional Controls – Maintain Michigan Department of Environmental Quality (MDEQ)/EPA-approved institutional controls to ensure the facility’s land use remains consistent with the remedial endpoints and risk assessments.*

Institutional controls (ICs) are in-place and include an on-site nonresidential property use restriction, a requirement to protect and maintain investigation and cleanup wells and systems, a (municipal) prohibition on the installation or use of drinking water or groundwater extraction wells, a restriction against the relocation of contaminated soil on the property except under an EPA/MDEQ-approved soil management plan, a requirement for vapor intrusion testing or for on-site vapor intrusion controls using Sub-Slab Depressurization (SSD) systems for all current/future buildings, and a requirement for the maintenance or post-removal replacement of impervious surfaces at the property. A Restrictive Covenant (RC) was reviewed and approved by MDEQ and EPA then recorded with the Lenawee County Register of Deeds on September 27, 2016. The RC is enforceable under Part 111, Hazardous Waste Management, Michigan Compiled Laws (MCL) 324.11101 *et seq.* (Part 111) and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101 *et seq.* (Part 201) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.11101, *et seq.*, (Part 111) and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101, *et seq.*, (Part 201) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.101, *et seq.*, and the administrative rules promulgated pursuant to those Parts, MAC R 299.9101, *et seq.*, and MAC R 299.5101, *et seq.*, and the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 United States Code (U.S.C.) §§ 6901, *et seq.*, and will ensure continued protection of human health and the environment. In addition, a municipal groundwater use restriction (Ordinance #4-11) was recorded with the Lenawee County Register of Deeds on September 21, 2017, which prohibits the use or installation of private water wells within a defined area of the City of Tecumseh.

- *Financial Assurance - Provide funds to complete the remedy including long-term O&M.*

The total estimated cost of EPA’s proposed remedy is approximately \$5,441,650.00. Financial assurance is required to ensure that the proposed remedy can be implemented over its expected lifetime of 15 years. The facility owner will provide updated cost estimates for implementation of remedies and unless additional costs are determined to be necessary, Financial Assurance will be maintained at the current level until EPA

determines that the on-site and off-site cleanup objectives have been met, and will include up to 55 years of periodic, long-term, MNA monitoring.

- *Operations & Maintenance, Annual Certifications and Five-Year Remedy Reviews - Implemented to verify effective site controls and evaluate the remedy if needed.*

An Operations and Maintenance (O&M) plan will need to be developed for monitoring remedial system components, including the groundwater treatment systems, SVE systems, and SSD systems. Quarterly performance reporting will be performed for a minimum of two years following system start-up. Reporting frequency may be reduced after conditions appear to be stable for all media, to a frequency not less than annually, and will document that existing engineering and institutional controls remain in-place and are preventing exposure. Periodic (5-year) remedy reviews will be conducted and the results will be used to evaluate reductions in chemical concentrations, the success of MNA, remedy efficacy, and to adjust the conceptual site model (CSM) if necessary.

FACILITY BACKGROUND

Location and History

The former TPC Facility contains large number of interconnected buildings/building additions that are in the process of being demolished; operations once occupied approximately 750,000 square feet on approximately 53 acres of land. The Facility address is 100 East Patterson Street, Tecumseh, Michigan located in Lenawee County (Appendix 2, Figure 1). The land is zoned as Industrial. The Facility property is bounded on the west by Evans Street and a manufacturing building located south of a residential area. To the north is Patterson Street, followed by Industrial/Commercial Properties and residences that pre-dated the industrial zoning. To the east are miscellaneous commercial/light industrial properties and residences that pre-dated industrial zoning, followed by a wetland and the River Raisin. To the south of the Facility is a commercial warehouse and fire station, in addition to other properties that are zoned as industrial. This area as described is considered the area subject to RCRA and will be referred to as the Facility.

The Tecumseh Compressor Company (Tecumseh Products Company, Inc.) Facility was acquired by TPC in 1934. The Facility was originally used to produce automotive parts, refrigeration systems, small tools and toys, and later for reconditioning compressors and condensing units for refrigeration and air conditioning units. Prior to TPC's acquisition of the property, portions had originally been developed by various industrial users by the late 1800s, including foundries and fence and wire manufacturers. Significant manufacturing processes previously conducted by TPC at the Facility included parts degreasing, unit assembly, paint preparation, unit painting, unit reconditioning and shipping and receiving, including use of an on-site rail spur until the 1960s. Manufacturing operations ceased at the Facility in June 2008, and it was sold in 2010.

TPC has owned the property since 1934, though past industrial owners have operated on the property, including Tiffany Iron Works (iron foundry); Heesen Brothers and Company (feed cookers, hog rings and hollowware); Carson Foundry and Manufacturing/Bruce Manufacturing (job castings and food cookers); Anthony Fence Company/American Steel and Wire Company (steel wire and woven wire fencing); and H. Brewer Company (concrete mixers and general foundry products). During TPC's operation, the uses of the Facility have not changed significantly, other than changes in some product lines, several episodes of facility expansion, and various levels of development until June 2008.

Materials Used and Wastes Generated

The predominant wastes generated by the former TPC Facility include solvent distillation sludge (F001), spent mineral spirits (D001), paint waste (D007), waste oil (F002), scrap metal and fines, iron phosphate, and citric acid solution. Past Facility operations reportedly included the use of trichloroethene (TCE) in the degreasing process, until the company switched to the use of 1,1,1-trichloroethane (1,1,1-TCA) along with water-based solvents. The wastes were generated during the manufacturing and rebuilding of compressor and refrigeration units and were stored in a former Spent Solvent Storage Tank and a Hazardous Waste Drum Storage Area (both decommissioned in 1979), in addition to less than 90-day accumulation areas and Waste Oil Storage Tanks. After closure of the Spent Solvent Storage Tank and Hazardous Waste Drum Storage Area in 1979 (officially "RCRA closed" in 1982), RCRA hazardous wastes were temporarily stored in containers in drum storage areas and removed off-site to a RCRA-permitted treatment facility within 90 days of generation.

Wastewater treatment was performed at two locations at the Facility; one within the west-central portion of the main building, and another at a newer Wastewater Treatment System built in 1994 and located in a separate building east of the main building. These systems treated process wastewater that contained suspended solids, water-based cleaning compounds, coolants, and a trace amount of oil and solvents. Wastes generated included filter cake from water filtration, solids from the settling process, and residual oil that was skimmed off and managed with all other waste oil generated at the Facility (solvent waste code F002). Treated wastewater was discharged to the City of Tecumseh publicly-owned treatment works (POTW).

Waste citric acid and iron phosphate solutions were generated during the cleaning and priming of the units prior to the painting process. The two waste streams were collected in 55-gallon drums and emptied into the Wastewater Treatment System.

Paint waste was generated from the cleaning of paint areas, which included the scraping of paint from the sides of the paint conveyor system. Such waste was accumulated in 55-gallon drums and stored at a Paint Waste Accumulation Area and transferred to the Hazardous Waste Drum Storage Area before pick-up for treatment and disposal.

A Distillation Solvent Recovery System located in the far southeastern portion of the building was used to distill spent 1,1,1-TCA from two vapor degreasers. The vapor degreasers were used to clean motors and parts before unit assembly. Clean solvent was recycled back into the vapor degreasers and sludge from the distillation of the spent 1,1,1-TCA was stored in the Hazardous Waste Drum Storage Area before off-site disposal. Prior to use of the recovery system, TPC managed spent 1,1,1-TCA in the former hazardous waste storage tank.

Waste oil was generated during the following operations: maintenance of plant machinery; drainage of oil from compressors and motors, and removal of oil from the skimmers that operated as a part of the Wastewater Treatment System. Maintenance of machinery as a part of site operations generated waste hydraulic oil. Waste oil was collected in the 6,000-gallon Waste Oil Storage Tank.

Metal fines and scrap metal were generated during the machining process and replacement of worn parts. These were collected and placed in Scrap Metal Bins in various areas before being sold to foundries or recycling facilities.

Historical Facility records indicated that at least 18 underground storage tanks (USTs) were present at the site. Fifteen of the USTs were listed in the MDEQ UST database, and ranged in size from 6,000 to 20,000 gallons; the USTs were used for storage of lubricating oils, lap oil, kerosene, used oil, fuel oil, and hazardous substances. The USTs, were installed between 1946 and 1970, and were located immediately west of the central part of the building. Three of the tanks were abandoned in place, and the remaining tanks were removed from the ground between July 1990 and November 1990. In addition, three tanks that were not in the MDEQ UST database were identified, including a two-compartment, 20,000-gallon tank located beneath the floor of the former wastewater treatment area which reportedly had been pumped out and filled with sand in 1990, and two additional USTs (a 20,000-gallon quench oil tank and a 6,000-gallon alcohol tank) that were removed in November 1987.

Site Geology and Hydrogeology

The Facility geology consists of a series of unconsolidated glacial deposits, predominantly gravel and sand with areas of silt and clay overlying Mississippian age shales. Soil at the Facility consists of a surficial silty/sandy clay interval ranging from 3 to 7 feet thick, underlain by unconsolidated fine to coarse sand and gravel to depths ranging from approximately 25 to 50 feet below ground surface (ft bgs) or more, depending upon the location and site topography, which dips sharply to the east towards the River Raisin. A continuous clay layer that is a minimum of 5 feet thick is present below the sand and gravel deposits, serving as an aquitard for the shallow groundwater aquifer. Well logs from borings in other areas of Tecumseh indicate that alternating layers of sand and clays can be present to depths of 200 ft bgs. Information has not been collected regarding the stratigraphy at deeper depths at the Facility. The bedrock underlying Lenawee County is expected to be the Coldwater Shale, which is reportedly first encountered at depths of between 100 to 250 feet.

The shallow groundwater unit is present at a depth ranging from approximately 5 ft bgs to more than 30 ft bgs within the sand and gravel unit, which reaches a depth of approximately 63 ft bgs northeast of the site. Investigation work indicates the water-bearing sand unit has an approximate hydraulic conductivity (K) of 1×10^{-2} centimeters per second (cm/s), but significant variations in K values occur due to the distribution of gravel or silt within the sand. The deeper clay layer has a K value of approximately 1×10^{-8} cm/s. The horizontal hydraulic gradient of the water table on-site is approximately 0.001 ft/ft, but is much higher near the eastern perimeter of the site, where the elevation further east of the site decreases significantly towards the River Raisin. The vertical hydraulic gradient of the site is essentially neutral, but a significant vertical downward gradient (-0.68 ft/ft) exists in the upper sand/gravel aquifer east/southeast of the site. Groundwater flows east across the Facility with a calculated groundwater flow velocity of approximately 30 feet per year.

Several shallow private water supply wells within the area subject to the groundwater ordinance were previously decommissioned by TPC. Water for the majority of the City of Tecumseh, including the area of the groundwater ordinance, comes from public water supply wells. The city well fields are located within 0.3 miles west (upgradient) of the Facility and much further north of the Facility. The well field west of the TPC Facility is positioned within the shallow, unconsolidated sand and gravel aquifer, and monitoring wells near the western property boundary have shown marginal or no contamination is present.

Surface Water

The nearest surface water feature is the River Raisin, located distances ranging from approximately 1,500 feet to 2,500 feet east of the Facility (Appendix 2, Figure 1).

Regulatory History and Corrective Action Background

TPC first submitted a Federal RCRA Part A permit application with EPA on March 17, 1981, to allow for container (S01) and tank (S02) storage of solvent wastes (F002 and F017). On June 10, 1982, EPA granted TPC interim status for the container storage and the tank storage areas. The permit allowed for tank storage of 2,500 gallons of hazardous waste and storage of up to 5,500 gallons (100 drums) of hazardous waste in containers.

On June 21, 1982, TPC submitted a closure plan for its container storage and 2,500-gallon spent solvent storage tank. EPA approved the closure plan, with final closure contingent on the submittal of a certification of closure for the storage tank. To satisfy EPA's October 18, 1982 conditional approval, a certificate of closure for the storage tank was submitted by McNamee, Porter, and Seeley Consulting Engineers on TPC's behalf on November 12, 1982. At that time, TPC became regulated as a generator of hazardous waste with less-than-90-day storage until 2008, when the plant closed.

Under the RCRA statute, the Interim Status Hazardous Waste Storage Facility owned by TPC remained subject to corrective action requirements for releases of hazardous wastes or constituents from any location where process wastes were stored, treated, disposed or routinely and systematically accumulated or released. Although such wastes may not meet the regulatory definition of RCRA hazardous wastes, they fall under the broader statutory definition of RCRA solid wastes. Locations where these wastes were managed or accumulated are defined as Solid Waste Management Units (SWMUs).

In 1993, EPA and its contractors performed a file review (Preliminary Assessment) and site visit (Visual Site Inspection), or PA/VSI, to identify SWMUs at the Facility and evaluate each for evidence of releases or the potential to release hazardous constituents. The PA/VSI identified the following 12 SWMUs at the Facility. These SWMUs are identified on Figure 2 in Appendix 2.

SWMUs:

1. Wastewater Treatment System
2. Metal Solids Bin
3. Underground Wastewater Storage Tanks
4. Final Holding Tank
5. Distillation Solvent Recovery System
6. Hazardous Waste Drum Storage Area
7. Citric Acid and Iron Phosphate Solution Accumulation Area
8. Scrap Metal Bins
9. Paint Waste Accumulation Area
10. Former Spent Solvent Storage Tank
11. Waste Oil Storage Tank
12. Metal Fines Storage

The PA/VSI indicated that no evidence of a release was visible at any of the SWMUs at the time of inspection.

EPA began working with TPC in 2009 when TPC was negotiating the sale of the property. TPC approached MDEQ to discuss entering the Part 201 program to address contamination identified at the Facility and subsequently negotiated a RCRA 3008(h) Administrative Order on Consent signed March 29, 2010 with EPA as the project lead. The main goals were to protect the community from potential exposures that could affect human health, establish control of the migration of contaminated groundwater off-site, and to conduct investigations and identify the corrective actions necessary under RCRA to allow for the reuse of the property by the new owner.

INVESTIGATIONS AND RISK ASSESSMENT

Industrial process wastes from manufacturing operations at the facility have been released into on-site soil and have leached to groundwater. Results included in a 2012 Remedial Investigation

and Groundwater Environmental Indicator Report and supplemental investigations conducted by TPC indicate that VOCs, including trichloroethene (TCE), PCE, 1,1,1-trichloroethane (1,1,1-TCA), cis-1,2-dichloroethene (cis-DCE), trans-1,2-dichloroethene (trans-DCE), xylene, and vinyl chloride (among others) are the primary COCs in the soil (from about 0 to 20 feet below ground surface, ft bgs). Based on their distribution and elevated concentrations, those VOCs are also considered the primary COCs in groundwater at the facility. Analysis of groundwater samples taken upgradient to the west of the Facility indicate that the contamination has not adversely impacted groundwater quality beyond the immediate area of the property line. However, downgradient to the east, groundwater contamination extends off-site in two directions at distances of up to 2,500 feet then discharges to the River Raisin. This is explained in more detail in the *Investigation Results* section of this SB.

To develop a Conceptual Site Model (CSM) of potential exposure of human and ecological receptors to contamination from the SWMUs, EPA and TPC evaluated the scenarios listed in Table 1, below:

**Table 1: Potential Human Receptors and Exposure Pathways
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Receptor	Pathways for Exposure
ON-SITE	
Routine Outdoor Workers	Inhalation of soil contaminants via volatilization to ambient air; Direct contact with surface soil; Inhalation of soil particulates and fugitive dust.
Routine Indoor Workers	Inhalation of volatile contaminants in indoor air (vapor intrusion); Hypothetical groundwater ingestion.
Non-Routine Outdoor Workers	Direct contact with groundwater (AOC-1 only); Inhalation of soil contaminants via volatilization to ambient air; Direct contact with surface soil; Inhalation of soil particulates and fugitive dust.
On-Site Environmental Workers	Direct contact with surface and sub-surface soils; Inhalation of soil contaminants via volatilization to ambient air; Inhalation of soil particulates and fugitive dust; and Direct contact with groundwater.
Trespassers	Inhalation of soil contaminants via volatilization to ambient air; Direct contact with surface soil; Inhalation of soil particulates and fugitive dust.
OFF-SITE	
Routine Outdoor Workers	Inhalation of soil ¹ contaminants via volatilization to ambient air; Direct contact with surface soil ¹ ; Inhalation of soil ¹ particulates and fugitive dust.
Routine Indoor Workers	Inhalation of volatile contaminants in indoor air (vapor intrusion); Hypothetical groundwater ingestion.
Non-Routine Outdoor Workers	Inhalation of soil ¹ and groundwater contaminants via volatilization to ambient air; Direct contact with surface soil ¹ and groundwater; Inhalation of soil ¹ particulates and fugitive dust.
Environmental Workers	Direct contact with surface ¹ and sub-surface soils; Inhalation of soil ¹ and groundwater contaminants via volatilization to ambient air; Inhalation of soil ¹ particulates and fugitive dust; and Direct contact with groundwater.

Receptor	Pathways for Exposure
Residents	Inhalation of volatile contaminants in indoor air (vapor intrusion); Inhalation of soil ¹ contaminants via volatilization to ambient air; Direct contact with surface soil ¹ ; Inhalation of soil ¹ particulates and fugitive dust; Hypothetical groundwater ingestion.
Recreational Users	Inhalation of soil ¹ and groundwater contaminants via volatilization to ambient air; Direct contact with surface soil ¹ and surface water; Inhalation of soil ¹ particulates and fugitive dust.

¹ Exposure is hypothetical; no off-site data exists for surface or subsurface soil. Off-site soil impacts would only be related to soils in contact with contaminated groundwater at depth.

The risk assumptions for this Facility were evaluated based on the Facility’s prior status as manufacturer, and its anticipated use for light industrial/commercial purposes in the foreseeable future. Much of the area where contamination is present is covered by the plant building or low-permeability pavement which prevents infiltration of precipitation and mobilization of contaminants into groundwater. Some of the areas were/are being addressed by implementing active Interim Measures, including operation of a permeable reactive barrier (PRB), an SVE system, and excavation/disposal.

Institutional controls previously developed and implemented for the Facility include a nonresidential deed restriction, a prohibition on the on-site use or installation of drinking water or groundwater extraction wells (except those related to cleanup), a prohibition on the relocation of contaminated soils onsite (except as allowed under Section 324.20120c of Michigan’s Natural Resources and Environmental Protection Act), a prohibition on future permitting for treatment, storage, or disposal of hazardous wastes onsite, a requirement to complete a Soil Management Plan to be submitted for EPA’s review before completing excavations in areas on high contamination, a requirement to maintain or reinstall and maintain impervious surfaces where required for operation of cleanup systems, a prohibition on installation of storm water detention basins, and a requirement to address vapor intrusion in on-site buildings (through testing/sampling of contaminants in the subsurface or installation of engineering controls to prevent vapor intrusion).

A soil management plan still needs to be developed to prevent the distribution of contaminated soil into areas with lower levels of contaminant impacts in soil during future excavation. Impervious barriers that are used as part of the final remedy (including those related to soil vapor management) will need to be surveyed, with the use of such barriers to eliminate exposure pathways recorded as amendments to the Restrictive Covenant to prevent damage to the barriers, and ensure long-term operations and maintenance of barriers until cleanup objectives are achieved. Any modifications to these current and proposed future restrictions will require EPA’s reevaluation of exposure scenarios and/or approval as additional corrective measures.

EPA also evaluated the potential for exposure of on-site workers and off-site residents to vapor-phase contaminants via inhalation of volatile contaminants which could migrate to indoor air from a source beneath the buildings; or from volatile contaminants migrating out of shallow groundwater beneath off-site residential buildings (vapor intrusion pathways). Data from

monitoring wells both at the Facility and off-site showed that concentrations of certain VOCs in groundwater exceeded the EPA's vapor intrusion screening levels (VISLs) and therefore, the *potential* migration of VOCs from groundwater to indoor air represented a *potential* health risk concern. However, contaminant concentrations in indoor air samples in most of areas tested were below the current screening levels. For those properties where indoor air concentrations were above the screening criteria, or where individual residents preferred additional protections, the risks of exposure by vapor intrusion was further reduced by installing SSD Systems.

The ground surface is covered by structures, concrete, asphalt, or grass. No potentially endangered ecosystems have been identified within the Facility boundaries. As a result, there are no potential risks to endangered ecosystems on-site. Off-site, 1,500 feet to 2,500 feet to the east, is a wetland adjacent to the River Raisin. The potential for recreational exposure via direct contact or inhalation of volatiles or particulates from soil, or direct contact and incidental ingestion of contaminated surface water exist, based on concentrations near those screening criteria in the wetland area. Threats to the wetland have been confirmed based on water sample results with concentrations above MDEQ's default Groundwater-Surface Water Interface (GSI) criteria, which are derived from potential exposure to sensitive taxa and aquatic organisms.

Health Risk Screening Levels

To evaluate the health risk significance of soil and groundwater contamination at the Facility, EPA and TPC's consultants used default, pathway-specific Site Screening Levels (SSLs) for the chemical compounds used in manufacturing and their byproducts. This evaluation focused on the location of the Facility, area land use, and potential pathways of human exposure to contaminants according to EPA guidance. EPA requires that the screening criteria for each SSL have an allowable risk threshold, with a non-cancer Hazard Index (HI) of 1 or lower and a Cumulative Site-Related Cancer Risk (CSCR) of 1×10^{-5} or lower (i.e., 1 in 100,000). The default screening levels used in the evaluation of contaminant data at TPC meet these criteria.

Published sources that were used to select SSLs include:

- EPA Regional Screening Levels (RSLs) for groundwater and on-site worker and trespasser soil exposure scenarios.
- EPA Maximum Contaminant Levels (Federal regulatory standards for drinking water including groundwater used as drinking water).
- Michigan DEQ Part 201 Generic Criteria.
- Michigan Department of Environmental Quality Criteria for evaluating migration of volatile groundwater contaminants to indoor air at non-residential buildings.
- Michigan Department of Environmental Quality Criteria for evaluating migration of volatile soil contaminants to indoor air at non-residential buildings.
- Michigan Department of Environmental Quality Indoor Air Screening Levels for the Vapor Intrusion Pathway.

The screening criteria that were used for investigation of the TPC facility are listed in Tables 2-4 that follow.

**Table 2: Soil Screening Level (SL) Criteria for TPC Risk Assessment
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Soil Direct Contact SL for On-Site Worker or Trespasser (mg/kg)	Groundwater Protection SL for Soil (mg/kg)	Vapor Intrusion SL for Soil (mg/kg)
Organic Contaminants			
1,1-Dichloroethane	160	0.0078	7.3
1,1-Dichloroethene	3.7	0.10	1.2
Cis-1,2-Dichloroethene	9.3	0.011	0.17
Trans-1,2-Dichloroethene	72	0.11	0.76
Ethylbenzene	41	0.017	4.0
Naphthalene	24	0.0054	8.9
Tetrachloroethene	45	0.051	1.0
Toluene	3300	0.76	169
1,1,1-Trichloroethane	4000	2.8	66.6
Trichloroethene	1.4	0.0018	0.05
1,2,4-Trimethylbenzene	27	0.034	5.9
Vinyl Chloride	2.2	0.000065	0.04
Xylenes	580	0.19	4.9
Inorganic Contaminants			
Arsenic	7.6	4.6	NA
Barium	37,000	13,000	NA
Cadmium	550	6	NA
Chromium	2,500	30	NA
Lead	400	700	NA
Selenium	2,600	4.0	NA
Zinc	1,700	2,400	NA

SL = Screening Level Concentrations (EPA Regional Screening Levels or Michigan DEQ Part 201 Generic Criteria). Criteria for soil are expressed in milligrams per kilogram (mg/kg).
NA = Not Available; No Criteria Available for this constituent.

**Table 3: Groundwater Screening Level (SL) Criteria for TPC Risk Assessment
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	SL for Groundwater* (ug/L)	Vapor Intrusion SL for Groundwater (ug/L)	GSI/Surface Water Protection SL ¹ (ug/L)
Organic Contaminants			
Benzene	4.6	140	200

Detected Contaminant/COC	SL for Groundwater* (ug/L)	Vapor Intrusion SL for Groundwater (ug/L)	GSI/Surface Water Protection SL ¹ (ug/L)
Chloroethane	760	180,000	1100
Chloroform	2.2	720	350
1,1-Dichloroethane	7.0	1600	130
1,1-Dichloroethene	7.0	1600	130
Cis-1,2-Dichloroethene	36	350	620
Trans-1,2-Dichloroethene	100	1500	1500
1,4-Dioxane	4.6	29,000	2800
Ethylbenzene	15	2600	18
Tetrachloroethene	5.0	460	60
Toluene	790	150,000	270
1,1,1-Trichloroethane	200	71,000	89
Trichloroethene	2.8	41	200
1,2,4-Trimethylbenzene	15	7,300	17
Vinyl Chloride	0.19	52	13
Xylenes	190	10,000	41

SL = Screening Level Concentration (EPA Regional Screening Levels or Michigan DEQ Generic Criteria).

Criteria for groundwater are expressed in micrograms per liter (ug/L).

* Assumes groundwater could be used as drinking water.

¹ Based on Levels Protective of Receptors/Pathways at the Wetland (MDEQ default GSI criteria and cleanup goal).

**Table 4: Vapor Phase Screening Level (SL) Criteria for TPC Risk Assessment
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Indoor Air SL (ppbv)	Sub-Slab Soil Gas SL (ppbv)	Deep Soil Gas SL (ppbv)
Organic Contaminants			
1,1-Dichloroethane	510	69,000	690,000
1,2-Dichloroethane	1.2	160	1,600
1,1-Dichloroethene	210	28,000	280,000
Cis-1,2-Dichloroethene	7.3	980	9,800
Trans-1,2-Dichloroethene	73	9,800	98,000
Tetrachloroethene	25	3,300	33,00
1,1,1-Trichloroethane	4,600	610,000	6,100,000
Trichloroethene	1.5	210	2,100
Vinyl Chloride	12	1,500	15,000

SL = Screening Level Concentrations (EPA Regional Screening Levels or Michigan DEQ Generic Criteria).

Criteria for vapor phase expressed in parts per billion volume (ppbv).

SL Criteria are from the EPA Vapor Intrusion Screening Levels Calculator or MDEQ Guidance for the Vapor Intrusion Pathway.

Investigations Conducted

EPA conducted a Preliminary Review/Visual Site Inspection (PA/VSI) at the Facility in 1993, during which 12 SWMUs were identified. During an investigation of the Facility related to its potential sale which was performed between December 2008 and January 2009, contamination was identified and TPC approached MDEQ and EPA about addressing the contamination. Under an Administrative Order on Consent (AOC) (RCRA-05-2010-0012), TPC sampled and analyzed the soil, soil gas, and groundwater throughout the Facility and assessed soil gas, storm water, surface water, and groundwater off-site. TPC targeted the known SWMUs and incidental site-wide releases to delineate the extent of the contamination. The work was performed in multiple phases, and the results are in reports including but not limited to:

- *Current Conditions Report*, dated September 21, 2009.
- *Current Human Exposures Under Control Environmental Indicator Report*, dated September 29, 2011.
- *Remedial Investigation and Groundwater Environmental Indicator Report*, dated September 28, 2012.
- *Second Quarter 2013 Progress Report*, dated July 15, 2013.
- *Supplement to the Current Human Exposures Environmental Indicator Report and Proposed Extension Pursuant to Paragraph 21 of the AOC*, dated September 30, 2013.
- *Summary of 2014 Passive Soil Gas Survey Activities*, dated June 18, 2014.
- *Third Quarter 2014 Progress Report*, dated October 15, 2014.
- *MIP Investigation Report and Workplan for High Resolution Site Characterization (Revision 2)*, dated April 30, 2015.
- *Supplement to Remedial Investigation and Environmental Indicator Report (Migration of Contaminated Groundwater Under Control)*, dated July 31, 2015.
- *Third Quarter 2015 Progress Report (including 2015 High Resolution Site Characterization Report and Updated Conceptual Site Model)*, dated October 15, 2015.
- *Revised Corrective Measures Proposal*, dated March 6, 2017.
- *Second Quarter 2017 Progress Report*, dated July 17, 2017.
- *Groundwater-Surface Water Interface Performance Monitoring Plan*, revised February 22, 2018.

TPC installed a network of approximately 288 temporary soil borings (soil borings, source area borings, Geoprobe™ borings, and MIP confirmation borings), 66 MIP borings, 76 permanent groundwater monitoring wells, 26 Soil Gas locations, and 19 PRB wells. These investigative borings and monitoring wells were installed near SWMUs and process areas, at property boundaries, and off-site (Appendix 2, Figures 1 and 2). Temporary borings and MIP borings were sampled once, and permanent groundwater wells, PRB wells and soil gas points have been sampled for consecutive years from the date of installation (2008-2016) through the present.

The results of the soil investigations are summarized in Table F1 in Appendix F of the CMP (VOCs only). Figures 14, 16, 17 and 18 of the CMP depict the generalized distribution of VOC contamination in the vadose zone soils. Soil sample analytical results for other contaminants were included as tables in the Current Conditions Report. The results of the groundwater investigations are summarized in various tables provided in Quarterly reports, and select VOC data is summarized in Tables F2 through F6 in Appendix F of the CMP. Figures 8, 9, 15, and 19 through 23 of the CMP depict the distribution of groundwater contamination.

A summary of constituents detected in soil, groundwater, and vapor phase at levels above the respective screening criteria is shown in Tables 5-7 on the pages that follow.

Table 5: Constituents of Concern Detected Above Screening Level Criteria in Soil Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Range of Detected Concentrations (mg/kg)	Screening Level Criteria Exceeded from Table 2	Evaluation of Health Risk or Remedial Response
Organic Contaminants			
1,1-Dichloroethane	0.037 - 0.75	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
1,1-Dichloroethene	0.24 - 0.36	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Cis-1,2-Dichloroethene	0.031 - 27	Soil Direct Contact, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Trans-1,2-Dichloroethene	0.04 - 0.62	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Ethylbenzene	0.058 - 1.3	Groundwater Protection	Install SVE systems and RC to prevent Groundwater use
Naphthalene	0.31 - 14	Groundwater Protection and Vapor Intrusion	Install SVE systems and RC to prevent Groundwater use
Tetrachloroethene	0.032 - 520	Soil Direct Contact, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems and RC to prevent Groundwater use
Toluene	0.086 - 0.92	Groundwater Protection	Install SVE systems and RC to prevent Groundwater use
1,1,1-Trichloroethane	0.033 - 17	Groundwater Protection	Install SVE systems, Maintain concrete slabs, and RC to prevent Groundwater use.
Trichloroethene	0.038 - 140	Soil Direct Contact, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems and RC to prevent Groundwater use
1,2,4-Trimethylbenzene	0.037 - 34	Soil Direct Contact, Groundwater Protection and Vapor Intrusion	Soil Excavation, Install SVE systems and RC to prevent Groundwater use
Vinyl Chloride	0.041 - 0.55	Groundwater Protection and Vapor Intrusion	Install SVE systems and RC to prevent Groundwater use
Xylenes	0.22 - 9.4	Groundwater Protection and Vapor Intrusion	Install SVE systems and RC to prevent Groundwater use
Inorganic Contaminants			
Arsenic	5.6 - 8.3	Groundwater Protection	RC to prevent Groundwater use
Barium	130 - 260	None	

Detected Contaminant/COC	Range of Detected Concentrations (mg/kg)	Screening Level Criteria Exceeded from Table 2	Evaluation of Health Risk or Remedial Response
Cadmium	0.22 - 9	Groundwater Protection	RC to prevent Groundwater use
Chromium	6.8 - 24	None	
Lead	27 - 140	None	
Selenium	1.2 - 1.8	None	
Zinc	160 - 260	None	

Detections in soil are expressed in milligrams per kilogram (mg/kg).

SVE = Soil Vapor Extraction system.

RC = Restrictive Covenant.

Table 6: Constituents of Concern Detected Above Screening Level Criteria in Groundwater Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Range of Detected Concentrations (ug/L)	Screening Level Criteria Exceeded from Table 3	Evaluation of Health Risk or Remedial Response
Organic Contaminants			
Benzene	1 - 9	Groundwater Use	RC to prevent Groundwater use
Chloroethane	5 - 43	None	
Chloroform	1.1 - 3	Groundwater Use	RC to prevent Groundwater use
1,1-Dichloroethane	3 - 280	Groundwater Use & GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
1,1-Dichloroethene	2 - 920	Groundwater Use & GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Cis-1,2-Dichloroethene	1 – 8,300	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Trans-1,2-Dichloroethene	1 - 270	Groundwater Use	RC to prevent Groundwater use
1,4-Dioxane	1.5 - 1.7	None	
Ethylbenzene	0.5 - 3	None	
Tetrachloroethene	0.9 - 76,000	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable Reactive Barriers and/or In-Situ Bioremediation to reduce concentrations
Toluene	3 - 62	None	
1,1,1-Trichloroethane	1.4 – 8,500	Groundwater Use and GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Trichloroethene	3.0 - 12,000	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable

Detected Contaminant/COC	Range of Detected Concentrations (ug/L)	Screening Level Criteria Exceeded from Table 3	Evaluation of Health Risk or Remedial Response
			Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
1,2,4-Trimethylbenzene	4.0 - 64	Groundwater Use and GSI/Surface Water Protection	RC to prevent Groundwater use, Install Permeable Reactive Barriers and/or In-Situ Bioremediation to reduce concentrations
Vinyl Chloride	1.8 – 1,900	Groundwater Use, Vapor Intrusion & GSI/Surface Water Protection	RC to prevent Groundwater use, Perform soil gas sampling to determine need for SSD system to protect building occupants, Install Permeable Reactive Barriers, Maintain concrete slabs, and/or In-Situ Bioremediation to reduce concentrations
Xylenes	ND	None	

Detections in groundwater are expressed in micrograms per liter (ug/L).

RC = Restrictive Covenant.

SSD = Sub Slab Depressurization system.

ND = The concentration of this constituent was below the analytical reporting limit in all samples.

Table 7: Constituents of Concern Detected Above Screening Level Criteria in Vapor Phase, Former Tecumseh Products Company Facility, Tecumseh, Michigan

Detected Contaminant/COC	Range of Detected Concentrations in Indoor Air (ppbv)	Range of Detected Concentrations in Sub-Slab Soil Gas (ppbv)	Range of Detected Concentrations in Deep Soil Gas (ppbv)	Screening Level Criteria Exceeded from Table 4	Evaluation of Health Risk or Remedial Response
Organic Contaminants					
1,1-Dichloroethane	ND	2.3 - 468	0.73 - 200	None	
1,2-Dichloroethane	0.65 - 1.5	17.8 - 474	1.6 to 166	SLs for Indoor Air and Sub-Slab Soil Gas	Potential for the constituent to cause unacceptable inhalation risk is addressed through installation of SVE and/or SSD Systems to protect current or future building occupants, monitoring, and groundwater treatment to reduce the generation of vapors
1,1-Dichloroethene	ND	29.9 - 4,360	2.1 - 31	None	
Cis-1,2-Dichloroethene	ND	49.3 – 1,030	1.0 - 1,300	SL for Sub-Slab Soil Gas	Potential for the constituent to cause unacceptable inhalation risk is addressed through installation of SVE and/or SSD Systems to protect current or future building occupants, monitoring, and groundwater treatment to reduce the generation of vapors
Trans-1,2-dichloroethene	ND	6.4 – 1,730	2.5 - 90.3	None	

Detected Contaminant/COC	Range of Detected Concentrations in Indoor Air (ppbv)	Range of Detected Concentrations in Sub-Slab Soil Gas (ppbv)	Range of Detected Concentrations in Deep Soil Gas (ppbv)	Screening Level Criteria Exceeded from Table 4	Evaluation of Health Risk or Remedial Response
Tetrachloroethene	0.17 -0.80	8.4 - 344	0.77 - 5,400	None	
1,1,1-Trichloroethane	2.5 - 19.2	13.0 – 436,000	0.81 - 12,000	None	
Trichloroethene	2.2 - 19.8	25.9 – 118,000	1.1 – 110,000	SLs for Indoor Air and Sub-Slab and Deep Soil Gas	Potential for the constituent to cause unacceptable inhalation risk is addressed through installation of SVE and/or SSD Systems to protect current or future building occupants, monitoring, and groundwater treatment to reduce the generation of vapors
Vinyl Chloride	ND	ND	1.0 – 3.3	None	

Detections in vapor phase expressed in parts per billion volume (ppbv).

ND = The concentration of this constituent was below the analytical reporting limit in all samples.

Investigation Results

TPC’s consultants obtained and analyzed numerous soil samples at each SWMU and throughout the Facility to delineate the lateral and vertical extent of contaminant concentrations and to compare to the site risk-based screening levels. TPC’s soil investigation targeted known process areas, and areas identified as impacted through passive soil gas surveys (Appendix 2, Figures 3 through 5) and MIP investigations (Appendix 2, Figures 6 and 7). TPC assessed and delineated groundwater contamination through the installation of temporary borings, permanent groundwater wells, MIP sampling, and high-resolution site characterization (HRSC) groundwater sampling (Appendix 2, Figures 8 through 12) both on-site and off-site. Based on the soil and groundwater results, TPC also performed sampling to determine contaminant levels in soil gas, indoor air, sediment pore water, and surface water in areas where the potential for impacts to those media were identified.

In 2009, investigation results identified contamination on-site and at the property lines. TPC identified the primary COCs, which included chlorinated hydrocarbon solvents and degradation products that were used in TPC’s past operations, specifically, 1,1,1-TCA, TCE, cis-1,2-DCE, PCE and vinyl chloride. Semivolatile organic compounds (SVOCs) and metals were also present, but not at significantly elevated levels. Additional investigation identified elevated levels of impacts in the following general areas:

1. The former Steam Cleaning Room, Chemical Stock Room, and Degreaser in the northern portion of the building and contained TCE levels in soil up to 140 milligrams per kilogram (mg/kg) at NS-29. Groundwater contamination is highest downgradient from

these areas near the northeast corner of the Building where TCE levels up to 12,000 micrograms per liter (ug/L) were found at SB-MIP-57. Contamination extends off-site to the northeast. TCE concentrations in soil gas up to 17,100 parts per billion volume (ppbv) were measured below the building in the area at SV-01 and as high as 1,320 ppbv at SG-05.

2. The former Wastewater Treatment System and Parts Degreaser adjacent to the central portion of the building contained TCE up to 23 mg/kg in soil at NS-34. Groundwater is only moderately contaminated, but concentrations TCE concentrations in soil gas up to 118,000 ppbv were measured in the area at SV-11.
3. The former Compressor Washer and Paint Line and SWMUs 4, 5, 7, and 9 (the Final Holding Tank, Distillation Solvent Recovery System, Citric Acid and Iron Phosphate Solution Accumulation Area, and Paint Waste Accumulation Area, respectively) in the Southern portion of the building contained 1,1,1-TCA levels in soil up to 17 mg/kg. 1,1,1-TCA and TCE in groundwater were generally within the range of 1,000-2,000 ug/L at MW-34s. TCE concentrations in soil gas up to 103,000 ppbv were measured in the area at SV-15, and up to 110,000 ppbv at SG-01.
4. The grassy area in far southeastern portion of the property contained concentrations of PCE up to 520 mg/kg in soil. This area (Soil-S4, Appendix 2, Figure 13) is considered a previously unknown Area of Concern (AOC 1). Groundwater contamination is highest at AOC 1 and extends east towards the property line where PCE up to 76,000 ug/L, and TCE up to 8,900 ug/L were identified, and continuing off-site at lower levels. Soil gas concentrations were highest at SG-2 and SG-22 where TCE in the shallow groundwater had the highest levels of contamination (Appendix 2, Figure 7).

TPC's investigation identified that contaminated groundwater was present near the River Raisin east of the southern plume, leading to the collection of pore-water samples that contained low levels of TCE degradation products (vinyl chloride, cis-DCE and trans-DCE at PW-07), and also identified direct discharges to the surface water through seeps identified in the wetland area (SP-01, SP-02, and SP-03), which extend to the River Raisin (Appendix 2, Figures 8 through 12) in small channels (rivulets).

The potential for vapor intrusion into structures located east of the property was identified early in TPC's initial investigation work. By May 2011, TPC installed a PRB to treat the contaminated shallow groundwater leaving the Facility. The intent was to treat shallow off-site groundwater and thereby minimize the potential for vapor intrusion at off-site locations. TPC's sampling of indoor air at properties east of the TPC Facility identified a home that required the installation of an SSD system to eliminate exposures through vapor intrusion. By June 2011, the City of Tecumseh had passed a Groundwater Use Ordinance, restricting the use of groundwater in the area near the former TPC Facility and within a 1-block buffer zone around the area of affected groundwater. TPC also connected properties with existing private wells within the restricted area to the municipal water supply, and abandoned 17 existing/historical private water wells identified on 24 of the 272 properties affected by the ordinance. TPC began operation of a SVE system in the northeastern P-Building of the former Facility in April 2012, expanding to

full-scale operation in October 2012, with the joint purposes of reducing the high levels of TCE found in the soil in that area, controlling the migration of soil vapors off-site, and preventing soil vapors from entering the portion of the building that was intended for reuse. By March 2014, TPC had installed and began operation of a Perimeter SVE system at the southern boundary of the property to reduce the potential for the lateral migration of VOCs in soil vapor onto the adjacent site, in addition to reducing concentrations of VOCs in the soil around southern source areas. To date, TPC's has removed approximately 700 kilograms (kg) of TCE from soils under the P-Building and approximately 220 kg of TCE, approximately 95 kg of PCE, and approximately 30 kg of 1,1,1-TCA from soil at the south perimeter of the property during operation of the SVE systems as Interim Measures (approximately 2,300 total pounds of contamination). In 2014, during evaluation of TPC's revised Human Health exposure evaluation, EPA also requested from TPC the installation of SSD systems or sampling of indoor air (depending upon the resident's wishes) at several properties located north of the TPC facility. These cumulative activities were performed as Interim Measures, which are intended to supplement the final corrective measures proposal described herein.

SUMMARY OF FACILITY RISKS

Potential Risks to Human Health

On-site human receptors who have the potential to contact contamination include environmental workers, trespassers, non-routine outdoor workers, routine outdoor workers, and routine indoor workers.

For on-site environmental workers, exposure to contamination may occur from:

- Direct contact (incidental ingestion and dermal contact) with surface and sub-surface soils;
- Inhalation of soil particulates and volatiles into ambient air; and,
- Direct contact with affected on-site groundwater via incidental ingestion and dermal contact.

For non-routine outdoor workers (one-time building construction workers, occasional excavation/maintenance workers, and redevelopment workers) exposure may occur from:

- Direct contact with surface and sub-surface soils;
- Inhalation of soil particulates and volatiles into ambient air;
- Direct contact with affected on-site groundwater via incidental ingestion and dermal contact; and,
- Inhalation of groundwater volatiles in trench air.

Routine outdoor workers (e.g., lawn service or maintenance worker) may be exposed to contamination because of:

- Direct contact with soil;
- Inhalation of soil particulates and volatiles into ambient air; and,

- Hypothetical ingestion and dermal contact with groundwater as tap water.

For Routine Indoor Workers, including occupants of future on-site commercial or industrial buildings, exposure may occur from:

- Inhalation of indoor air impacted by volatile contaminants migrating into a building from affected subsurface soils or groundwater (vapor intrusion).

A trespasser could enter the facility and be exposed to contamination by:

- Direct contact (incidental ingestion and dermal contact) with soils; and,
- Inhalation of soil particulates and volatiles into ambient air.

Surface soil risks are determined to be acceptable for all on-site receptors, except for the on-site routine worker and on-site redevelopment worker. The risk for the on-site routine worker is related to the potential for inhalation of TCE in ambient air due to volatilization from soils with TCE concentrations above a calculated cleanup objective of 27 mg/kg. The most stringent SL for this COC and pathway is 14 ppm pursuant to MDEQ's Part 201 regulations. Soil sample locations with TCE above 27 mg/kg are all located beneath the existing building slab, or were collected below the groundwater surface. The potential for exposure would increase if the existing building slab were removed. Subsurface soil does not pose risks for any receptor. As a result, direct contact (incidental ingestion and dermal contact) with surface and sub-surface soils, and inhalation of soil particulates and volatiles in ambient air represents a minimal risk at the Facility.

Groundwater risks for on-site receptors are acceptable for the construction worker volatile inhalation in trench scenario. A risk from the hypothetical ingestion of contaminated groundwater is driven by TCE, PCE, 1,1-DCE, vinyl chloride, xylenes 1,4-dioxane, and 1,1-dichloroethane; however, that risk is eliminated by the City Groundwater Ordinance, which prohibits the installation or use of groundwater on-site and within an off-site restricted area. There is a slightly elevated noncancer risk for the on-site occasional excavation/maintenance worker from dermal contact with PCE in groundwater. Safety precautions will be needed for excavation work in the southeast corner of the property at AOC-1 (if performed prior to groundwater remediation). In addition, the risk for future on-site indoor workers is unacceptable due to the potential for vapor intrusion from elevated concentrations of PCE, TCE, and vinyl chloride.

Off-site receptors who have the potential to contact affected media include environmental workers, non-routine outdoor workers, routine outdoor workers, routine indoor workers, residents, and recreational users. Of those, the most significant potential for exposure is to routine indoor workers and residents, both of which may be exposed to contamination from:

- Inhalation of indoor air impacted by vapor intrusion from affected groundwater; and,
- Hypothetical ingestion or dermal contact with groundwater as tap water or for domestic purposes.

For recreational users (outdoors), potential exposure can occur from:

- Direct contact with affected surface water via incidental ingestion and dermal contact.

Off-site surface and subsurface soil are not impacted and there are no related risks. However, unacceptable risks for off-site residents exist due to elevated concentrations of TCE, cis-DCE, and vinyl chloride in groundwater via the vapor intrusion exposure route and via the hypothetical groundwater ingestion exposure route. Risks for off-site routine workers are driven by TCE, cis-DCE, and vinyl chloride for hypothetical groundwater use, and are driven by TCE and vinyl chloride for the vapor intrusion pathway. Off-site vapor intrusion risks were further evaluated by sampling soil gas and indoor air.

A survey of existing and out-of-use wells was conducted to identify any potential users of groundwater within the area of known contamination; TPC abandoned all wells that could be located to prevent their future use. Groundwater on-site is not used, and a Groundwater Ordinance was passed to eliminate the potential for on-site and off-site workers and/or residents to ingest contaminated groundwater in the future. The closest municipal wells are located over one-quarter mile west of the Facility, at depths of between 82 and 85 feet bgs. There is no contamination in groundwater migrating off-site in the direction of the well. For these reasons, human exposure to contaminated groundwater by ingestion or direct contact is highly improbable, and the hypothetical groundwater ingestion pathway is an incomplete pathway.

To address off-site groundwater impacts that could contribute to potential vapor intrusion into off-site buildings and homes, TPC implemented quarterly soil gas monitoring. At the east side of the property, a PRB was installed to treat the shallow groundwater beyond the east property line, and create a layer of less contaminated groundwater at the water table surface that would reduce the risk of vapor intrusion. In addition, indoor air monitoring was conducted and results identified that one property required a SSD mitigation system to eliminate the vapor intrusion pathway. North of the Facility, an on-site SVE system was used to reduce the potential for the lateral migration of soil vapors off-site from the Facility. Monitoring of soil gas also occurred north and east of the property, at those properties within 100 feet of the groundwater plume having the potential to be affected by vapor intrusion pathway. Indoor air testing was performed to verify that the vapor intrusion concern was not present or, alternatively, homeowners agreed to the installation of SSD mitigation systems as presumptive remedies to eliminate the vapor intrusion pathway.

On-site engineered and institutional controls will be used to prevent human exposure while contaminated soil and groundwater is being treated. Off-site sampling will be performed to ensure conditions do not change during the treatment process.

Potential Risks to the Environment

Storm water is discharged from the Facility to the River Raisin via Patterson Street under an EPA National Pollutant Discharge Elimination System (NPDES) permit. Given the lack of viable

ecosystems on-site, there is no potential for on-site contamination to impact environmental or ecological receptors. However, contamination has been detected at unacceptable levels in groundwater which migrates beyond the Facility boundary, discharging to the River Raisin, as identified during the GSI investigation. Based on that information, EPA and MDEQ have determined that operations at the Facility have adversely impacted the ecology of the wetland adjacent to the River Raisin. Remedial measures on-site are intended to correct these adverse impacts over the long-term cleanup.

SCOPE OF CORRECTIVE ACTION

EPA's short-term goals for the Facility are:

1. Control all current human exposures to contamination at and from the Facility for which there are complete risk/exposure pathways by eliminating significant or unacceptable exposures for all media known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above risk-based levels; and,
2. Stabilize migration of contaminated groundwater at and from the Facility. The migration of all groundwater known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above acceptable levels must be stabilized to remain within any existing areas of contamination. In addition, any discharge of groundwater to surface water must not pose an unacceptable risk, or be currently acceptable according to an appropriate interim assessment of surface water.

One of EPA's short-term goals has already been achieved. On August 14, 2017, EPA determined that the Facility met the criteria for Human Exposures Under Control (CA725), superseding EPA's prior "Incomplete" determination made on October 5, 2015. The favorable determination was based on a combination of available indoor air sampling data, and the elimination of exposure pathway through SSD systems and the groundwater ordinance.

EPA determined on October 5, 2015 that the criteria for Migration of Contaminated Groundwater Under Control (CA750) had not been achieved. Achievement of a migration of contaminated groundwater under control determination for the TPC Facility is contingent upon treatment of groundwater to reduce and stabilize groundwater contaminant levels, and to eliminate unacceptable ongoing discharges to the wetland and River Raisin. Treatment of the groundwater will reduce concentrations of COCs in the groundwater, while treatment of the soil in key areas will prevent the potential for the soil to re-contaminate groundwater in the future.

EPA's long-term goals for the Facility are:

1. Protecting human health and the environment by assuring that the Facility poses no unacceptable risk; and,

2. Establishing and maintaining institutional controls.

Final corrective measures for the TPC Facility must ensure that:

1. Soil and groundwater contamination on-site will neither endanger human health nor continue to migrate off-site at levels that represent a continuing potential concern for residential vapor intrusion;
2. Contamination that has migrated off-site by transport in groundwater must be reduced in concentration so it does not endanger human health or require land use restrictions for off-site properties;
3. Institutional and engineered controls to protect human health and the environment on-site will be recorded as RCs in the property deed and will be binding on all future owners of the Facility property, to ensure that those who visit the property will be protected from unacceptable exposure to contamination, including unacceptable exposure to vapor-phase COCs in indoor air within buildings on the property in the future;
4. Construction workers who may perform excavations in areas with remaining contamination will be protected from unacceptable exposure to that contamination and will properly handle contaminated soil in accordance with applicable State and Federal regulations via a Soil Management Plan, which will be added as an amendment to the RC recorded with property deed; and,
5. Contamination is reduced to a level that promotes the natural degradation of contamination, leading to the eventual long-term restoration of the aquifer, and/or elimination of on-site vapor intrusion restrictions.

SUMMARY OF PROPOSED REMEDY COMPONENTS

Current conditions at the Facility indicate that the following exposure pathways exist: 1) hypothetical groundwater ingestion pathway (on-site and off-site); 2) the on-site non-residential vapor intrusion pathway; 3) the off-site residential vapor intrusion pathway; 4) the on-site volatilization to ambient air pathway; 5) the on-site occasional worker groundwater direct contact pathway; and 6) the on-site migration to groundwater (above off-site residential vapor intrusion) pathway. EPA has selected the following remedy components for the Facility.

Soil and Groundwater Remedies

TPC has proposed on-site remediation of soil and groundwater to address impacts above the media cleanup standards. Vapor intrusion controls will be implemented for all current/future buildings at the property in accordance with the Declaration of Restrictive Covenant recorded with the Lenawee County Register of Deeds on September 27, 2016 at Liber 2533 and Page

0341, until the on-site remediation of soil and groundwater meet the media cleanup standards. Mitigation controls will require verification sampling and analysis to document that unacceptable health risk from the exposure pathway has been eliminated, and operations and maintenance reporting will be required until the remedial activities are complete. TPC also intends to address the risk of inhalation of TCE in ambient air by using the Declaration of Restrictive Covenant to require the installation of a similarly protective barrier if the slab is ever removed from affected areas in the future. Interim remedies have been used to eliminate the risk of exposure to contamination at the Facility and in the surrounding area. The purpose of the soil treatment proposed herein is to prevent contaminants in on-site soil from leaching to the groundwater, and re-contaminating groundwater off-site at levels above the most stringent groundwater cleanup goal for vapor intrusion at residential properties, and to reduce levels of contaminants in on-site soil to below the soil cleanup goal for vapor intrusion at nonresidential properties. The purpose of the groundwater treatment proposed herein is to eventually eliminate the need for off-site mitigation systems, restrictions, or testing by achieving the most stringent groundwater media cleanup standard for vapor intrusion at residential properties. These two forms of treatment will eliminate the need for engineering or institutional controls at all off-site properties.

- EPA proposes that TPC treat soil in areas Soil-N1, Soil-N2, Soil-S1, and Soil-S3 (Appendix 2, Figure 13) in addition to the use of the existing RC as an Institutional Controls (IC) and active cleanup using Engineering Controls (ECs). EPA selected these corrective measures considering that interim corrective measures, which include the use of a SVE, are ongoing. Based on an evaluation of the options, EPA selected SVE for treatment of the areas Soil-N1, Soil-S1 and Soil-S3. Contingent on waste classification, EPA recommends either excavation and disposal or in-situ chemical oxidation as the treatment option for area Soil-N2. EPA's selections are based on effectiveness, implementability, sustainability and cost.
- EPA proposes groundwater treatment for TPC to achieve the groundwater corrective measures objectives for four general areas: North On-site, North Off-site, South On-site and South Off-site (Appendix 2, Figure 14). EPA selected these corrective measures considering that interim corrective measures, which include the PRB and SVE are ongoing and provide a complementary strategy to meet the groundwater cleanup levels. Based on an evaluation of the options, EPA recommends enhanced in-situ bioremediation for treatment of the North On-site and South On-site areas, and recommends MNA for the North Off-site and South Off-site areas. EPA's selections are based on effectiveness, implementability, sustainability and cost.
- TPC will use existing ECs and ICs to prevent on-site and off-site exposures during and after soil and groundwater remediation. TPC will provide the EPA with annual written verification that the ECs and ICs described in this Statement of Basis remain in place and are being complied with until such a time that they are no longer necessary. This will include verification with off-site property owners that SSD systems continue to be operated until groundwater cleanup levels are met, verification with the property owner

(100 E. Patterson, LLC or successors) that the requirements of the License Agreement and the New Declaration are being met, and verification with the City of Tecumseh that the Groundwater Use Ordinance remains in effect. Modifications to ECs and ICs are likely to include: 1) site restrictions with monitoring and reporting to confirm that on-site vapor intrusion requirements are being met; 2) documentation attached to the deed and included in an environmental covenant regarding the replacement of impervious surfaces used as ECs to eliminate inhalation to ambient air or other pathways, along with a restriction on future excavations in those areas that may disturb the barriers, unless with prior consent of EPA/MDEQ; and, 3) a Soil Management Plan for EPA/MDEQ approval to prevent the potential redistribution of contaminated soil to less contaminated areas during future excavation and recording the soil handling restrictions on the property deed to assure adherence to the approved Soil Management Plan.

- TPC will continue to provide Financial Assurance in the amount of \$5,441,650.00 over the expected lifetime of 15 years, unless additional costs are determined to be necessary, and will provide updated cost estimates for implementation of remedies. Financial Assurance will be maintained at the current level until EPA determines that the on-site and off-site cleanup objectives have been met, after which revisions to cost estimates will include up to 55 years of periodic, long-term, MNA monitoring from certain wells.

EPA will re-evaluate its remedy decision if the Agency learns that conditions have changed in ways which may increase risk of human and/or environmental exposure to contamination, or if any vapor intrusion investigation identifies a complete vapor intrusion pathway. If any concrete slabs or asphalt pavement is demolished or removed from the Facility, EPA will revisit the proposed RC and request modifications. If the use of the property is changed or contamination is identified that requires additional corrective measures, EPA may need to revisit the decisions made regarding the proposed remedy.

EPA developed cleanup goals to address contaminants with concentrations above the media cleanup standards for applicable exposure pathways. The cleanup goals include site-specific values developed by TPC using third-party Risk Based Corrective Action (RBCA) software and spreadsheet calculations, a Seasonal Soil Compartment (SESOIL) model for contaminant migration, and generic MDEQ Part 201 cleanup criteria. Those criteria are identified below along with the respective media and timeframe for cleanup, to identify the requirements and related controls. EPA considers these levels to be appropriate to protect the public and workers.

**Table 8: Cleanup Goals for On-Site Volatilization from Soil to Air (Routine Site Worker)
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Soil Volatilization to Ambient Air ¹ (mg/kg)	Soil Volatilization to Indoor Air ² (mg/kg)
Cis-1,2-Dichloroethene	3,360	0.17
Tetrachloroethene	559	1.0

Detected Contaminant/COC	Soil Volatilization to Ambient Air ¹ (mg/kg)	Soil Volatilization to Indoor Air ² (mg/kg)
Trichloroethene	27	0.050
1,2,4-Trimethylbenzene	348	5.9

¹ Calculated Site-Specific Cleanup Level.

² Default Screening Criteria. Site specific cleanup level is dependent upon the various parameters of buildings that have not yet been constructed; a site-specific cleanup level may be calculated in the future to determine an appropriate time for SSD system shutdown.

Cleanup levels in mg/kg (parts per million).

Refer to Table 4 of the CMP for further details.

Contaminant concentrations above the levels outlined above require appropriate controls, or cleanup, to be protective of pathway.

Primary cleanup goal for TCE

**Table 9: Cleanup Goals for On-Site Non-Residential Groundwater
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	GW Volatilization to Indoor Air ¹ (ug/l)	Drinking Water Criteria ² (ug/l)
1,1-Dichloroethane	18,000	441
1,1-Dichloroethene	42,000	7
Cis-1,2-Dichloroethene	32,000	70
Trans-1,2-Dichloroethene	36,000	100
Tetrachloroethene	1,400	5
1,1,1-Trichloroethane	71,000	200
Trichloroethene	1,100	5
Vinyl Chloride	1,100*	2
Xylenes	79,000	10,000
1,4-Dioxane	NA	25
Years to achieve	2-3	55

¹ Calculated Site-Specific Cleanup Level.

² Default Screening Criteria. Site specific cleanup level is based on hypothetical drinking water criteria for MNA demonstration. Cleanup levels in ug/l (parts per billion).

Refer to Table 5 of the CMP for further details.

* Although a cleanup goal was calculated for vapor intrusion for vinyl chloride in groundwater, vinyl chloride has been absent in soil gas samples. As a result, the cleanup goal for vinyl chloride via vapor intrusion will be the criteria for soil vapor/indoor air.

NA = Not applicable.

Contaminant concentrations above the levels outlined above require appropriate controls until the cleanup goals are achieved.

Primary cleanup goal for TCE

**Table 10: Site-Specific Cleanups Goal for Off-Site Residential Groundwater
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	GW Volatilization to Indoor Air ¹ (ug/l)	Drinking Water Criteria ² (ug/l)
1,1-Dichloroethane	4,300	205
1,1-Dichloroethene	4,700	7

Detected Contaminant/COC	GW Volatilization to Indoor Air ¹ (ug/l)	Drinking Water Criteria ² (ug/l)
Cis-1,2-Dichloroethene	3,600	70
Trans-1,2-Dichloroethene	4,000	100
Tetrachloroethene	165	5
1,1,1-Trichloroethane	17,000	200
Trichloroethene	130	5
Vinyl Chloride	NA*	2
Years to achieve	7-15	55

¹ Calculated Site-Specific Cleanup Level.

² Default Screening Criteria. Site specific cleanup level is based on hypothetical drinking water criteria for MNA demonstration. Cleanup levels in ug/l (parts per billion).

Refer to Table 6 of the CMP for further details.

* Vinyl chloride has been present in groundwater but absent in soil gas samples. As a result, the cleanup goal for vinyl chloride via vapor intrusion will be the criteria for soil vapor/indoor air.

NA = Not Applicable.

Contaminant concentrations above the levels outlined above require appropriate controls until the cleanup goals are achieved

Primary cleanup goal for TCE in off-site groundwater

**Table 11: Site-Specific Cleanup Goals for Groundwater to Surface Water
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	Recreational User Direct Contact ¹ (ug/l)	All Surface Water Receptors/Pathways² (ug/l)	All Wetland Receptors/Pathways² (ug/l)
Acetone	NA	NA	1,700
2-Butanone	NA	40,000	2,200
1,1-Dichloroethane	NA	13,000	740
1,1-Dichloroethene	198,000	2,300	130
Cis-1,2-Dichloroethene	11,600	11,000	620
Ethylbenzene	NA	320	18
Tetrachloroethene	5740	2,900	60
Toluene	NA	2,600	270
Trans-1,2-Dichloroethene	83600	28,000	1,500
1,1,1-Trichloroethane	NA	1,600	89
Trichloroethene	1,570	3,500	200
1,2,4-Trimethylbenzene	NA	310	17
Xylenes	NA	NA	49
Vinyl Chloride	263	NA	13
Years to achieve	7-15	7-15	7-15

¹ Calculated Site-Specific Cleanup Level.

² Default Screening Criteria. Site specific cleanup level is based on hypothetical drinking water criteria for MNA demonstration. Cleanup levels in ug/l (parts per billion).

Refer to Revised Table 7 of the CMP for further details.

* Vinyl chloride has been present in groundwater but absent in soil gas samples. As a result, the cleanup goal for vinyl chloride via vapor intrusion will be the criteria for soil vapor/indoor air.

NA = Not Applicable.

Contaminant concentrations above the levels outlined above require appropriate controls until the cleanup goals are achieved.

Highlighted cleanup goals are more stringent than those for vapor intrusion, and thus, represent off-site groundwater cleanup goal

**Table 12: Cleanup Goal for On-Site Soil Vapor/Indoor Air
Former Tecumseh Products Company Facility, Tecumseh, Michigan**

Detected Contaminant/COC	On-Site Indoor Air ¹ (ppbv)	Off-Site Indoor Air ¹ (ppbv)	On-site Soil Vapor ² (ppbv)	Off-site Soil Vapor ² (ppbv)
1,1-Dichloroethane	510	120	690,000	41,000
1,2-Dichloroethane	1.2	0.24	1,600	82
1,1-Dichloroethene	210	50	280,000	17,000
Cis-1,2-Dichloroethene	7.3	1.7	9,800	580
Trans-1,2-Dichloroethene	73	17	98,000	5,800
Tetrachloroethene	25	5	33,000	1,700
1,1,1-Trichloroethane	4,600	1,100	6,100,000	360,000
Trichloroethene	1.5	0.37	2,100	120
Vinyl Chloride	12	0.62	15,000*	210*

¹ Indoor Air Screening Levels taken from May 2013 MDEQ Final Guidance Document for the Vapor Intrusion Pathway.

² Default Non-Residential Deep Soil Gas Screening Levels (SGSLs) taken from May 2013 MDEQ Final Guidance Document for the Vapor Intrusion Pathway; not applicable for sub slab performance monitoring using vapor pins during the performance monitoring period.

* Vinyl chloride has been absent in soil gas samples but will be monitored during cleanup with respect to soil vapor/indoor air.

NA = Not applicable.

Contaminant concentrations above the levels outlined above require appropriate controls until the cleanup goals are achieved.

Primary cleanup goals for TCE

CRITERIA FOR EVALUATION OF THE PROPOSED REMEDY

EPA evaluates proposed corrective measures by using the following criteria:

1. Overall protection of human health and the environment;
2. Attainment of media cleanup standards;
3. Controlling the sources of releases;
4. Compliance with waste management standards;
5. Long-term reliability and effectiveness;
6. Reduction of toxicity, mobility or volume of wastes;
7. Short-term effectiveness;
8. Implementability; and
9. Cost

EVALUATION OF THE SELECTED REMEDY

The remedies proposed by TPC were evaluated against these criteria to determine whether those criteria will be sufficiently addressed, as described below.

Criteria 1 and 7 will be achieved by implementation of the proposed remedies for soil and groundwater. TPC removed contaminated soils and wastes from the facility during prior RCRA closure and interim corrective action activities. The proposed remedies will further protect human health and the environment by reducing contamination to acceptable levels and by preventing exposure to residual contamination. Short-term effectiveness will be measured through monitoring activities, and the proposed technologies been demonstrated to be effective. Therefore, these criteria will be adequately addressed.

Criteria 2, 3, and 6 will be achieved by installing the SVE systems, implementing excavation and removal of contaminated soil or in-situ treatment, and installing EISB groundwater treatment cells. These remedies will allow conditions at the former TPC to meet the criteria by reducing the volume and mobility of wastes, removing sources of contamination, and attaining media cleanup standards.

Criterion 4 will be met by a combination of past Interim Measures for closure of the Spent Solvent Storage Tank and a Hazardous Waste Drum Storage Area, and by complying with the RC, the Soil Management Plan for excavation within the areas of contaminated soil, and with State and Federal regulations related to the handling and management of wastes.

Criteria 8 will be met, since past Interim Measures at the Facility were implemented successfully and other components of the proposed remedies can be easily implemented based on their extensive history of use in environmental cleanups.

Criteria 5 and 9 are met because the remedies proposed are proven, cost-effective and implementable technologies with long-term effectiveness. The SVE system is expected to remove TCE from new target treatment areas within approximately 4 years. Results from soil samples in the area treated by the current SVE have demonstrated a reduction in contaminant levels. Excavation and disposal would achieve the criteria more rapidly, but at higher costs. EISB for groundwater treatment is also implementable, at reasonable costs, and compatible with the existing microbial degradation in both the treatment area and downgradient through recirculation cells. Maintenance of engineering barriers and adherence to a RC recorded on the property deed will effectively control risks. Monitoring will demonstrate that MNA is and will continue occurring off-site. Financial assurance will insure that the controls remain in place.

The evaluation described in this Statement of Basis demonstrates that the engineered and institutional controls prescribed by the remedy, along with past remedial efforts, will be effective in preventing further off-site releases above the media cleanup standards or other allowable exposure limits, and achieving these threshold criteria.

PUBLIC PARTICIPATION

EPA is soliciting input from the community on its proposed corrective actions for the former TPC Facility in Tecumseh, Michigan, to render the property suitable for continued non-residential use, and for off-site properties to be free from any land-use restrictions or engineering controls. EPA has scheduled a public comment period of 30 days from October 29, 2018 to November 28, 2018 to encourage public participation in the decision process. During the comment period, the public may request a public meeting to discuss the proposed remedies. The public may submit written comments, questions and requests for a public meeting to the following address:

U.S. Environmental Protection Agency, Region 5
Remediation and Reuse Branch (LU-16J)
77 West Jackson Boulevard
Chicago, IL 60604
Attention: Joseph Kelly
kelly.joseph@epa.gov
(312) 353-2111

The administrative record is available for public review at the following two locations:

Tecumseh District Library
215 N. Ottawa Street
Tecumseh, MI 49286
517-423-2238
<http://www.tecumsehlibrary.org/>
Monday – Thursday 10:00 am – 8:00 pm
Friday, Saturday 10:00 am – 5:00 pm
Sunday 1:00 pm – 5:00 pm (Oct - Apr)

and

U.S. EPA, Region 5 Records Center
77 West Jackson Boulevard
Chicago, IL 60604
Monday – Friday 8:00 am – 4:00 pm (Central Time)

After reviewing and considering the public comments it receives, EPA will summarize the comments and provide a Response to Comments document. EPA will prepare the Final Decision and Response to Comments after the conclusion of the public comment period and include it in the administrative record. Based on comments received and its own finding, EPA may make changes to the proposed corrective measures and document them in the Final Decision and Response to Comments.

APPENDIX 1

ADMINISTRATIVE RECORD INDEX

STATEMENT OF BASIS
TECUMSEH PRODUCTS COMPANY
TECUMSEH, MICHIGAN
EPA ID: MID 005 049 440

**ADMINISTRATIVE RECORD
FOR THE
TECUMSEH PRODUCTS COMPNAY SITE
TECUMSEH, LENAWEЕ COUNTY, MICHIGAN**

EPA ID NO: MID 005 049 440

STATEMENT OF BASIS

SEMS ID:

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
1	942375	2/2/82	Tecumseh Products Company	U.S. EPA	Part A Permit Application and Figures	15
2	942376	5/27/82	Tecumseh Products Company	U.S. EPA	Waste Training Contingency Plan	24
3	942377	6/21/82	Tecumseh Products Company	U.S. EPA	Closure Plan	4
4	942378	6/24/82	Tecumseh Products Company	U.S. EPA	Closure Correspondence	1
5	942379	7/20/82	Tecumseh Products Company	U.S. EPA	Request for Closure	2
6	942380	8/5/82	U.S. EPA	Tecumseh Products Company	Closure Memo	1
7	942381	10/18/82	U.S. EPA	Tecumseh Products Company	Closure Approval	1
8	942382	11/12/82	Mcnamee, Porter, & Seely	U.S. EPA	Closure Certification	1

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
9	942383	3/30/93	PRC Environmental Management	U.S. EPA	Preliminary Assessment/Visual Site Inspection	70
10	942384	6/16/05	MDEQ	City of Tecumseh	NPDES Permit No. MI0020583	31
11	942385	9/21/09	RMT	U.S. EPA	Current Conditions Report	688
12	942386	11/18/09	Crockford, G., RMT	Mullin, M., U.S. EPA	Email Re: Preliminary Onsite Soil Gas Data	5
13	942387	11/20/09	Mullin, M., U.S. EPA	Tecumseh Products Company	Memo Re: Kick-Off Meeting Summary Memorandum	2
14	942388	12/9/09	Crockford, G., RMT	Mullin, M., U.S. EPA	Email Re: Update on Well Install	5
15	942389	1/21/10	Tecumseh Bakery	MDEQ	Baseline Environmental Assessment- Complete	2013
16	942390	2/12/10	RMT	U.S. EPA	Status Update	313
17	942391	2/24/10	Mullin, M., U.S. EPA	Smith, J., TPC	Email Re: Attachment for PCB E- Mail	2
18	942392	2/24/10	Smith, J., TPC	Mullin, M., U.S. EPA	Email Re: PCB Investigations	2
19	942393	3/4/10	U.S. EPA	Tecumseh Products Company	Memo Re: Response to Technical Memorandum	5
20	942394	3/8/10	RMT	U.S. EPA	Memo Re: 2010-03-12 Technical Memorandum Re Mitigation	78
21	942395	3/9/10	Perdomo, S., U.S. EPA	McCure, D.	Email Re: Summary of 3/8 Call	2
22	942396	3/29/10	Mullin, M., U.S. EPA	Crockford, G., RMT	Email Re: Soil Gas Work Plan	7
23	942397	3/29/10	U.S. EPA	Tecumseh Products Company	Final Stamped Order	19
24	942398	3/30/10	U.S. EPA	Tecumseh Products Company	3/29/10 3008(H) AOC - Attached W/Cover Letter	20

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
25	942399	4/8/10	Mullin, M., U.S. EPA	Crockford, G., RMT	Email Re: 3/8 Tech Memo	4
26	942400	4/30/10	Crockford, G., RMT	Mullin, M., U.S. EPA	Email Re: Extent of Vocs in Drinking Water Above Criteria	2
27	942401	5/5/10	Mullin, M., U.S. EPA	Crockford, G., RMT	Email Re: Plume Boundary	2
28	942402	5/6/10	Mullin, M., U.S. EPA	Crockford, G., RMT	Email Re: VI Call	1
29	942403	7/15/10	RMT	U.S. EPA	2Qtr 2010 Progress Report Complete	621
30	942404	8/23/10	Mullin, M., U.S. EPA	File	Attachment VI Next Steps - 08/23/2010 Conference Call Discussion Points	1
31	942405	8/24/10	Mullin, M., U.S. EPA	Tecumseh Products Company	Letter Re: Soil Gas Results	4
32	942406	8/27/10	RMT	U.S. EPA	QAPP	1104
33	942407	10/13/10	Perdomo, S., U.S. EPA	McCure, D.	Email Re: Courtesy Copy of Vapor Intrusion Letter	4
34	942408	10/13/10	Mullin, M., U.S. EPA	Crockford, G., RMT	Letter Re: TPC Off-Site Soil Gas Screening Certified Letter	2
35	942409	2/7/11	Mullin, M., U.S. EPA	Smith, J., TPC	Email Re: Call on Q4 Report	1
36	942410	2/10/11	RMT	U.S. EPA	Memo Re: 2011-02-10 Tech Memo - Sampling for PRB Design	5
37	942411	2/18/11	Quackenbush, MDNR	Mullin, M., U.S. EPA	Email Re: Proposed Restricted Groundwater are and Wellhead Protection	4
38	942412	3/11/11	U.S. EPA	Tecumseh Products Company	Letter Re: Off-Site Vapor Intrusion Mitigation Letter	2
39	942413	3/26/11	McCure, D.	Mullin, M., U.S. EPA	Email Re: 3/11/2011 VI Letter	2
40	942414	3/30/11	RMT	File	Email Re: Attachment to 2011/03/30 Crockford Email - Tech Memo GW Notifications	13

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
41	942415	4/19/11	RMT	MDEQ	Email Re: Discharge Permit for PRB Work Plan TM0275116001-003	3
42	942416	4/19/11	Metz, S., RMT	Quackenbush, MDNR	Email Re: PRB Install with Permit for PRB Memo and 3/30/11 PRB Work Plan Attached	5
43	942417	5/2/11	RMT	U.S. EPA	Memo Re: PRB Work Plan Rev 1	194
44	942418	5/12/11	Mullin, M., U.S. EPA	Crockford, G., RMT	Email Re: Monitoring PRB	4
45	942419	5/19/11	Mullin, M., U.S. EPA	Crockford, G., RMT	Email Re: 2ND Request for PRB Monitoring	1
46	942420	7/8/11	TRC	U.S. EPA	PRB Work Plan Addendum - Revised Performance Monitoring Network	15
47	942421	7/15/11	TRC	File	2Qtr 2011 Progress Report	364
48	942422	9/28/11	TRC	File	Memo Re: Private Wells Survey TM00275115-001A	37
49	942423	9/29/11	TRC	U.S. EPA	Current Human Exposure Under Control Environmental Indicator Report	169
50	942424	10/3/11	TRC	U.S. EPA	Work Plan for SSDS at Building S	28
51	942425	10/19/11	Crockford, G., RMT	Mullin, M., U.S. EPA	Email Re: Permits	7
52	942426	10/19/11	Blathras, C., U.S. EPA	Mullin, M., U.S. EPA	Email Re: Review of Air Calcs	4
53	942427	10/21/11	Bixby, J., MDEQ	Mullin, M., U.S. EPA	Email Re: No Need for MDEQ Permit	1
54	942428	11/22/11	U.S. EPA	Tecumseh Products Company	Letter Re: 2011/11/22 EPA Response to TPC Environmental Indicator Report for Human Health Under Control	2
55	942429	12/5/11	U.S. EPA	Tecumseh Products Company	Letter Re: Environmental Indicator Report for Human Health Under Control	2
56	942430	12/28/11	U.S. EPA	Tecumseh Products Company	Letter Re: Second Response and Extension to Human Health EI Report	2

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
57	942431	1/9/12	Mullin, M., U.S. EPA	Crockford, G., RMT	Email Re: Meeting on VI and GW	1
58	942432	2/20/12	TRC	U.S. EPA	PRB Construction Documentation Report	148
59	942433	2/20/12	TRC	U.S. EPA	S-Building SSDV System Construction Documentation	24
60	942434	3/1/12	Tecumseh Products Company	U.S. EPA	Meeting Agenda	51
61	942435	5/2/12	TRC	U.S. EPA	S-Building SSDV Inspection and Air Results	21
62	942436	5/25/12	TRC	U.S. EPA	Full Scale SVE Work Plan	149
63	942437	5/30/12	U.S. EPA	Tecumseh Products Company	Letter Re: 2012/05/30 EPA Summary Of March 2012 Meeting	5
64	942438	6/19/12	TRC	MDEQ	Request for Mixing Zone-Based GSI Criteria	91
65	942439	6/21/12	TRC	U.S. EPA	Statistical Evaluation of Groundwater Stability	933
66	942440	6/29/12	Crockford, G., RMT	Mullin, M., U.S. EPA	Email Re: Soil Gas and Clay Layer	3
67	942441	7/5/12	TRC	U.S. EPA	Memo Re: Work Plan for Source Area RI	4
68	942442	9/14/12	Crockford, G., RMT	Kelly, J., U.S. EPA	Email Re: GSI	4
69	942443	9/22/12	TRC	U.S. EPA	Permeable Reactive Barrier Monitoring Report	905
70	942444	9/28/12	TRC	U.S. EPA	Remedial Investigation and Groundwater EI Report - Part 1	2838
71	942445	9/28/12	TRC	U.S. EPA	Remedial Investigation and Groundwater EI Report - Part 2	4656
72	942446	10/29/12	U.S. EPA	Tecumseh Products Company	2012/10/29 to 30 EPA Meeting Agenda	13
73	942447	12/5/12	TRC	U.S. EPA	Memo Re: 2012/12/05 TPC Scope Summary	7

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
74	942448	2/1/13	U.S. EPA	Tecumseh Products Company	Letter Re: Denying First Jan 2013 Work Plan for Groundwater	6
75	942449	2/13/13	TRC	U.S. EPA	SVE P-Building Construction Doc Report	777
76	942450	2/19/13	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: PIDS and Lack of Information	2
77	942451	2/27/13	TRC	U.S. EPA	Revised Supplemental RI Work Plan and Response to Comments	32
78	942452	3/6/13	U.S. EPA	Tecumseh Products Company	Letter Re: Extension Letter	10
79	942453	6/26/13	Crockford, G., RMT	Kelly, J., U.S. EPA	Email Re: Kelly Questions on PSG	5
80	942454	7/15/13	TRC	File	2Q13 Progress Report	579
81	942455	8/5/13	Crockford, G., RMT	Kelly, J., U.S. EPA	Email Re: HHEI Questions	5
82	942456	8/27/13	Perdomo, S., U.S. EPA	McCure, D.	Email Re: Deficiencies	3
83	942457	8/29/13	TRC	MDEQ	GSI Evaluation and Site Specific Criteria	127
84	942458	9/21/13	Tecumseh Products Company	U.S. EPA	Letter Re: USEPA Concerning 2013/09/12 Conf Call	3
85	942459	9/30/13	TRC	U.S. EPA	Supplement to the Human Exposures EI	260
86	942460	10/15/13	TRC	U.S. EPA	3Q13 Progress Report	144
87	942461	11/22/13	TRC	U.S. EPA	Work Plan to Install SVE System	80
88	942462	12/10/13	MDEQ	TRC	Email Re: Mixing Zone Denial	2
89	942463	1/31/14	U.S. EPA	TRC	Supplement to the Human Exposure EI	34
90	942464	2/18/14	U.S. EPA	TRC	Email Re: Belief of No VI Concerns	6
91	942465	2/20/14	U.S. EPA	Tecumseh Products Company	Letter Re: EPA's Position and Re-Question SOW	8

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
92	942466	3/27/14	TRC	U.S. EPA	Memo Re: Revised SOW	81
93	942467	4/17/14	U.S. EPA	Tecumseh Products Company	Letter Re: 2014/04/17 EPA Letter Response to SOW and Request for Meeting	2
94	942468	5/1/14	U.S. EPA	Tecumseh Products Company	Letter Re: Meeting Agenda for May 2014 Meeting	3
95	942469	5/2/14	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: Concerns and Trends	9
96	942470	6/9/14	U.S. EPA	Tecumseh Products Company	2014/06/09 Final Letter Summary of May Meeting	21
97	942471	6/10/14	Kelly, J., U.S. EPA	McCure, D. CMP Law	Email Re: 6/9 McClure Email	12
98	942472	6/18/14	TRC	U.S. EPA	Memo Re: TM 2014 Passive Soil Gas Survey	101
99	942473	6/24/14	Bush, C., MDCH	Kelly, J., U.S. EPA	Email Re: Home Visit	2
100	942474	6/30/14	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: Requesting ADDI MIPS Based on PSGS	5
101	942475	7/30/14	Welch, K., TCP	Kelly, J., U.S. EPA	Email Re: Fact Sheet for Vapor Intrusion	1
102	942476	8/14/14	U.S. EPA, MCED, & MDCH	File	Vapor Intrusion Fact Sheet Attached to 2014/8/14 Email	2
103	942477	10/23/14	TRC	U.S. EPA	Meeting Agenda for Conf Call on 3-D Presentation	2
104	942478	12/5/14	TRC/SER	U.S. EPA	MIP Report SER90 Pt 1	463
105	942479	12/5/14	TRC/SER	U.S. EPA	MIP Report SER90 Pt 2	117
106	942481	12/14/14	Kelly, J., U.S. EPA	File	Inspection Report from Nov 2014 Site Visit	38
107	942480	12/23/14	TRC/SER	U.S. EPA	Revised 2014/12/05	2
108	942482	3/26/15	U.S. EPA	Tecumseh Products Company	MIP Work Plan Comments	10

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
109	942483	4/23/15	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: Comments on MIP Work Plan	2
110	942484	4/30/15	TRC	File	MIP Investigation Report and Work Plan for High Resolution Site Characterization (Revision 2)	1030
111	942485	5/7/15	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: MIP Work Plan	4
112	942486	7/24/15	Tecumseh Products Company	File	Notice of Migration of Contamination	9
113	942487	7/31/15	TRC	File	Supplement to RI EI Indicator Report	5156
114	942488	8/10/15	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: 2Q15 Report	4
115	942489	8/20/15	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: GSI Email	9
116	942490	9/30/15	U.S. EPA FIELDS Group	U.S. EPA RRB	Trend Analysis-Final	141
117	942491	10/1/15	U.S. EPA	Tecumseh Products Company	Notice Of Violation	164
118	942492	10/5/15	U.S. EPA	File	CA750-NO	8
119	942493	10/5/15	U.S. EPA	File	CA725-IN	8
120	942494	10/15/15	TRC	U.S. EPA	3Q15 Progress Report	176
121	942495	11/6/15	Tecumseh Products Company	U.S. EPA	Letter Re: Nov Response	9
122	942496	12/10/15	U.S. EPA	CMP Law	Letter Re: Summary of 12/8/ Meeting	3
123	942497	12/21/15	Kelly, J., U.S. EPA	Crockford, G., RMT	Letter Re: CMP & CSM Deficiencies	7
124	942498	1/14/16	Kelly, J., U.S. EPA	Crockford, G., RMT	Letter Re: Regarding Status of CMP	3
125	942499	1/15/16	TRC	U.S. EPA	Qtr15 Progress Report	12
126	942500	1/19/16	Kelly, J., U.S. EPA	Crockford, G., RMT	Phone Record	3

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
127	942501	3/2/16	PNC Bank	File	FA Amendment	16
128	942502	3/8/16	Kelly, J., U.S. EPA	MDEQ	Phone Record	2
129	942503	3/18/16	U.S. EPA	Tecumseh Products Company	Letter Re: Conditional Approval/Response to App. E/C	10
130	942504	3/31/16	TRC	MDEQ	Revised GSI Work Plan	135
131	942505	4/12/16	TRC	U.S. EPA	Review of CMP 4/12/16	273
132	942506	4/26/16	Fibertec Environmental Services	AKT Peerless Environmental Services	Building P Data	15
133	942507	7/26/16	Kelly, J., U.S. EPA	TRC & Tecumseh Products Company	Phone Record	2
134	942508	8/2/16	Kelly, J., U.S. EPA	TRC & Tecumseh Products Company	Call Summary	2
135	942509	8/24/16	TRC	U.S. EPA	Summary of 2016 Soil Investigation Activities	556
136	942510	8/29/16	TRC	U.S. EPA	Response to Comments	41
137	942511	8/30/16	Kelly, J., U.S. EPA	TRC & Tecumseh Products Company	Phone Record	2
138	942512	9/8/16	Kelly, J., U.S. EPA	MDEQ, TRC, & Tecumseh Products Company	GSI Phone Record	2
139	942513	9/14/16	Kelly, J., U.S. EPA	Toeroek, TRC, & Tecumseh Products Company	Phone Record	2
140	942514	9/20/16	Kelly, J., U.S. EPA	Toeroek, TRC, & Tecumseh Products Company	Phone Record	2

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
141	942516	9/20/16	TRC	U.S. EPA	HHRA - Final	972
142	942515	9/21/16	Kelly, J., U.S. EPA	Crockford, G., RMT	Email Re: Call Follow-up	3
143	942517	9/21/16	City of Tecumseh	Lenawee County	Recorded Groundwater Ordinance	7
144	942518	9/27/16	Kelly, J., U.S. EPA	Toeroek, TRC, & Tecumseh Products Company	Phone Record	3
145	942519	9/27/16	TRC/100 Patterson LLC	Lenawee County	Declaration of Restrictive Covenant	18
146	942520	10/3/16	Crockford, G., TRC	Kelly, J., U.S. EPA	Email Re: Call Follow Up	2
147	942521	10/3/16	TRC	U.S. EPA	PCE Work Plan	126
148	942522	10/12/16	TRC	U.S. EPA	HHRA Supplement (1 Of 4)	682
149	942523	10/12/16	TRC	U.S. EPA	HHRA Supplement (2 Of 4)	2
150	942524	10/12/16	TRC	U.S. EPA	HHRA Supplement (3 Of 4)	117
151	942525	10/12/16	TRC	U.S. EPA	HHRA Supplement (4 Of 4)	44
152	942526	10/21/16	TRC	MDEQ	Memo Re: Groundwater to Surface Water Migration Pathway and Mixing Zone Request	148
153	942527	11/7/16	TRC	U.S. EPA	Memo Re: Determination of Groundwater Clean-Up Objectives for Vapor Intrusion Under Reasonably Anticipated Current and Future Land Use Scenarios	89
154	942528	11/11/16	TRC	U.S. EPA	Re: Evaluation of Risk Associated with Areas of Interest and Development of Approximate Soil Cleanup Effort Using a Soil Leaching Model	128
155	942529	11/17/16	Toeroek	U.S. EPA	Letter Re: Risk Assessment	3
156	942530	11/18/16	U.S. EPA	Tecumseh Products Company	Response to HHRA	9

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
157	942531	11/30/16	Perdomo, S., U.S. EPA	Kouimelis, E., Winston & Strawn	Email Re: MCLS	4
158	942532	11/30/16	Crockford, G., TRC	Kelly, J., U.S. EPA	Email Re: TPC Discussion on HHRA Comments	7
159	942533	12/5/16	Crockford, G., TRC	Kelly, J., U.S. EPA	Email Re: Draft Risk	7
160	942534	12/9/16	Crockford, G., TRC	Kelly, J., U.S. EPA	Email Re: Summary of Call	2
161	942535	1/10/17	Burden, D., & Barth, E., U.S. EPA	Kelly, J., U.S. EPA	Email Re: Sesoil Modeling	2
162	942536	1/13/17	TRC	U.S. EPA	Memo Re: Calculation of Risk and Groundwater Cleanup Levels Associated with the Vapor Intrusion Migration Pathway	900
163	942537	1/16/17	TRC	U.S. EPA	Construction Documentation Report 2016 PCE Source Removal	512
164	942538	2/2/17	U.S. EPA	Tecumseh Products Company	Letter Re: Cost Estimate Extension Approval	1
165	942539	2/3/17	Kelly, J., U.S. EPA	Crockford, G., TRC	Email Re: Residential Objective Offsite	4
166	942540	2/8/17	Kelly, J., U.S. EPA	Crockford, G., TRC	Email Re: Residential Objective Offsite	6
167	942541	2/8/17	TRC	U.S. EPA	Risk Assessment Final	913
168	942542	2/13/17	Toeroek	U.S. EPA	Contractor Comments on Appendix A	3
169	942543	3/6/17	TRC	U.S. EPA	Revised Corrective Measures Proposal	1009
170	942544	5/10/17	TRC	U.S. EPA	Email Re: Vapor Intrusion Decision Matrix	2
171	942545	6/27/17	U.S. EPA	Tecumseh Products Company	Letter Re: Mixing Zone Implementation	6
172	942546	7/13/17	Toeroek	U.S. EPA	Review of CMP	2

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
173	942547	7/17/17	TRC	U.S. EPA	2Q17 Progress Report	326
174	942548	8/14/17	U.S. EPA	File	CA725-YE Human Health Env. Indicator	9
175	942549	9/5/17	MDEQ	Crockford, G., TRC	Email Re: GSI Limits	6
176	942550	9/13/17	Kelly, J., U.S. EPA	Smith, J., TPC, Crockford, G., TRC & Metz, S., RMT	Email Re: Performance Monitoring	8
177	942551	12/18/17	U.S. EPA	Tecumseh Products Company	Conditional Approval of CMP	12
178	942552	1/23/18	U.S. EPA	Tecumseh Products Company	Conditional Approval of GSI	2
179	942553	2/22/18	TRC	U.S. EPA	Revised GSI Performance Monitoring Plan	409
180	942554	5/23/18	TRC	U.S. EPA	Memo Re: TM - 1Q18 Well Install and Sample	153
181	942555	5/23/18	TRC	U.S. EPA	Perimeter SVE Documentation Report	994
182	-	9/18/2018	EPA	-	Statement of Basis	62

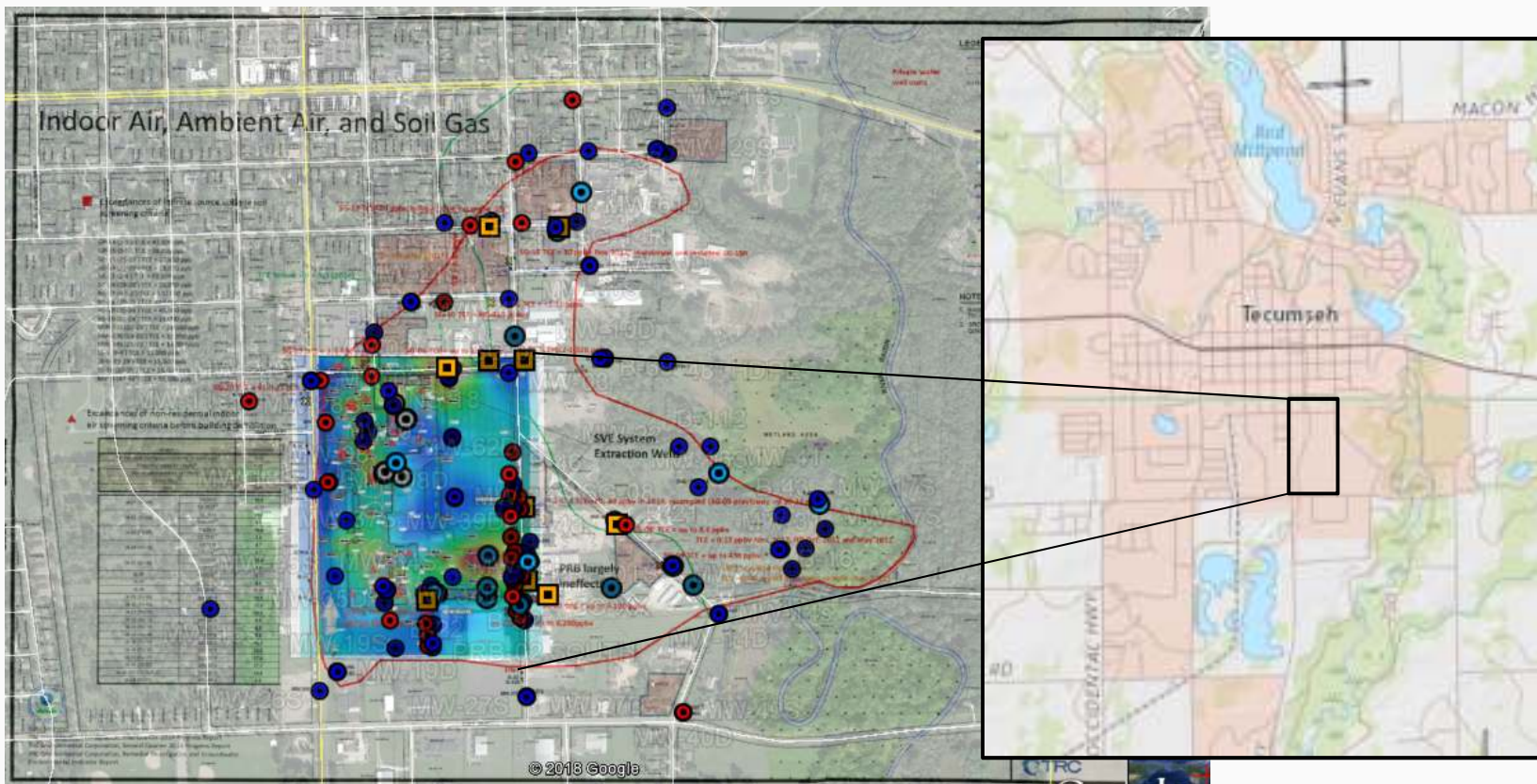
APPENDIX 2

FIGURES

STATEMENT OF BASIS
TECUMSEH PRODUCTS COMPANY
TECUMSEH, MICHIGAN
EPA ID: MID 005 049 440



Tecumseh Products Company - 100 E. Patterson Street, Tecumseh, Michigan MID 005 049 440



U.S. Environmental Protection Agency
5/18/2018

Figure 1: Site Location

PATTERSON ST.

HIAWATHA ST.

MUSCODY ST.

SOUTH EVANS STREET

SOUTH MAUMEE ST

LEGEND

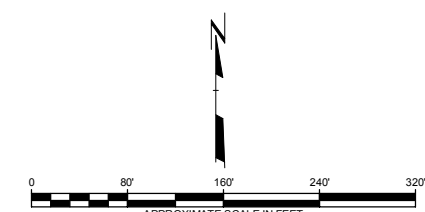
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- TECUMSEH PRODUCTS BUILDING OUTLINE
- PARCEL BOUNDARY
- FENCE LINE
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE LOCATION OF FORMER SOLID WASTE MANAGEMENT UNITS (SWMUs)
- APPROXIMATE LOCATION OF HISTORICAL USE AREA

Demolition Key

- PHASE I DEMOLITION AREA (DEMOLITION COMPLETE - 2013)
- PHASE II DEMOLITION AREA (DEMOLITION COMPLETE - 2013)
- PROPOSED DEMOLITION AREA (2017)

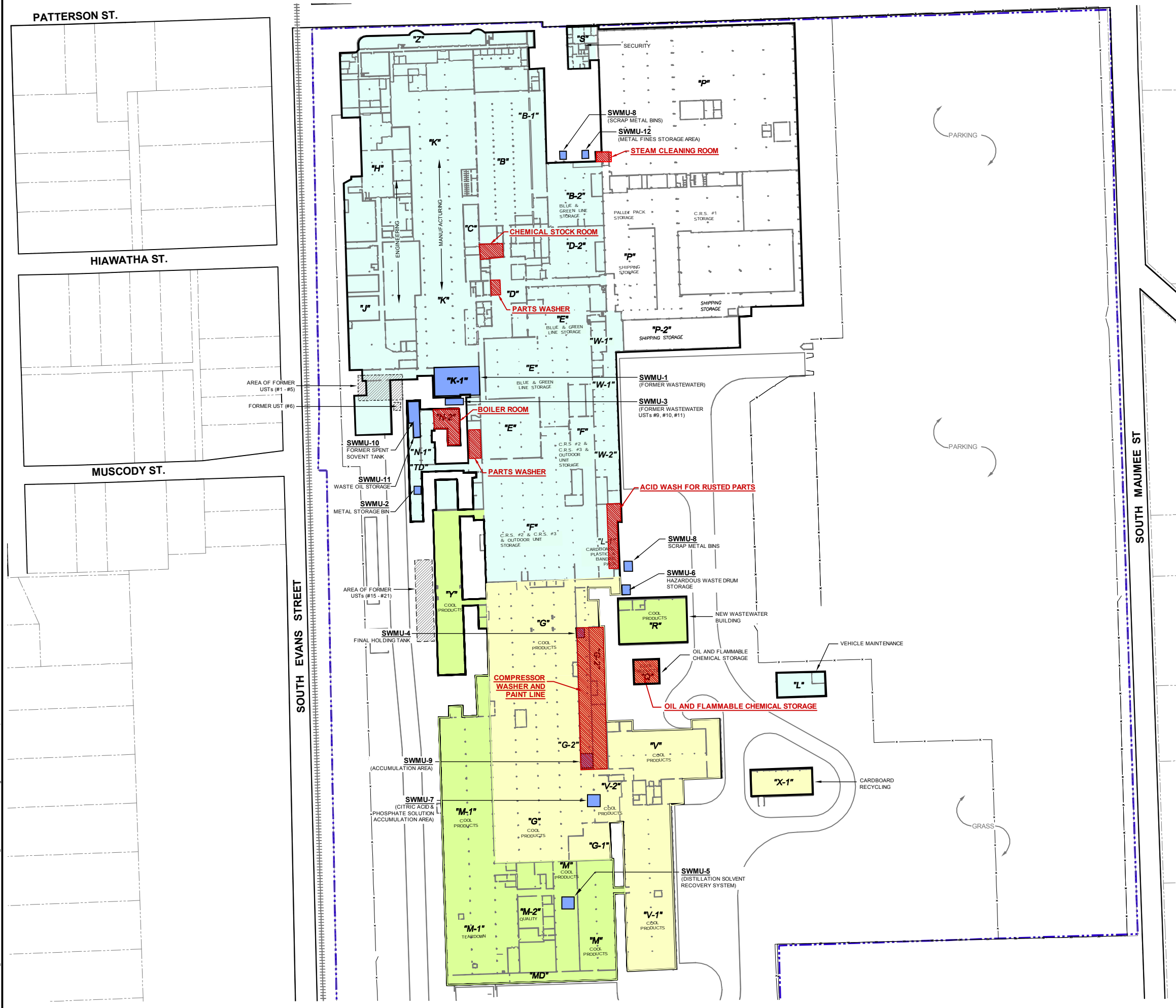
NOTES

- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
- SEE APPENDIX C OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR A DESCRIPTION OF SWMUs, UNDERGROUND STORAGE TANKS AND OTHER RELEVANT DATA.

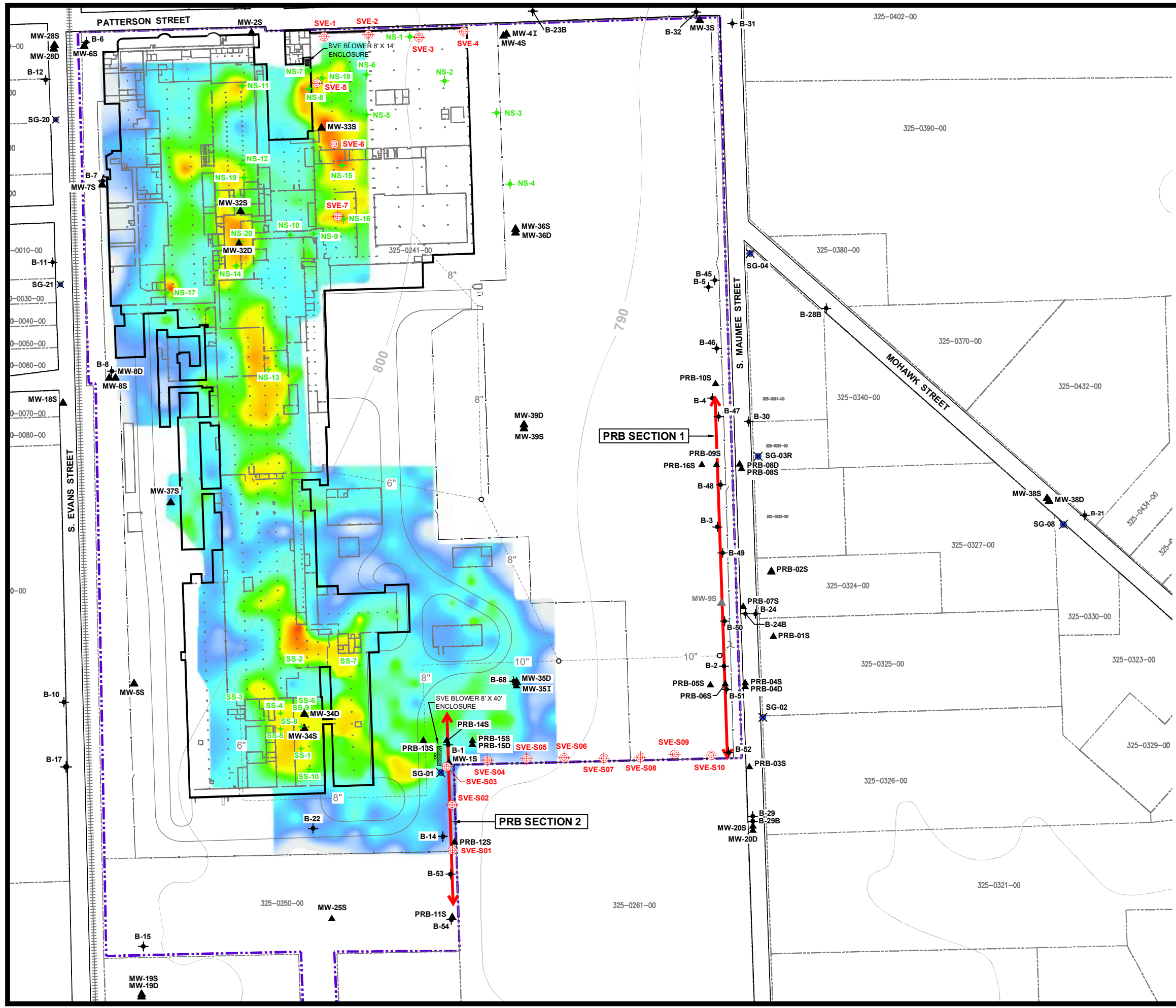


1					DGS	02/13/17	UPDATE NOTE 2, DEMOLITION AREA; ADD HISTORICAL USE AREA	SEM
NO.	BY	DATE	REVISION	APPD.				
PROJECT: FORMER TECUMSEH PRODUCTS SITE, TECUMSEH, MICHIGAN								
TITLE: SWMUs & PROCESS AREAS								
DRAWN BY: DSHehle		PROJ. NO: 246667.0004						
CHECKED BY: SMetz								
APPROVED BY: GCrookford		FIGURE 2						
DATE: FEBRUARY 2017								
		1540 Eisenhower Place Ann Arbor, MI 48108 Phone: 734-971-7080 www.trcsolutions.com						
FILE NO: 246667.0004.02.dwg								

2/2/17 - ATTACHED XREFS: bnd3109 - ATTACHED IMAGES: DRAWING NAME: J:\TRC\Tecumseh Products\Tecumseh MI\246667\0004.dwg - PLOT DATE: March 02, 2017 - 8:59AM - LAYOUT: FIG02:Site Features & Demo Areas



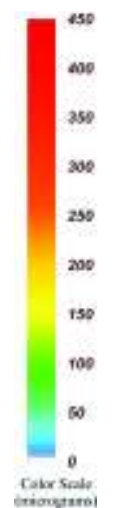
Project: 27042 Bascom Color Scale - TCE Breakdowns, 27042 Bascom Color Scale - TCE Breakdowns, 27042 Bascom Color Scale - TCE Breakdowns - Color Scale, 27042 Bascom Color Scale - TCE Breakdowns - Color Scale, 27042 Bascom Color Scale - TCE Breakdowns - Color Scale
 Date: December 31, 2014
 Time: 11:58 AM
 User: P:\04\Proj\27042\27042.dwg
 Plot Date: December 31, 2014
 Plot Time: 11:58 AM
 User: P:\04\Proj\27042\27042.dwg
 Plot Date: December 31, 2014
 Plot Time: 11:58 AM
 User: P:\04\Proj\27042\27042.dwg



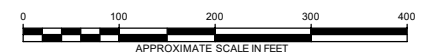
LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- B-54 + PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MW-4S ▲ MONITORING WELL LOCATION AND NUMBER
- MW-9S ▲ DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SS-2 + SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SG-02 ✕ SOIL GAS SAMPLE LOCATION AND NUMBER
- 8" PIPE DIAMETER AND APPROXIMATE LOCATION OF ON-SITE SANITARY SEWER
- PRB LOCATION
- FENCE LINE
- SVE-S04 ⊕ EXTRACTION WELL LOCATION AND NUMBER
- 800 APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP

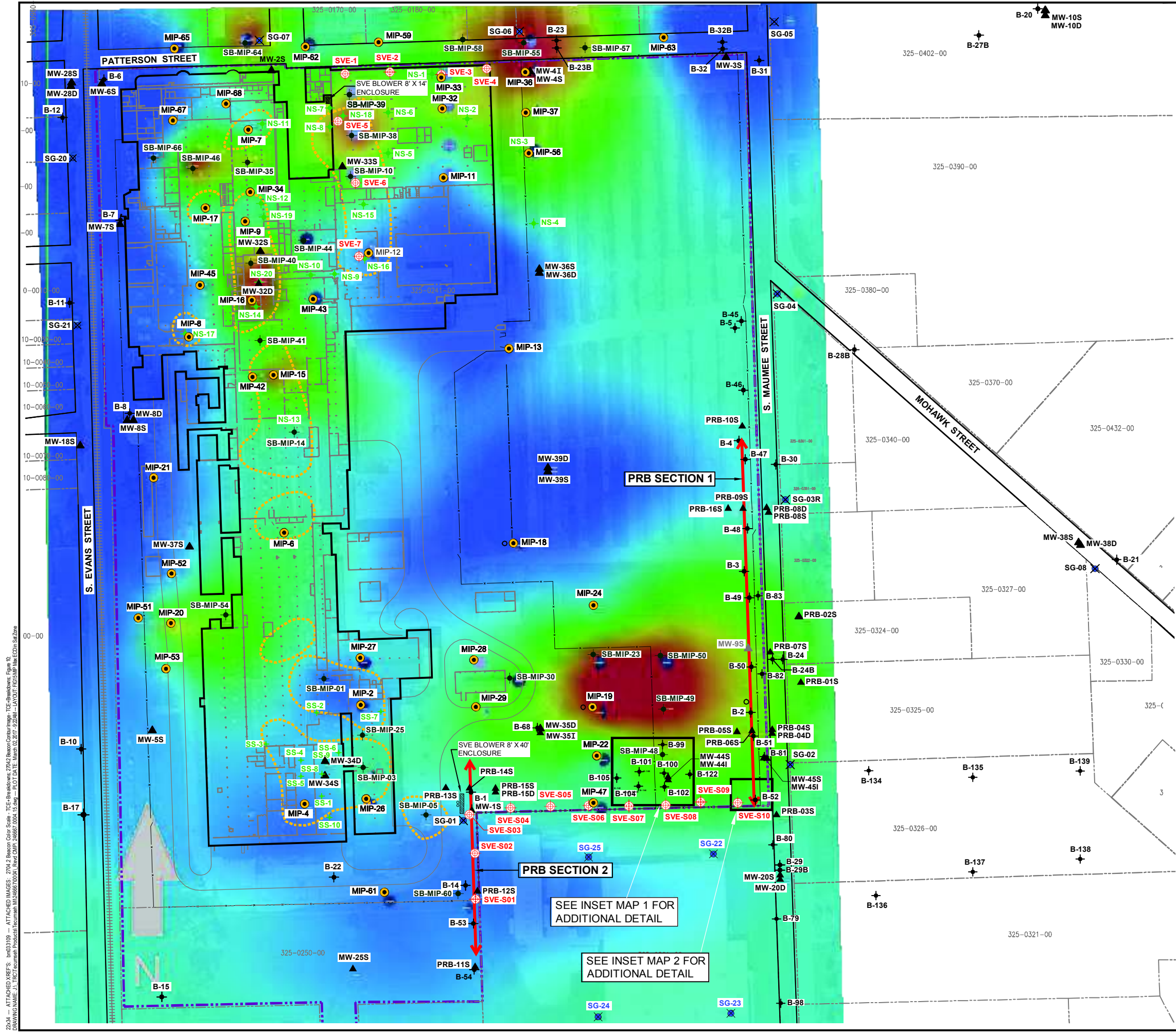
COLOR SCALE FOR RELATIVE RESPONSE FROM PASSIVE SOIL GAS SURVEY - TCE AND BREAKDOWN PRODUCTS



- ### NOTES
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 3. TCE BREAKDOWN PRODUCTS INCLUDE cis-1,2-DICHLOROETHENE; trans-1,2-DICHLOROETHENE; 1,1-DICHLOROETHENE, AND VINYL CHLORIDE.



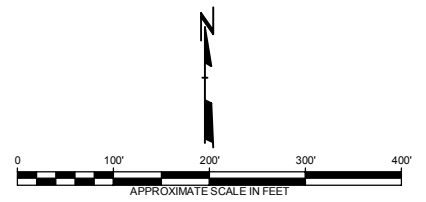
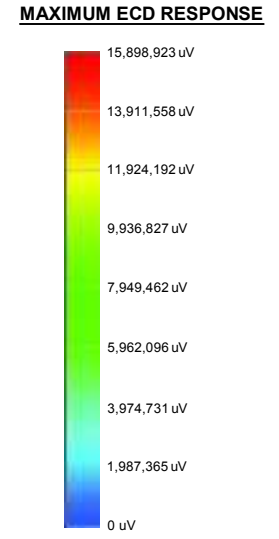
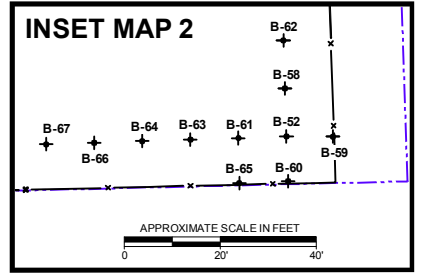
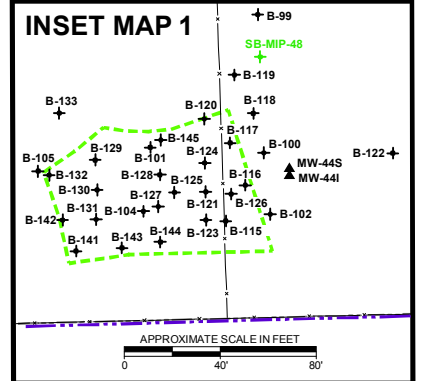
3					
2					
1					
NO.	BY	DATE	REVISION		APPD
FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN					
RESULTS OF PASSIVE SOIL GAS SURVEY DISTRIBUTION OF TCE AND BREAKDOWN PRODUCTS					
DRAWN BY:	DGS	SCALE:	AS INDICATED	PROJ. NO:	220003.0000
CHECKED BY:	SEM	DATE PRINTED:		FILE NO:	220003.0000.04.dwg
APPROVED BY:	GC				FIGURE 3
DATE:	DECEMBER 2014				
				1540 Eisenhower Place Ann Arbor, MI 48108 Phone: 734.971.7080 Fax: 734.971.9022	



LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- B-2 PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MW-4S MONITORING WELL LOCATION AND NUMBER
- MW-9S DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SS-2 SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SG-02 SOIL GAS SAMPLE LOCATION AND NUMBER
- MIP-57 MEMBRANE INTERFACE PROBE (MIP) LOCATION AND NUMBER
- SVE-S04 EXTRACTION WELL LOCATION AND NUMBER
- PRB LOCATION
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)
- FENCE LINE
- OUTLINE OF PASSIVE SOIL GAS SURVEY AREAS WITH ELEVATED RESPONSE FOR TCE AND BREAKDOWN PRODUCTS

- NOTES**
- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 - SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 - ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.
 - TCE BREAKDOWN PRODUCTS INCLUDE cis-1,2-DICHLOROETHENE; trans-1,2-DICHLOROETHENE; 1,1-DICHLOROETHENE; AND VINYL CHLORIDE.
 - LATERAL DISTRIBUTION OF ECD RESPONSE MAPPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE TO KRIG MIP DATA.
 - SATURATED ZONE INCLUDES ALL DEPTHS FROM THE MAXIMUM OBSERVED WATER TABLE (APPROXIMATELY 2 FEET ABOVE THE WATER TABLE AT THE TIME OF THE INVESTIGATION) TO THE SURFACE OF THE UNDERLYING CLAY CONFINING UNIT.

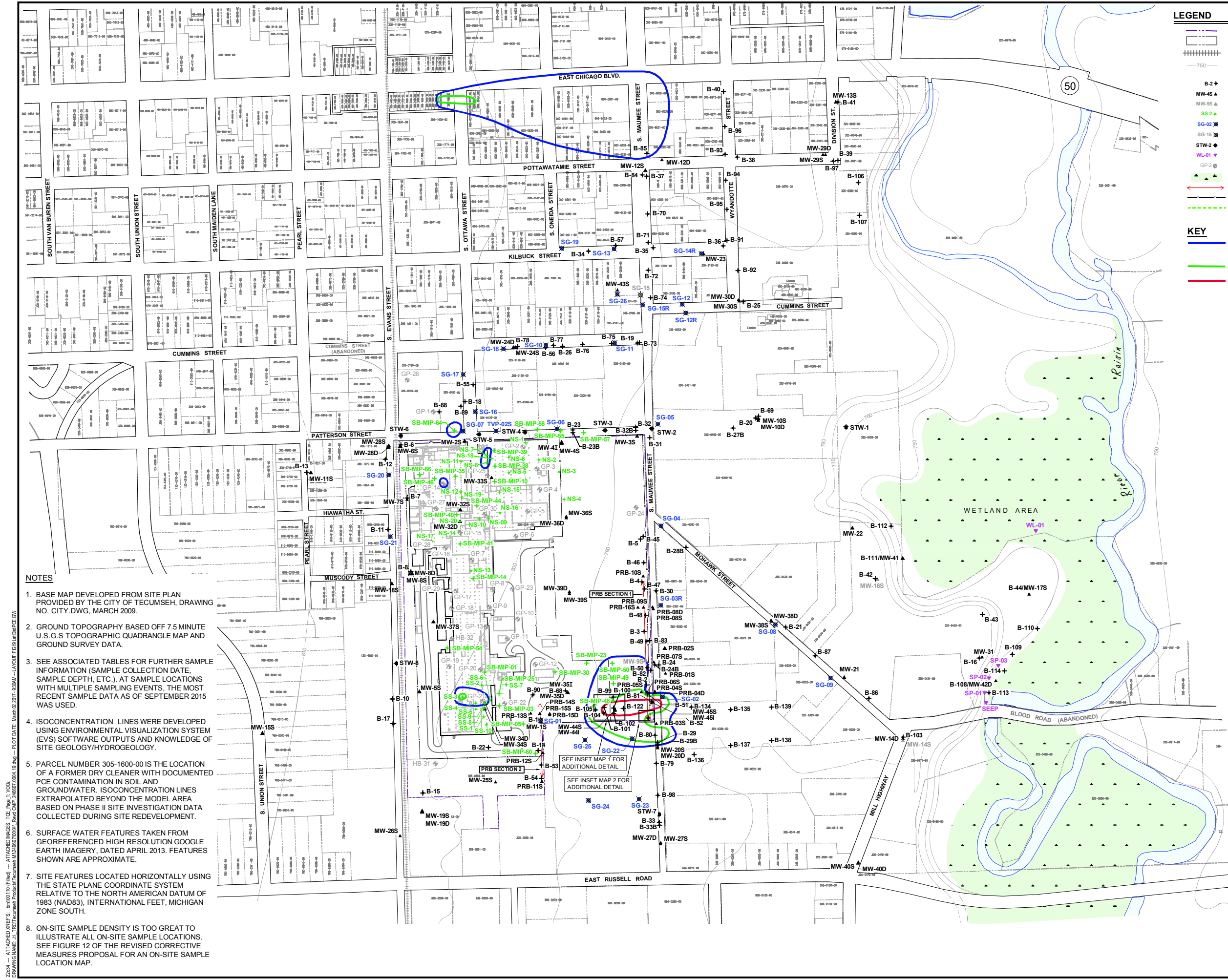


SEE INSET MAP 1 FOR ADDITIONAL DETAIL

SEE INSET MAP 2 FOR ADDITIONAL DETAIL

2/24/17 ATTACHED XREFS: bnd03109 - ATTACHED IMAGES: 2704_2 Beacon Color Scale - TCE-Breakdowns, 2704_2 Beacon Color Scale - TCE-Breakdowns, Figure 10; DRAWING NAME: J:\TRC\Tecumseh Products\246667\2004_15.dwg - PLOT DATE: March 02, 2017 - 9:27AM - LAYOUT: F015MIP Max ECD in Sat Zone

NO.	BY	DATE	REVISION	APPD.
1	DGS	02/13/17	ADD NEW 2016 GROUNDWATER SAMPLE LOCATIONS, NOTES 445	
PROJECT: FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN				
TITLE: MIP INVESTIGATION RESULTS DISTRIBUTION OF MAXIMUM ECD RESPONSE IN SATURATED ZONE				
DRAWN BY: DS/Sheh		PROJ. NO.: 246667.0004		
CHECKED BY: SMetz				
APPROVED BY: GCrookford				FIGURE 7
DATE: FEBRUARY 2017				
		1540 Eisenhower Place Ann Arbor, MI 48108 Phone: 734.971.7080 www.trcsolutions.com		
FILE NO:		246667.0004.15.DWG		

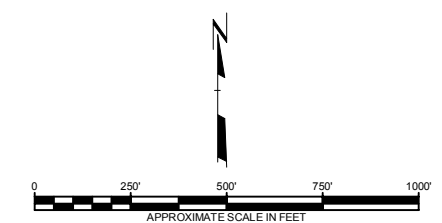
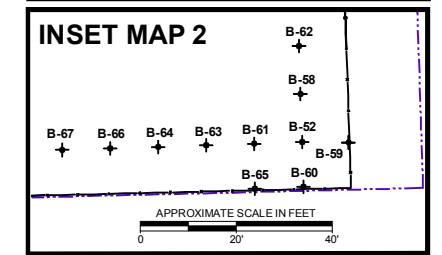
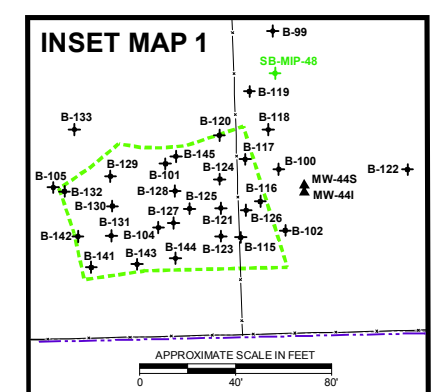


LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MONITORING WELL LOCATION AND NUMBER
- DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SOIL GAS SAMPLE LOCATION AND NUMBER
- DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- ATC PHASE II ESA BORING LOCATION AND NUMBER
- FLOODPLAIN / WOODED WETLAND AREA
- PRB LOCATION
- FENCE LINE
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

KEY

- EXTENT OF TETRACHLOROETHENE (PCE) ABOVE MICHIGAN PART 201 DRINKING WATER CRITERION (5 ug/L)
- EXTENT OF PCE ABOVE MICHIGAN PART 201 SURFACE WATER INTERFACE CRITERION (60 ug/L)
- EXTENT OF PCE ABOVE THE SITE SPECIFIC CLEANUP LEVEL PROTECTIVE OF THE RESIDENTIAL VAPOR INTRUSION MIGRATION PATHWAY (2,000 ug/L)



- NOTES**
- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 - GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 - SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.). AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 - ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE OUTPUTS AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 - PARCEL NUMBER 305-1600-00 IS THE LOCATION OF A FORMER DRY CLEANER WITH DOCUMENTED PCE CONTAMINATION IN SOIL AND GROUNDWATER. ISOCONCENTRATION LINES EXTRAPOLATED BEYOND THE MODEL AREA BASED ON PHASE II SITE INVESTIGATION DATA COLLECTED DURING SITE REDEVELOPMENT.
 - SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 - SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 - ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.

NO.	BY	DATE	REVISION	APPD.
2	DGS	02/11/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 8	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM

PROJECT: **FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN**

TITLE: **LATERAL DISTRIBUTION OF
TETRACHLOROETHENE IN GROUNDWATER**

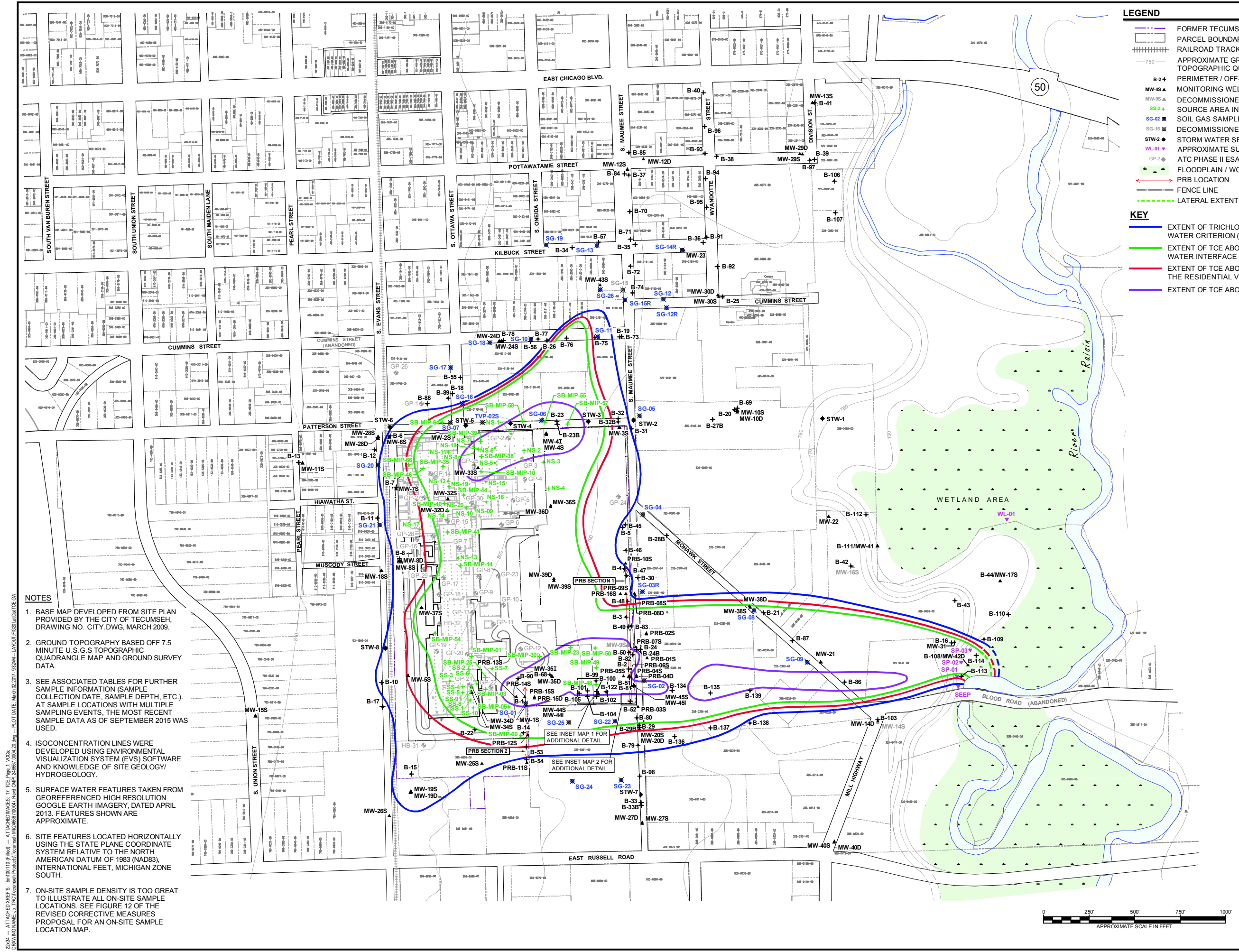
DRAWN BY: DStahl PRJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCroford
 DATE: FEBRUARY 2017

FIGURE 8

1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 246667.0004.19DWG

2/24/17 - ATTACHED XREFS: bml01010 (F:\M) - ATTACHED IMAGES: TCE_PCE_1100X.DWG - PLOT DATE: March 02, 2017 - 9:30AM - LAYOUT: FCBP.LAY (D:\PCE) - DRAWING NAME: J:\TRC\Tecumseh Products\Tecomseh M12466770004_19.dwg

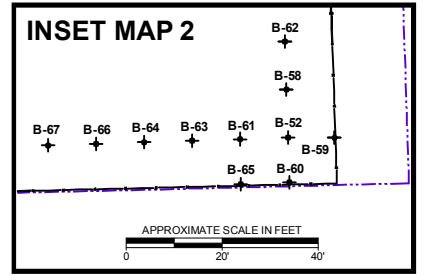
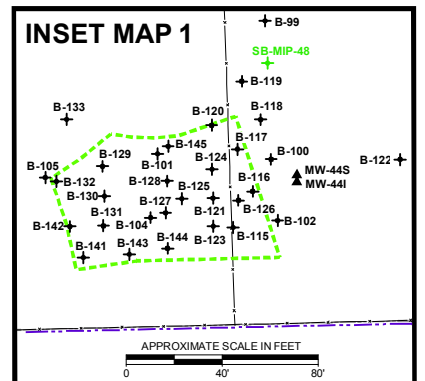


LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- B-2+ PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MW-4S MONITORING WELL LOCATION AND NUMBER
- MW-5S DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SS-2+ SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SG-02 SOIL GAS SAMPLE LOCATION AND NUMBER
- SG-15 DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STW-2 STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- WL-01 APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- GP-2 ATC PHASE II ESA BORING LOCATION AND NUMBER
- FLOODPLAIN / WOODED WETLAND AREA
- PRB LOCATION
- FENCE LINE
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

KEY

- EXTENT OF TRICHLOROETHENE (TCE) ABOVE THE MICHIGAN PART 201 DRINKING WATER CRITERION (6 ug/L)
- EXTENT OF TCE ABOVE THE MICHIGAN PART 201 GROUNDWATER SURFACE WATER INTERFACE CRITERION (200 ug/L)
- EXTENT OF TCE ABOVE THE THE SITE SPECIFIC CLEANUP LEVEL PROTECTIVE OF THE RESIDENTIAL VAPOR INTRUSION MIGRATION PATHWAY (130 ug/L)
- EXTENT OF TCE ABOVE 2000 ug/L



- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 3. SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.), AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 4. ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 5. SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 6. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 7. ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.

FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN				
TITLE: LATERAL DISTRIBUTION OF TRICHLOROETHENE IN GROUNDWATER				
NO.	BY	DATE	REVISION	APPD.
2	DGS	02/11/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 7	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM

PROJECT: **FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN**

TITLE: **LATERAL DISTRIBUTION OF
TRICHLOROETHENE IN GROUNDWATER**

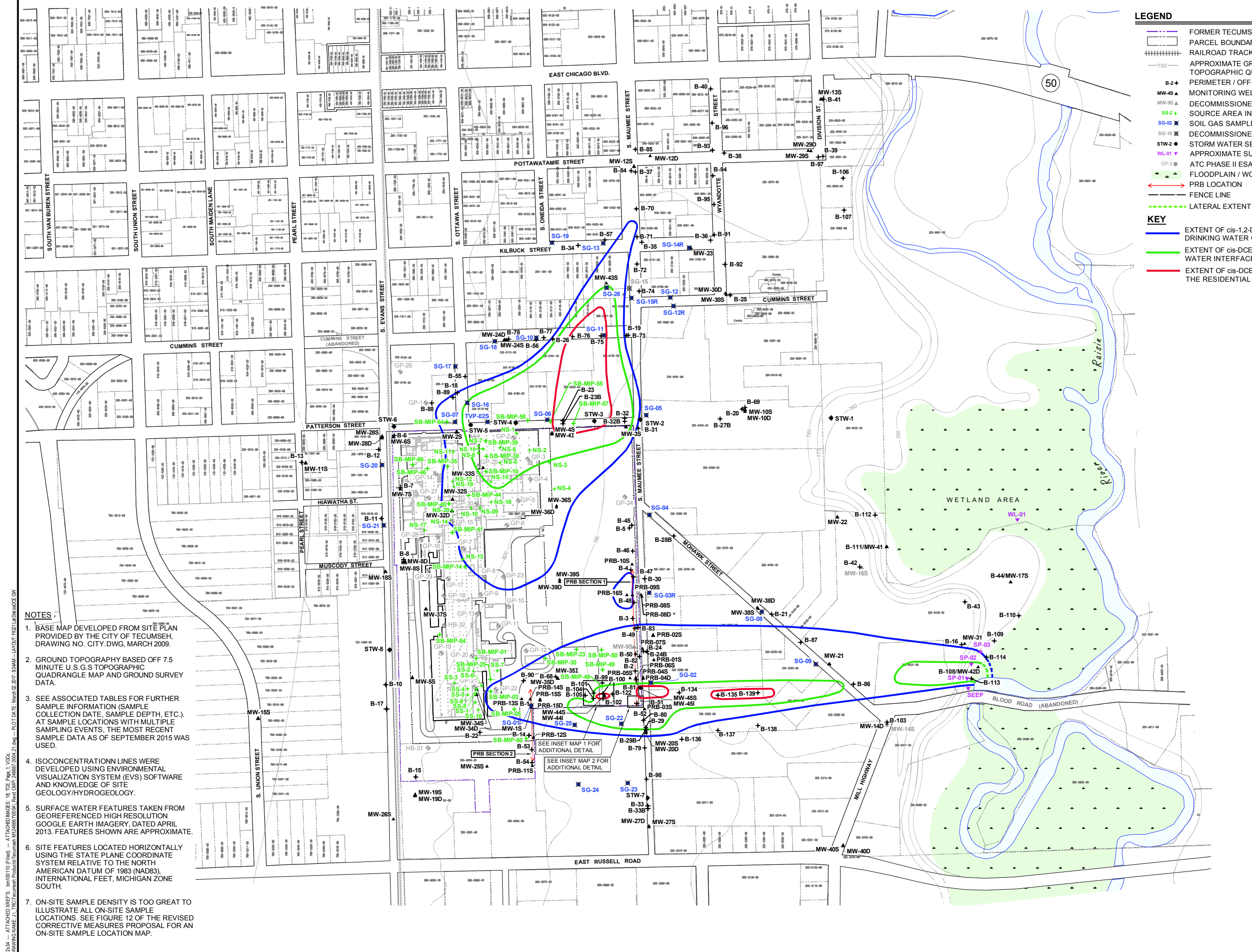
DRAWN BY: DStahle PROJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCrookford
 DATE: FEBRUARY 2017

FIGURE 9

FILE NO.: 246667.0004.20.DWG

1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

2034 - ATTACHED XREFS: bml0010 (F146) - ATTACHED IMAGES: 17, TCE, Page 1, V003
DRAWING NAME: J:\TRC\Tecumseh Products\246667\T0004L_Rev DWP_246667.0004.dwg - PLOT DATE: March 02, 2017 - 9:30AM - LAYOUT: E200.LAYOUT.DWG

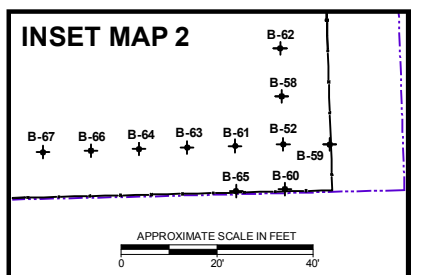
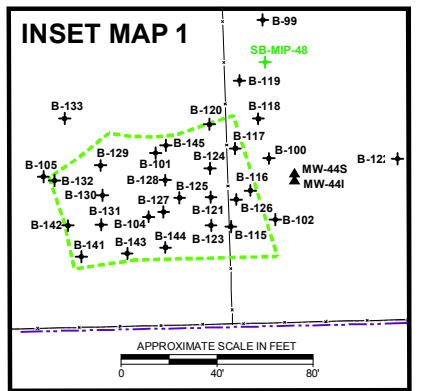


LEGEND

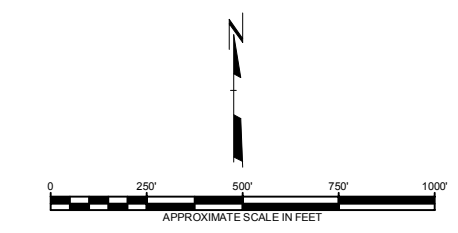
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MONITORING WELL LOCATION AND NUMBER
- DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SOIL GAS SAMPLE LOCATION AND NUMBER
- DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- ATC PHASE II ESA BORING LOCATION AND NUMBER
- FLOODPLAIN / WOODED WETLAND AREA
- PRB LOCATION
- FENCE LINE
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

KEY

- EXTENT OF cis-1,2-DICHLOROETHENE (cis-DCE) ABOVE THE MICHIGAN PART 201 DRINKING WATER CRITERION (70 ug/L)
- EXTENT OF cis-DCE ABOVE THE MICHIGAN PART 201 GROUNDWATER SURFACE WATER INTERFACE CRITERION (620 ug/L)
- EXTENT OF cis-DCE ABOVE THE SITE SPECIFIC CLEANUP LEVEL PROTECTIVE OF THE RESIDENTIAL VAPOR INTRUSION MIGRATION PATHWAY (3,800 ug/L)



- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 3. SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.), AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 4. ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 5. SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 6. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 7. ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.



PROJECT				
FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN				
TITLE: LATERAL DISTRIBUTION OF cis-DICHLOROETHENE IN GROUNDWATER				
NO.	BY	DATE	REVISION	APPD.
2	DGS	02/11/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 7	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM

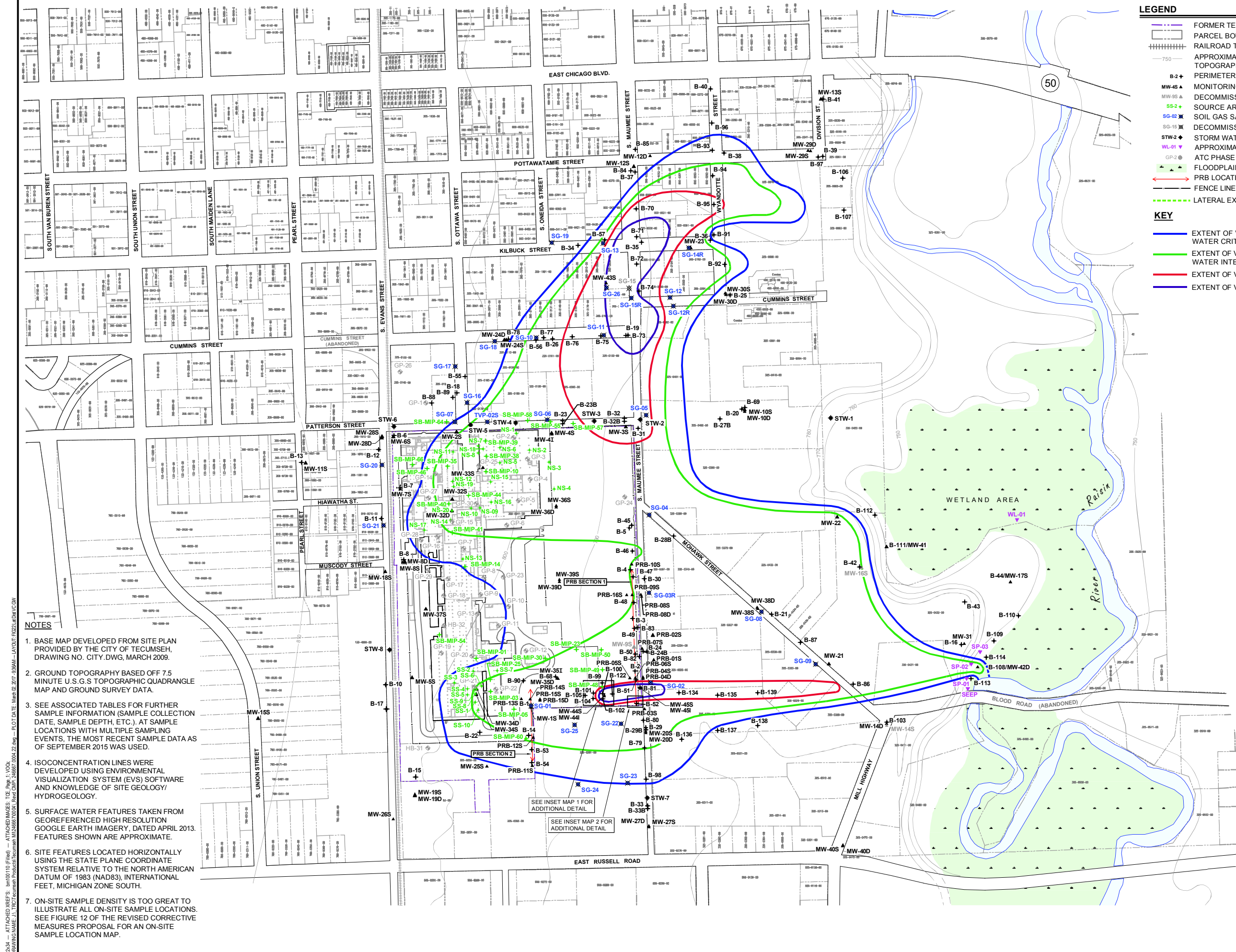
DRAWN BY:	DStahle	PROJ. NO.:	246667.0004
CHECKED BY:	SMetz		
APPROVED BY:	GCrookford		
DATE:	FEBRUARY 2017		

FIGURE 10

1540 Eisenhower Place
 Ann Arbor, MI 48108
 Phone: 734.971.7080
 www.trcsolutions.com

FILE NO.: 246667.0004.21.DWG

2/24/17 - ATTACHED XREFS: bml01010 (P) (W) - ATTACHED IMAGES: 18, 10E, Page 1, VOXX
 DRAWING NAME: J:\TRC\Tecumseh Products\246667\70004L_Rev 02.dwg - PLOT DATE: March 02, 2017 9:54AM - LAYOUT: FEZ11 (L) (D) (S) (D) (G)

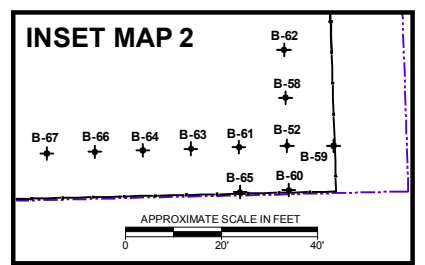
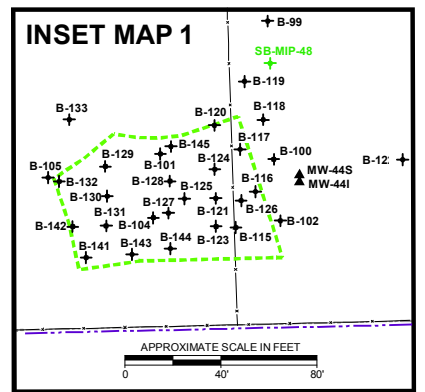


LEGEND

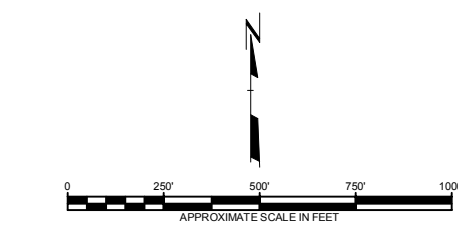
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- ▭ PARCEL BOUNDARY
- ▬ RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- B-2+ MONITORING WELL LOCATION AND NUMBER
- MW-4S+ DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SS-2+ SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SG-02+ SOIL GAS SAMPLE LOCATION AND NUMBER
- SG-15+ DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STW-2+ STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- WL-01+ APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- GP-2+ ATC PHASE II ESA BORING LOCATION AND NUMBER
- ▲ FLOODPLAIN / WOODED WETLAND AREA
- ▬ PRB LOCATION
- ▬ FENCE LINE
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

KEY

- EXTENT OF VINYL CHLORIDE (VC) ABOVE THE MICHIGAN PART 201 DRINKING WATER CRITERION (2 ug/L)
- EXTENT OF VC ABOVE THE MICHIGAN PART 201 GROUNDWATER SURFACE WATER INTERFACE CRITERION (13 ug/L)
- EXTENT OF VC ABOVE 200 ug/L
- EXTENT OF VC ABOVE 1,000 ug/L



- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 3. SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.). AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 4. ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 5. SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 6. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 7. ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.



NO.	BY	DATE	REVISION	APPD.
2	DGS	02/11/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 7	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM

PROJECT: **FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN**

TITLE: **LATERAL DISTRIBUTION OF
VINYL CHLORIDE IN GROUNDWATER**

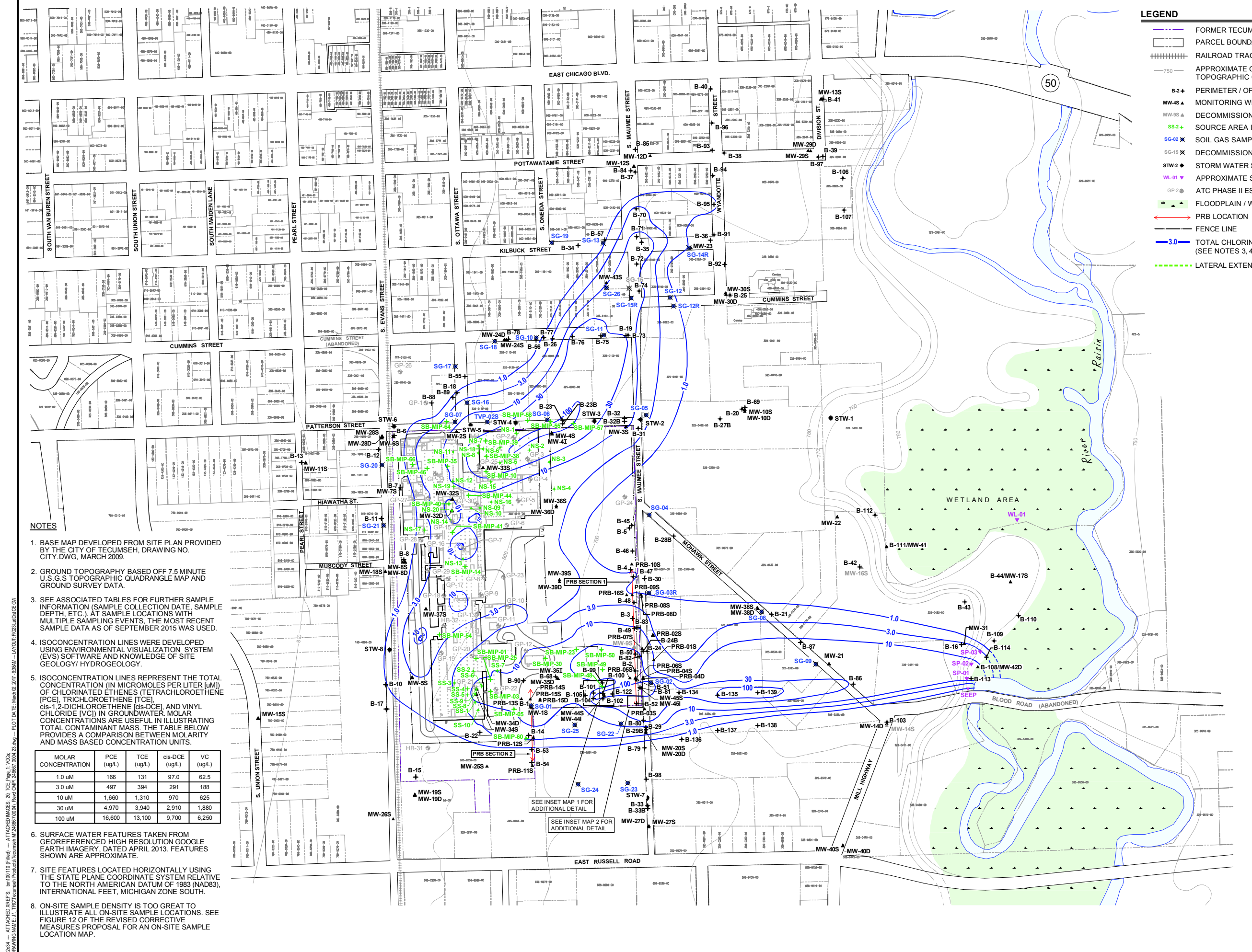
DRAWN BY: DS/Shele PROJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCroford
 DATE: FEBRUARY 2017

FIGURE 11

FILE NO.: 246667.0004.22DWG

1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

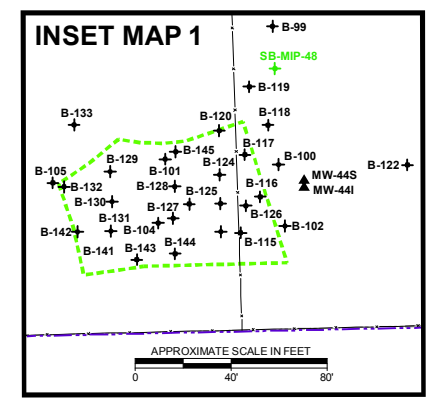
246667.0004.22DWG - ATTACHED XREFS: bml01010 (F146) - ATTACHED IMAGES: TCE, Page: 1, V00X
DRAWING NAME: J. TRC/Tecumseh Products/Tecumseh Michigan/246667.0004.22.dwg - PLOT DATE: March 02, 2017 - 3:59AM - LAYOUT: FE2214.DWG

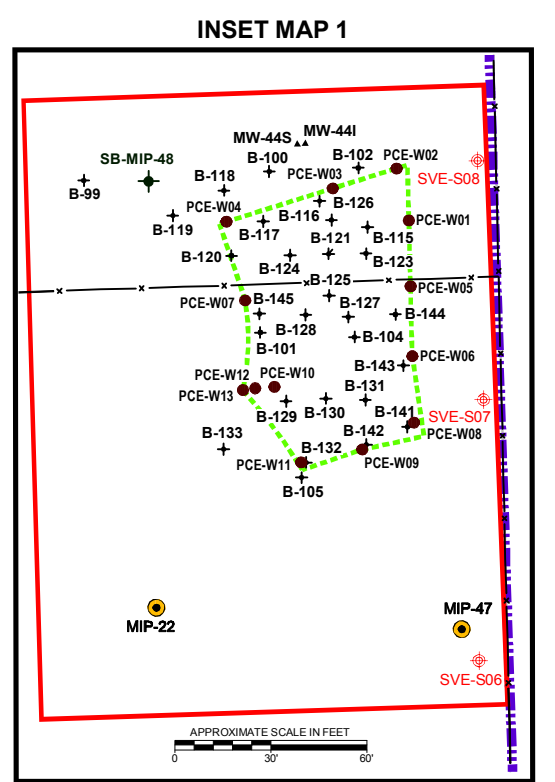
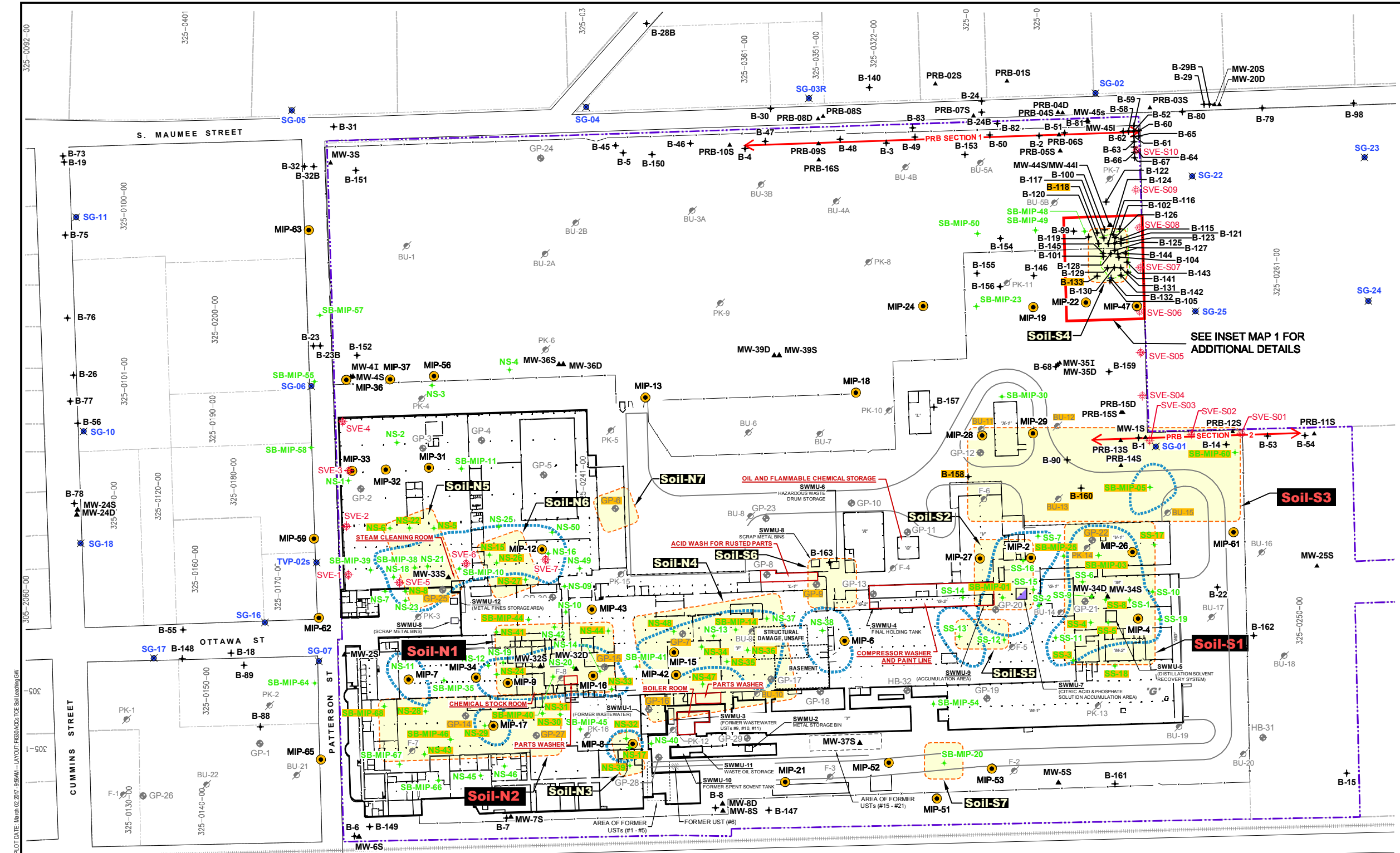


- LEGEND**
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
 - PARCEL BOUNDARY
 - ||||| RAILROAD TRACKS (APPROXIMATE LOCATION)
 - 750 APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
 - B-2+ PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
 - MW-4S+ MONITORING WELL LOCATION AND NUMBER
 - MW-9S+ DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
 - SS-2+ SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
 - SG-02+ SOIL GAS SAMPLE LOCATION AND NUMBER
 - SG-15+ DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
 - STW-2+ STORM WATER SEWER SAMPLE LOCATION AND NUMBER
 - WL-01+ APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
 - GP-2+ ATC PHASE II ESA BORING LOCATION AND NUMBER
 - ▲ FLOODPLAIN / WOODED WETLAND AREA
 - PRB LOCATION
 - FENCE LINE
 - 3.0 TOTAL CHLORINATED ETHENE ISOCONCENTRATION LINE (SEE NOTES 3, 4 AND 5)
 - LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

- NOTES**
- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 - GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 - SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.) AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS. THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 - ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 - ISOCONCENTRATION LINES REPRESENT THE TOTAL CONCENTRATION (IN MICROMOLES PER LITER [uM]) OF CHLORINATED ETHENES (TETRACHLOROETHENE [PCE], TRICHLOROETHENE [TCE], cis-1,2-DICHLOROETHENE [cis-DCE], AND VINYL CHLORIDE [VC]) IN GROUNDWATER. MOLAR CONCENTRATIONS ARE USEFUL IN ILLUSTRATING TOTAL CONTAMINANT MASS. THE TABLE BELOW PROVIDES A COMPARISON BETWEEN MOLARITY AND MASS BASED CONCENTRATION UNITS.
 - SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 - SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 - ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.

MOLAR CONCENTRATION	PCE (ug/L)	TCE (ug/L)	cis-DCE (ug/L)	VC (ug/L)
1.0 uM	166	131	97.0	62.5
3.0 uM	497	394	291	188
10 uM	1,660	1,310	970	625
30 uM	4,970	3,940	2,910	1,880
100 uM	16,600	13,100	9,700	6,250

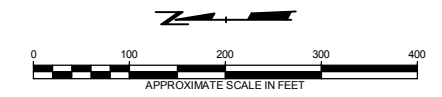




LEGEND	
	FORMER TECUMSEH PRODUCTS SITE BOUNDARY
	FENCE LINE
	PARCEL BOUNDARY
	PRB LOCATION
	PERIMETER/OFF-SITE INVESTIGATION BORING LOCATION AND NUMBER
	MONITORING WELL LOCATION AND NUMBER
	SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
	ATC PHASE II ESA BORING LOCATION AND NUMBER
	SOIL VAPOR EXTRACTION WELL LOCATION AND NUMBER
	SOIL GAS SAMPLE LOCATION AND NUMBER
	MEMBRANE INTERFACE PROBE (MIP) LOCATION AND NUMBER
	AKT BORING LOCATION AND NUMBER
	SIDEWALL SAMPLE LOCATION AND NUMBER
	AREA OF FORMER UST
	APPROXIMATE LOCATION OF FORMER SOLID WASTE MANAGEMENT UNITS (SWMUs)
	APPROXIMATE LOCATION OF HISTORICAL USE AREA
	LATERAL EXTENT OF PCE SOURCE EXCAVATION (ALSO SEE INSET MAP 1)
	OUTLINE OF PASSIVE SOIL GAS SURVEY AREAS WITH ELEVATED RESPONSE FOR TCE AND BREAKDOWN PRODUCTS
	ORANGE HIGHLIGHTING INDICATES TCE CONCENTRATIONS IN SOIL GREATER THAN 2.6 MG/KG
	YELLOW SHADING DELINEATES THE LATERAL EXTENT OF TRICHLOROETHENE AREAS OF INTEREST. SEE NOTE 3.

NOTES

- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
- SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
- SESOIL/AT123D MODELS ONLY ALLOW NUMERIC LABELING OF SOURCE AREAS AND POCs. IN ORDER TO DISTINGUISH BETWEEN THE SOURCE AREAS AND POCs IN THE NORTHERN AND SOUTHERN AREAS, THESE FEATURES ARE DESIGNATED WITH AN "N" OR AN "S" ON THIS FIGURE. FOR EXAMPLE, THE FIRST SOIL SOURCE INPUT INTO THE SOUTHERN MODEL, CALLED "SOURCE 1" IN THE MODEL FILES, IS DESIGNATED Soil-S1 (SOIL-SOUTHERN 1) ON THIS FIGURE.



PROJECT: FORMER TECUMSEH PRODUCTS SITE, TECUMSEH, MICHIGAN

TITLE: SOIL AREAS OF INTEREST FOR RISK ASSOCIATED WITH TRICHLOROETHENE LEACHING TO GROUNDWATER

FIGURE 13

DATE: FEBRUARY 2017

1540 Eisenhower Place, Ann Arbor, MI 48108, Phone: 734.971.7080, www.trcsolutions.com

2017-02-28 10:00:00 AM - PLOT DATE: March 02, 2017 - 9:56 AM - LAYOUT: FIG03A0001.TCE SoL Leaching.DWG

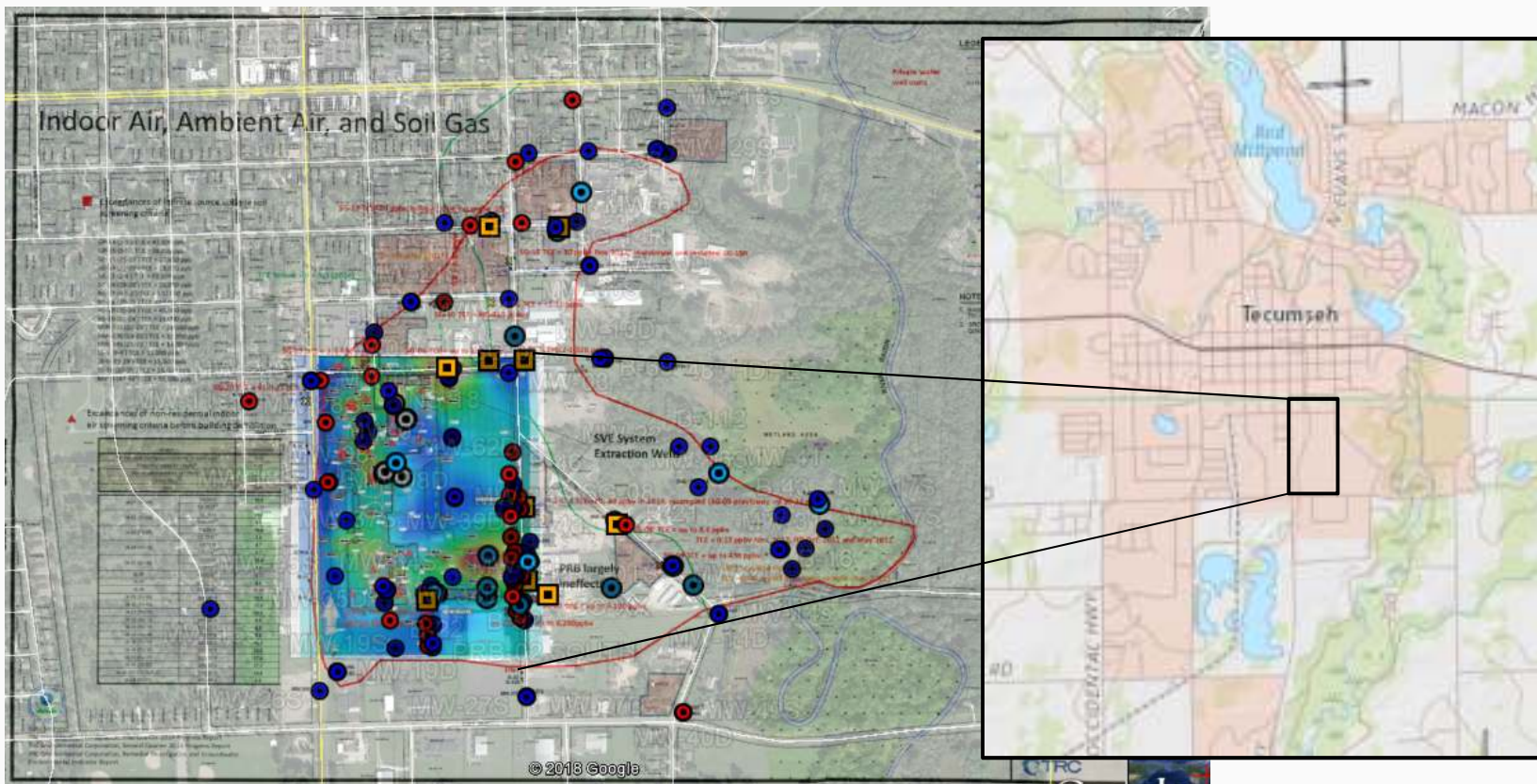
APPENDIX 2

FIGURES

FINAL DECISION & RESPONSE TO COMMENTS
TECUMSEH PRODUCTS COMPANY
TECUMSEH, MICHIGAN
EPA ID: MID 005 049 440



Tecumseh Products Company - 100 E. Patterson Street, Tecumseh, Michigan MID 005 049 440



U.S. Environmental Protection Agency
6/11/2019

Figure 1: Site Location



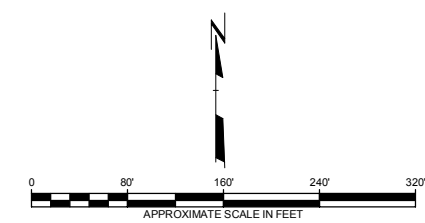
LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- TECUMSEH PRODUCTS BUILDING OUTLINE
- PARCEL BOUNDARY
- FENCE LINE
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE LOCATION OF FORMER SOLID WASTE MANAGEMENT UNITS (SWMUs)
- APPROXIMATE LOCATION OF HISTORICAL USE AREA

Demolition Key

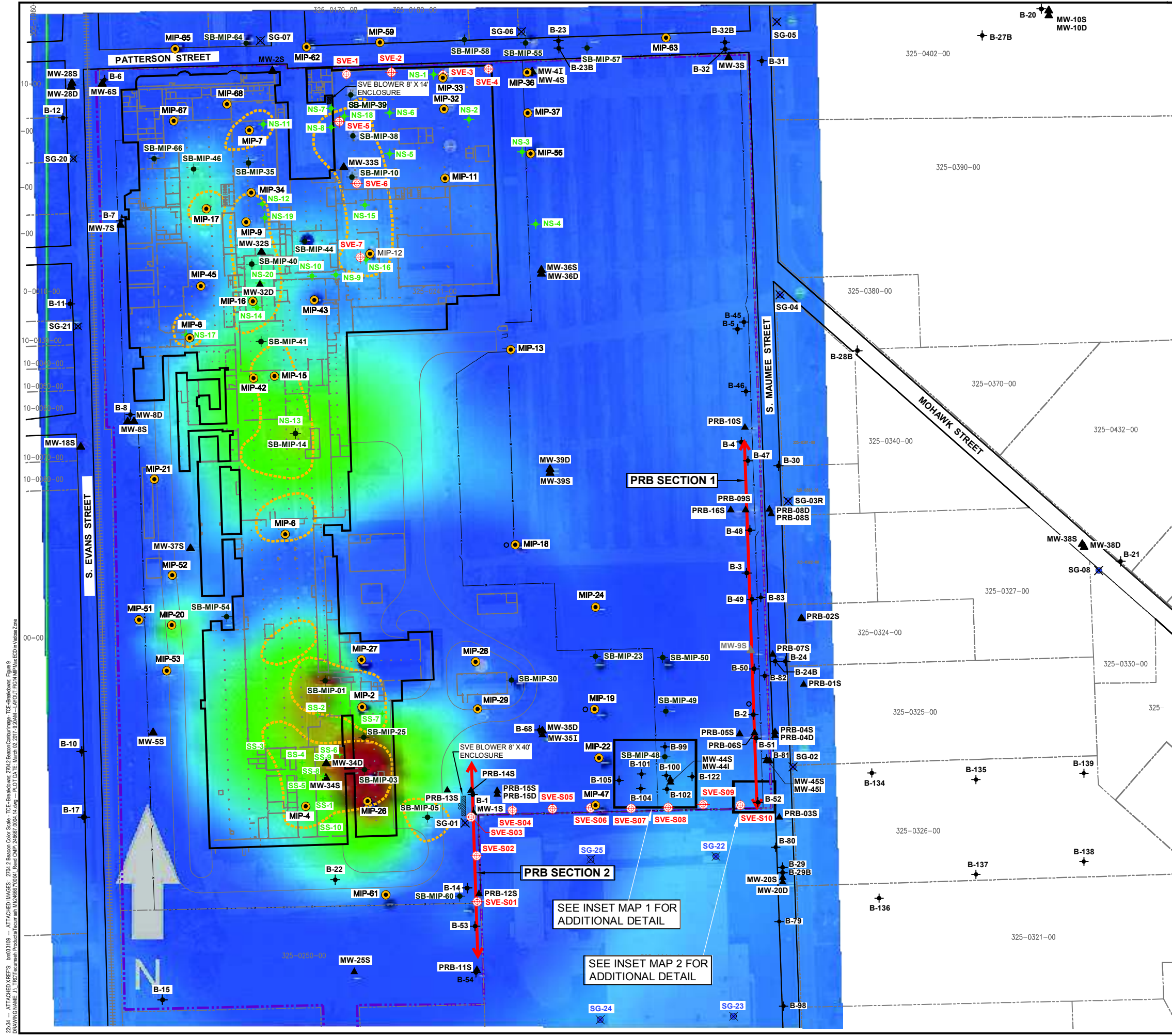
- PHASE I DEMOLITION AREA (DEMOLITION COMPLETE - 2013)
- PHASE II DEMOLITION AREA (DEMOLITION COMPLETE - 2013)
- PROPOSED DEMOLITION AREA (2017)

- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. SEE APPENDIX C OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR A DESCRIPTION OF SWMUs, UNDERGROUND STORAGE TANKS AND OTHER RELEVANT DATA.



NO.	BY	DATE	REVISION	APPD.
1	DGS	02/13/17	UPDATE NOTE 2, DEMOLITION AREA; ADD HISTORICAL USE AREA	SEM
FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN				
TITLE: SWMUs & PROCESS AREAS				
DRAWN BY: DSHehle		PROJ. NO.: 246667.0004		
CHECKED BY: SMetz		FIGURE 2		
APPROVED BY: GCrookford		DATE: FEBRUARY 2017		
		1540 Eisenhower Place Ann Arbor, MI 48108 Phone: 734-971-7080 www.trcsolutions.com		
FILE NO.: 246667.0004.02.dwg				

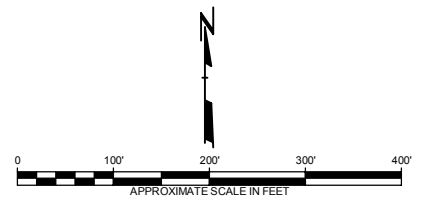
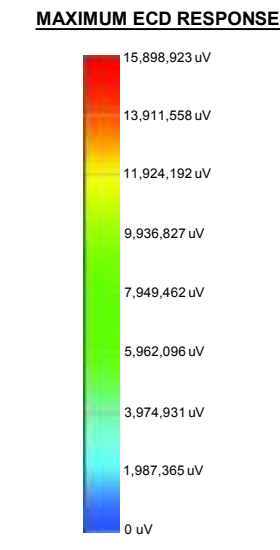
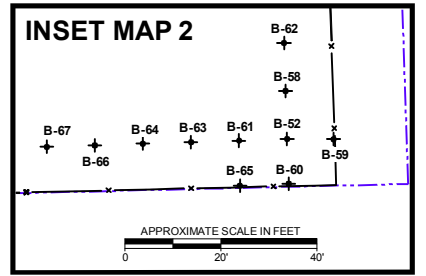
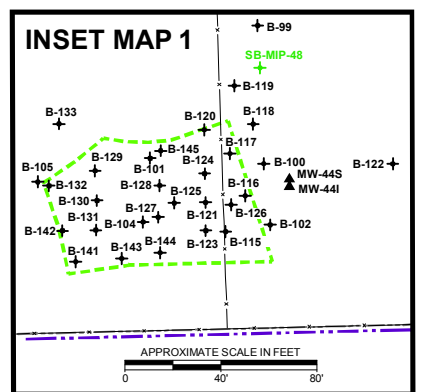
2/24/17 - ATTACHED XREFS: bnd3109 - ATTACHED IMAGES: DRAWING NAME: J:\TRC\Tecumseh Products\Tecumseh MI\246667\0004.dwg - PLOT DATE: March 02, 2017 - 8:59AM - LAYOUT: FIG02:Site Features & Demo Areas



LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MONITORING WELL LOCATION AND NUMBER
- DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SOIL GAS SAMPLE LOCATION AND NUMBER
- MEMBRANE INTERFACE PROBE (MIP) LOCATION AND NUMBER
- EXTRACTION WELL LOCATION AND NUMBER
- PRB LOCATION
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)
- FENCE LINE
- OUTLINE OF PASSIVE SOIL GAS SURVEY AREAS WITH ELEVATED RESPONSE FOR TCE AND BREAKDOWN PRODUCTS

- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 3. ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.
 4. TCE BREAKDOWN PRODUCTS INCLUDE cis-1,2-DICHLOROETHENE; trans-1,2-DICHLOROETHENE; 1,1-DICHLOROETHENE; AND VINYL CHLORIDE.
 5. LATERAL DISTRIBUTION OF ECD RESPONSE MAPPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE TO KRIG MIP DATA.
 6. VADOSE ZONE INCLUDES ALL DEPTHS FROM THE GROUND SURFACE TO THE MAXIMUM OBSERVED WATER TABLE (APPROXIMATELY 2 FEET ABOVE THE WATER TABLE AT THE TIME OF THE INVESTIGATION).



SEE INSET MAP 1 FOR ADDITIONAL DETAIL

SEE INSET MAP 2 FOR ADDITIONAL DETAIL

2/24/17 - ATTACHED XREFS: hnd03109 - ATTACHED IMAGES: 2704_2 Balcon Color Scale - TCE-Breakdowns_27042 Balcon Contour Image - TCE-Breakdowns - Figure 8
 DRAWING NAME: J:\TRC\Tecumseh Products\Tecumseh MI\246667\2004_14.dwg - PLOT DATE: March 02, 2017 - 9:24 AM - LAYOUT: FIG 14 MIP Max ECD in Vadose Zone

NO.	BY	DATE	REVISION	APPD.
1	DGS	02/13/17	ADD NEW 2016 GROUNDWATER SAMPLE LOCATIONS, NOTES 445	

PROJECT: FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN

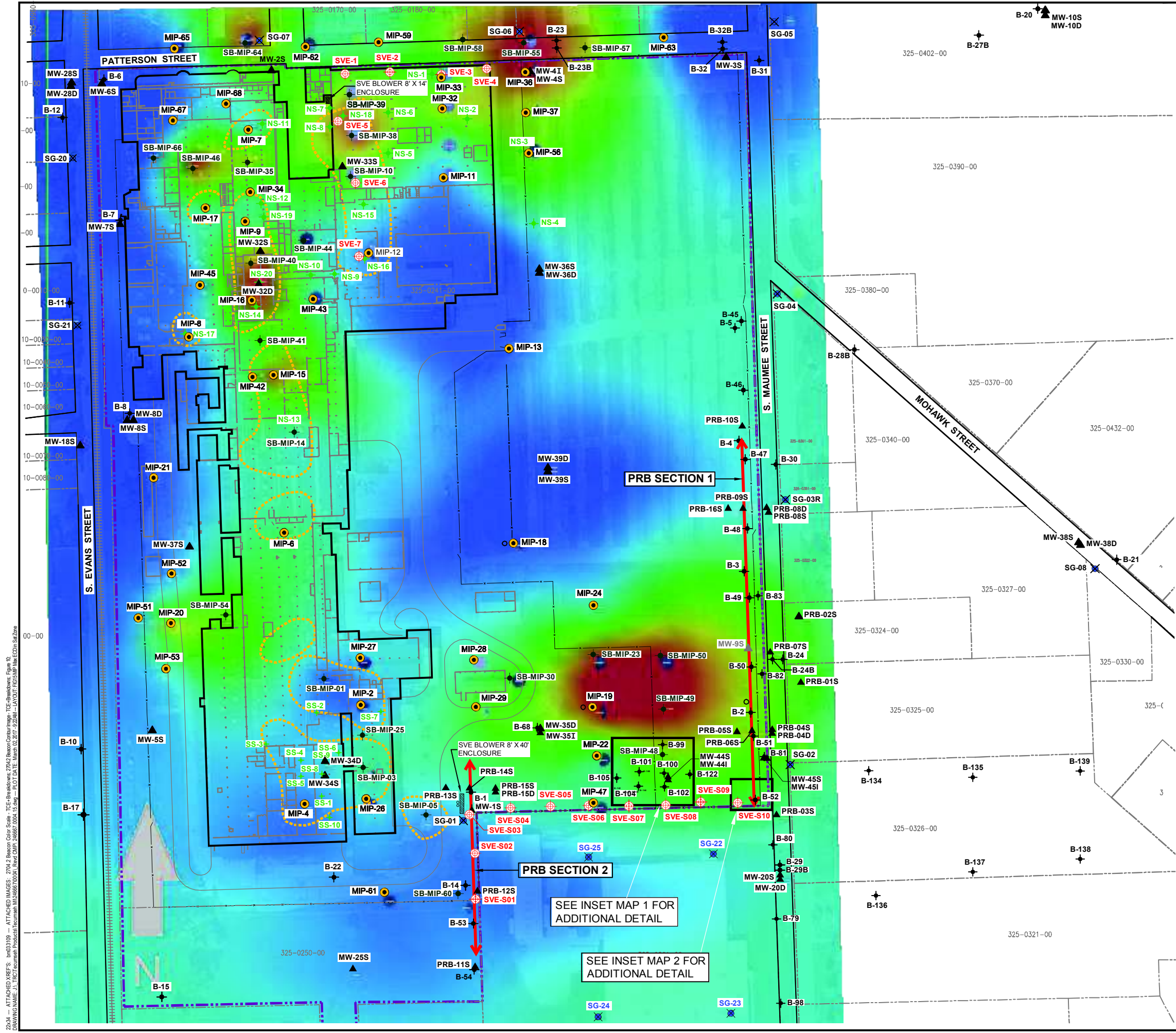
TITLE: MIP INVESTIGATION RESULTS
DISTRIBUTION OF MAXIMUM ECD RESPONSE
IN VADOSE ZONE

DRAWN BY: DStehle PROJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCrookford
 DATE: FEBRUARY 2017

FIGURE 6

TRC 1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

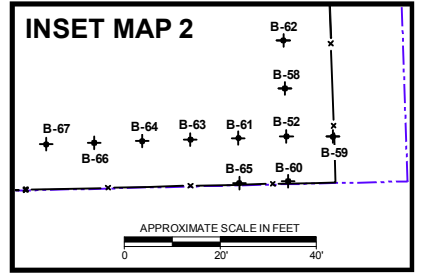
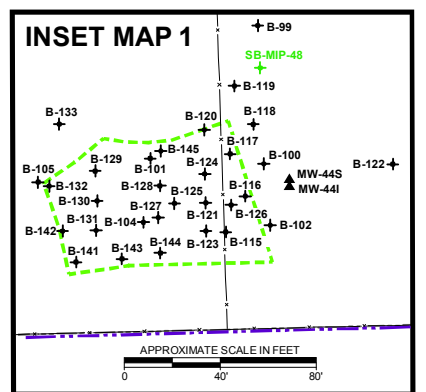
FILE NO.: 246667.0004.14.DWG



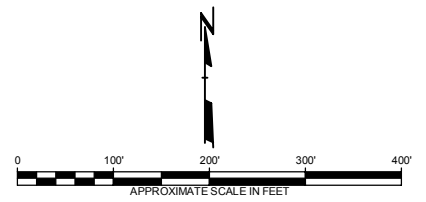
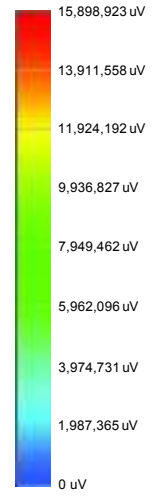
LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MONITORING WELL LOCATION AND NUMBER
- DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SOIL GAS SAMPLE LOCATION AND NUMBER
- MEMBRANE INTERFACE PROBE (MIP) LOCATION AND NUMBER
- EXTRACTION WELL LOCATION AND NUMBER
- PRB LOCATION
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)
- FENCE LINE
- OUTLINE OF PASSIVE SOIL GAS SURVEY AREAS WITH ELEVATED RESPONSE FOR TCE AND BREAKDOWN PRODUCTS

- ### NOTES
- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 - SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 - ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.
 - TCE BREAKDOWN PRODUCTS INCLUDE cis-1,2-DICHLOROETHENE; trans-1,2-DICHLOROETHENE; 1,1-DICHLOROETHENE; AND VINYL CHLORIDE.
 - LATERAL DISTRIBUTION OF ECD RESPONSE MAPPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE TO KRIG MIP DATA.
 - SATURATED ZONE INCLUDES ALL DEPTHS FROM THE MAXIMUM OBSERVED WATER TABLE (APPROXIMATELY 2 FEET ABOVE THE WATER TABLE AT THE TIME OF THE INVESTIGATION) TO THE SURFACE OF THE UNDERLYING CLAY CONFINING UNIT.



MAXIMUM ECD RESPONSE

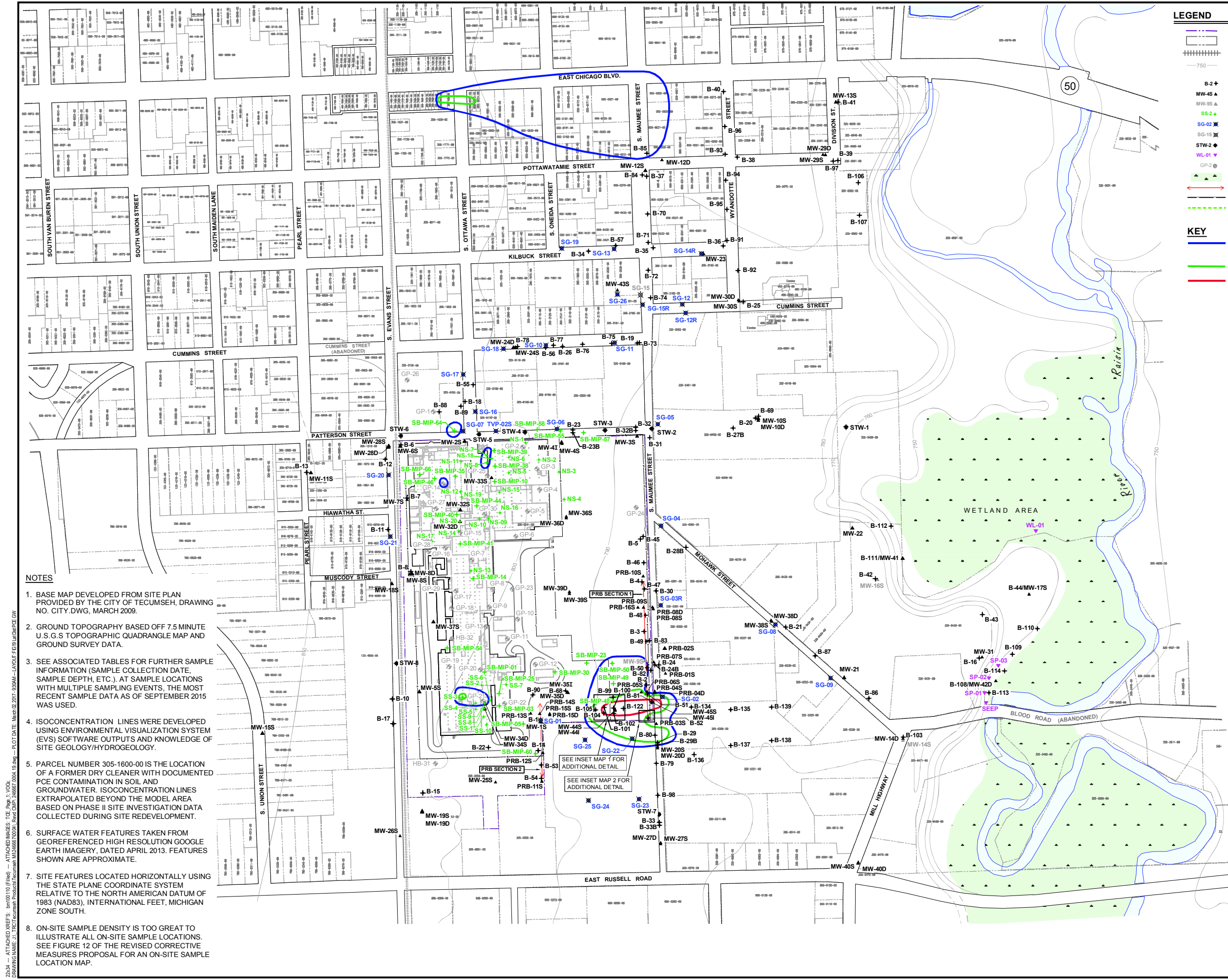


SEE INSET MAP 1 FOR ADDITIONAL DETAIL

SEE INSET MAP 2 FOR ADDITIONAL DETAIL

2/24/17 ATTACHED XREFS: bnd03109 - ATTACHED IMAGES: 2704_2 BldgColor Scale - TCE-Breakdowns, 2704_2 BldgColor Scale - TCE-Breakdowns, Figure 10; DRAWING NAME: J:\TRC\Tecumseh Products\246667\246667\246667_15.dwg - PLOT DATE: March 02, 2017 - 9:27AM - LAYOUT: F015MIP Max ECD in Sat Zone

NO.	BY	DATE	REVISION	APPD.
1	DGS	02/13/17	ADD NEW 2016 GROUNDWATER SAMPLE LOCATIONS, NOTES 445	
PROJECT: FORMER TECUMSEH PRODUCTS SITE, TECUMSEH, MICHIGAN				
TITLE: MIP INVESTIGATION RESULTS, DISTRIBUTION OF MAXIMUM ECD RESPONSE IN SATURATED ZONE				
DRAWN BY: DStehle		PROJ. NO.: 246667.0004		
CHECKED BY: SMetz				
APPROVED BY: GCrookford		FIGURE 7		
DATE: FEBRUARY 2017				
		1540 Eisenhower Place Ann Arbor, MI 48108 Phone: 734.971.7080 www.trcsolutions.com		
FILE NO:		246667.0004.15.DWG		

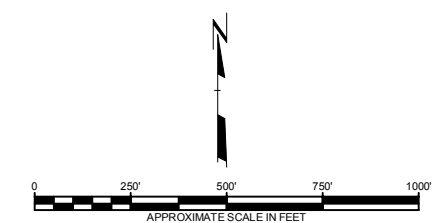
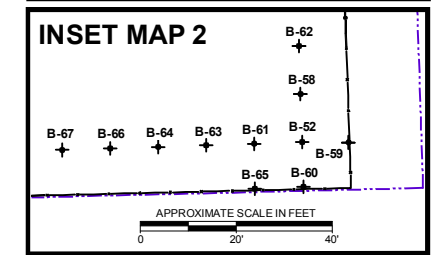
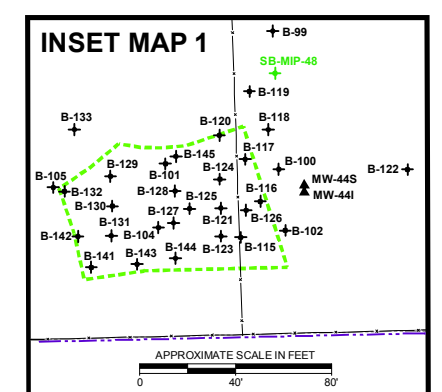


LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MONITORING WELL LOCATION AND NUMBER
- DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SOIL GAS SAMPLE LOCATION AND NUMBER
- DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- ATC PHASE II ESA BORING LOCATION AND NUMBER
- FLOODPLAIN / WOODED WETLAND AREA
- PRB LOCATION
- FENCE LINE
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

KEY

- EXTENT OF TETRACHLOROETHENE (PCE) ABOVE MICHIGAN PART 201 DRINKING WATER CRITERION (5 ug/L)
- EXTENT OF PCE ABOVE MICHIGAN PART 201 SURFACE WATER INTERFACE CRITERION (60 ug/L)
- EXTENT OF PCE ABOVE THE SITE SPECIFIC CLEANUP LEVEL PROTECTIVE OF THE RESIDENTIAL VAPOR INTRUSION MIGRATION PATHWAY (2,000 ug/L)



- NOTES**
- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 - GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 - SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.). AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 - ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE OUTPUTS AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 - PARCEL NUMBER 305-1600-00 IS THE LOCATION OF A FORMER DRY CLEANER WITH DOCUMENTED PCE CONTAMINATION IN SOIL AND GROUNDWATER. ISOCONCENTRATION LINES EXTRAPOLATED BEYOND THE MODEL AREA BASED ON PHASE II SITE INVESTIGATION DATA COLLECTED DURING SITE REDEVELOPMENT.
 - SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 - SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 - ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.

NO.	BY	DATE	REVISION	APPD.
2	DGS	02/11/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 8	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM

PROJECT: **FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN**

TITLE: **LATERAL DISTRIBUTION OF
TETRACHLOROETHENE IN GROUNDWATER**

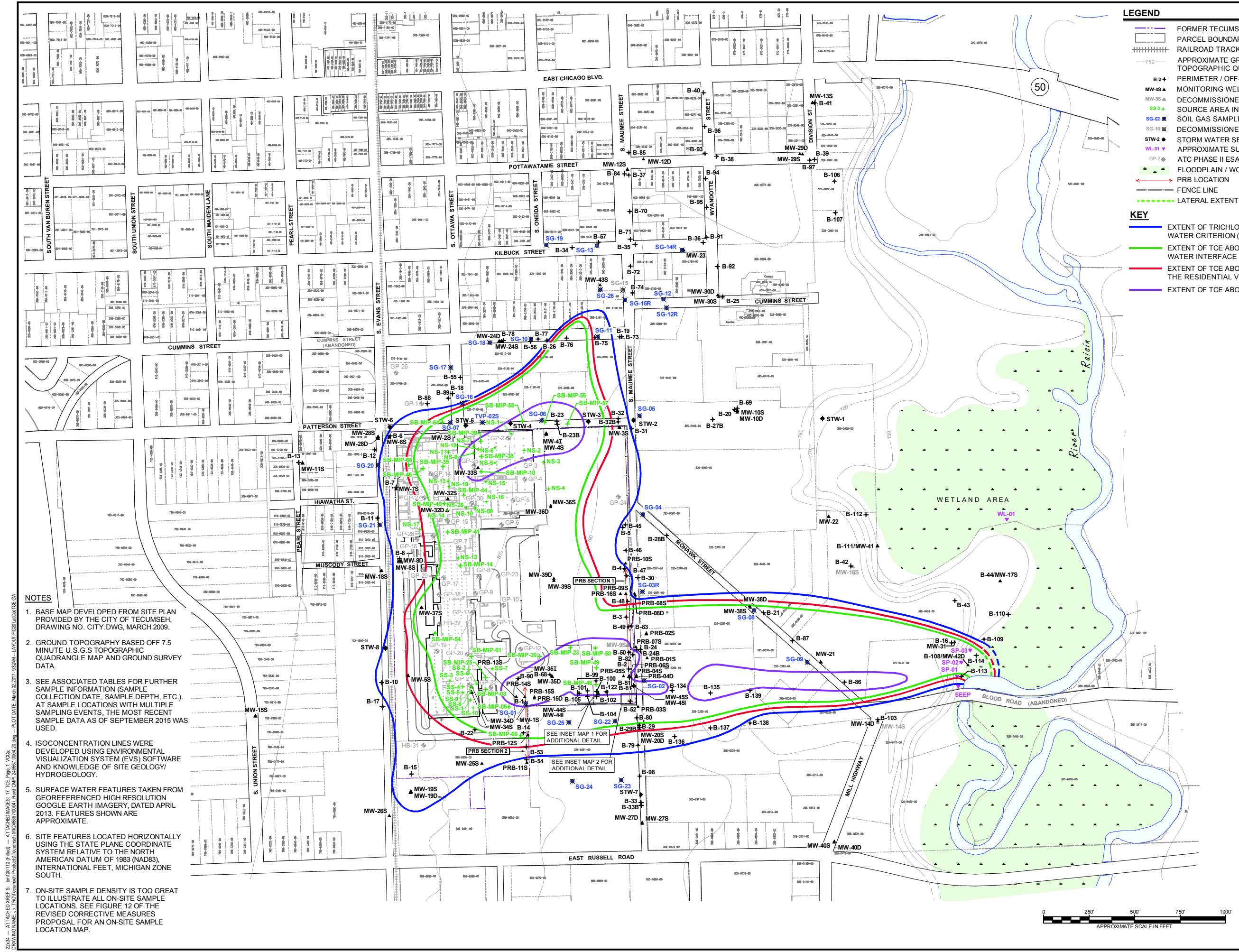
DRAWN BY: DShtle PROJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCroford
 DATE: FEBRUARY 2017

FIGURE 8

1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 246667.0004.19DWG

2/24 - ATTACHED XREFS: bml010 (F) - ATTACHED IMAGES: TCE, Page 1; V00X; DRAWING NAME: J:\TRC\Tecumseh Products\Tecomseh M246667\0004_19.dwg - PLOT DATE: March 02, 2017 - 9:30AM - LAYOUT: FEBR.DWG

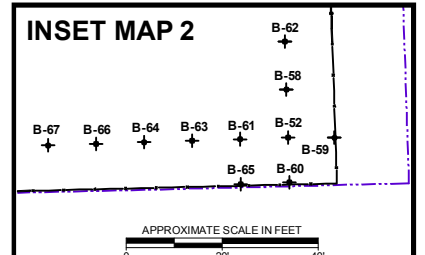
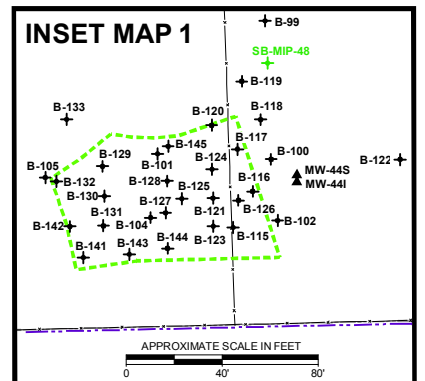


LEGEND

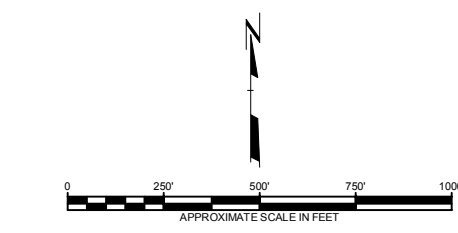
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MONITORING WELL LOCATION AND NUMBER
- DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SOIL GAS SAMPLE LOCATION AND NUMBER
- DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- ATC PHASE II ESA BORING LOCATION AND NUMBER
- FLOODPLAIN / WOODED WETLAND AREA
- PRB LOCATION
- FENCE LINE
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

KEY

- EXTENT OF TRICHLOROETHENE (TCE) ABOVE THE MICHIGAN PART 201 DRINKING WATER CRITERION (6 ug/L)
- EXTENT OF TCE ABOVE THE MICHIGAN PART 201 GROUNDWATER SURFACE WATER INTERFACE CRITERION (200 ug/L)
- EXTENT OF TCE ABOVE THE THE SITE SPECIFIC CLEANUP LEVEL PROTECTIVE OF THE RESIDENTIAL VAPOR INTRUSION MIGRATION PATHWAY (130 ug/L)
- EXTENT OF TCE ABOVE 2000 ug/L



- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 3. SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.), AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 4. ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 5. SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 6. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 7. ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.



FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN				
TITLE: LATERAL DISTRIBUTION OF TRICHLOROETHENE IN GROUNDWATER				
NO.	BY	DATE	REVISION	APPD.
2	DGS	02/11/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 7	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM

DATE: FEBRUARY 2017

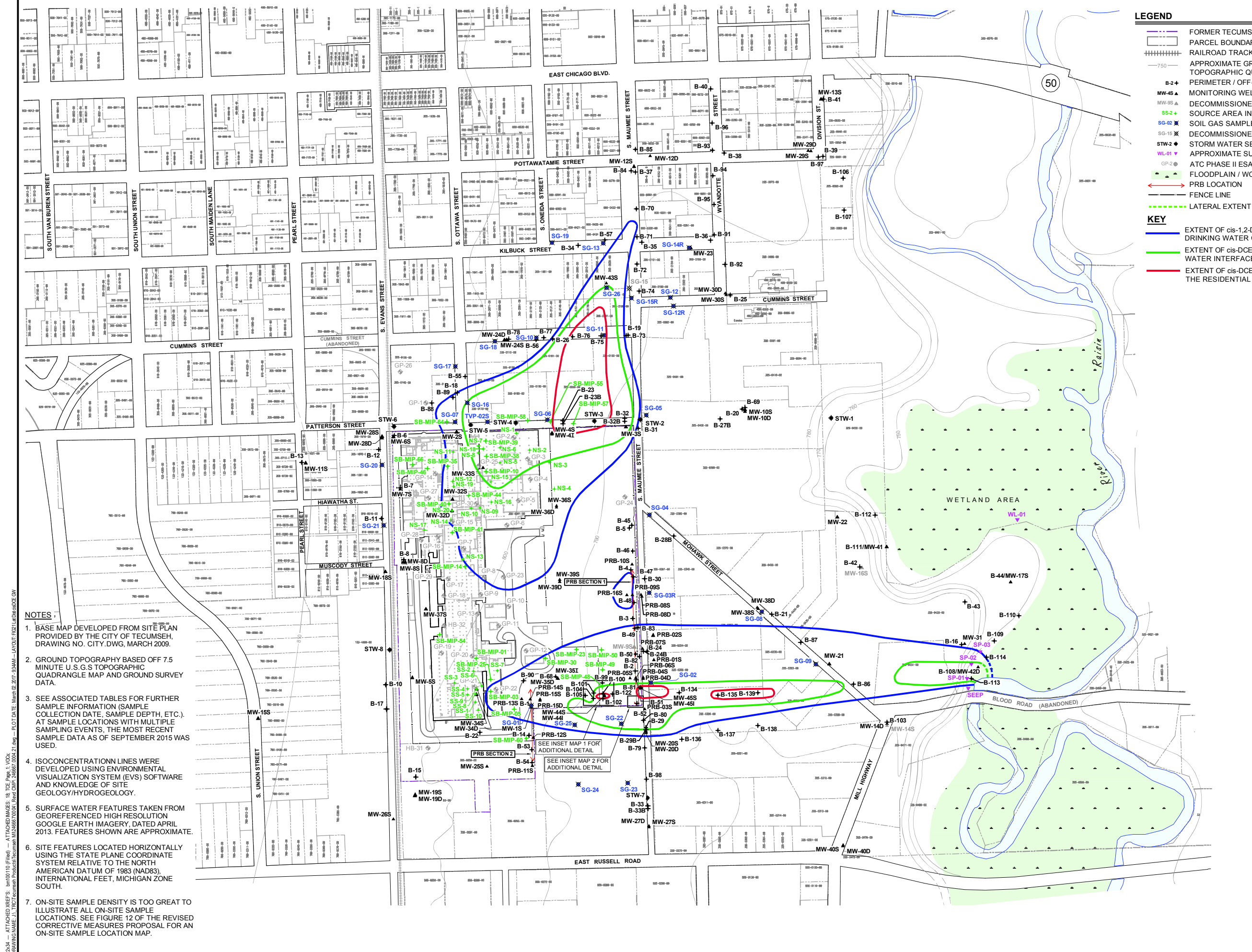
FIGURE 9

DRAWN BY: DStahle PROJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCrookford
 DATE: FEBRUARY 2017

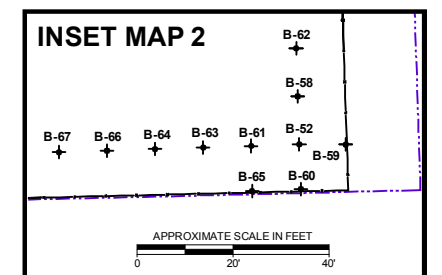
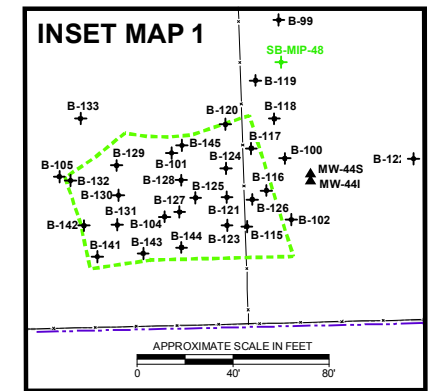
1540 Eisenhower Place
 Ann Arbor, MI 48108
 Phone: 734.971.7080
 www.trcsolutions.com

FILE NO.: 246667.0004.20.DWG

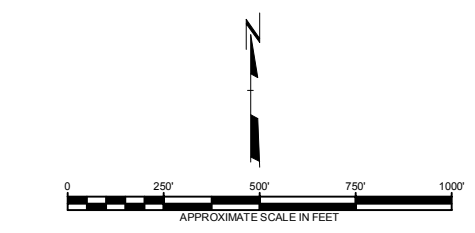
2/24/17 - ATTACHED XREFS: bml00110 (F146) - ATTACHED IMAGES: 17, 10E, Page 1, VOXX
 DRAWING NAME: J:\TRC\Tecumseh Products\246667\0004_20.dwg - PLOT DATE: March 02, 2017 - 9:30AM - LAYOUT: E200.LAYOUT.DWG



- LEGEND**
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
 - ▭ PARCEL BOUNDARY
 - ▬ RAILROAD TRACKS (APPROXIMATE LOCATION)
 - 750 APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
 - B-2+ PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
 - MW-45▲ MONITORING WELL LOCATION AND NUMBER
 - MW-55▲ DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
 - SS-2+ SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
 - SG-62x SOIL GAS SAMPLE LOCATION AND NUMBER
 - SG-15x DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
 - STW-2◆ STORM WATER SEWER SAMPLE LOCATION AND NUMBER
 - WL-01▼ APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
 - GP-2● ATC PHASE II ESA BORING LOCATION AND NUMBER
 - ▭ FLOODPLAIN / WOODED WETLAND AREA
 - ▬ PRB LOCATION
 - ▬ FENCE LINE
 - LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)
- KEY**
- EXTENT OF cis-1,2-DICHLOROETHENE (cis-DCE) ABOVE THE MICHIGAN PART 201 DRINKING WATER CRITERION (70 ug/L)
 - EXTENT OF cis-DCE ABOVE THE MICHIGAN PART 201 GROUNDWATER SURFACE WATER INTERFACE CRITERION (620 ug/L)
 - EXTENT OF cis-DCE ABOVE THE SITE SPECIFIC CLEANUP LEVEL PROTECTIVE OF THE RESIDENTIAL VAPOR INTRUSION MIGRATION PATHWAY (3,800 ug/L)

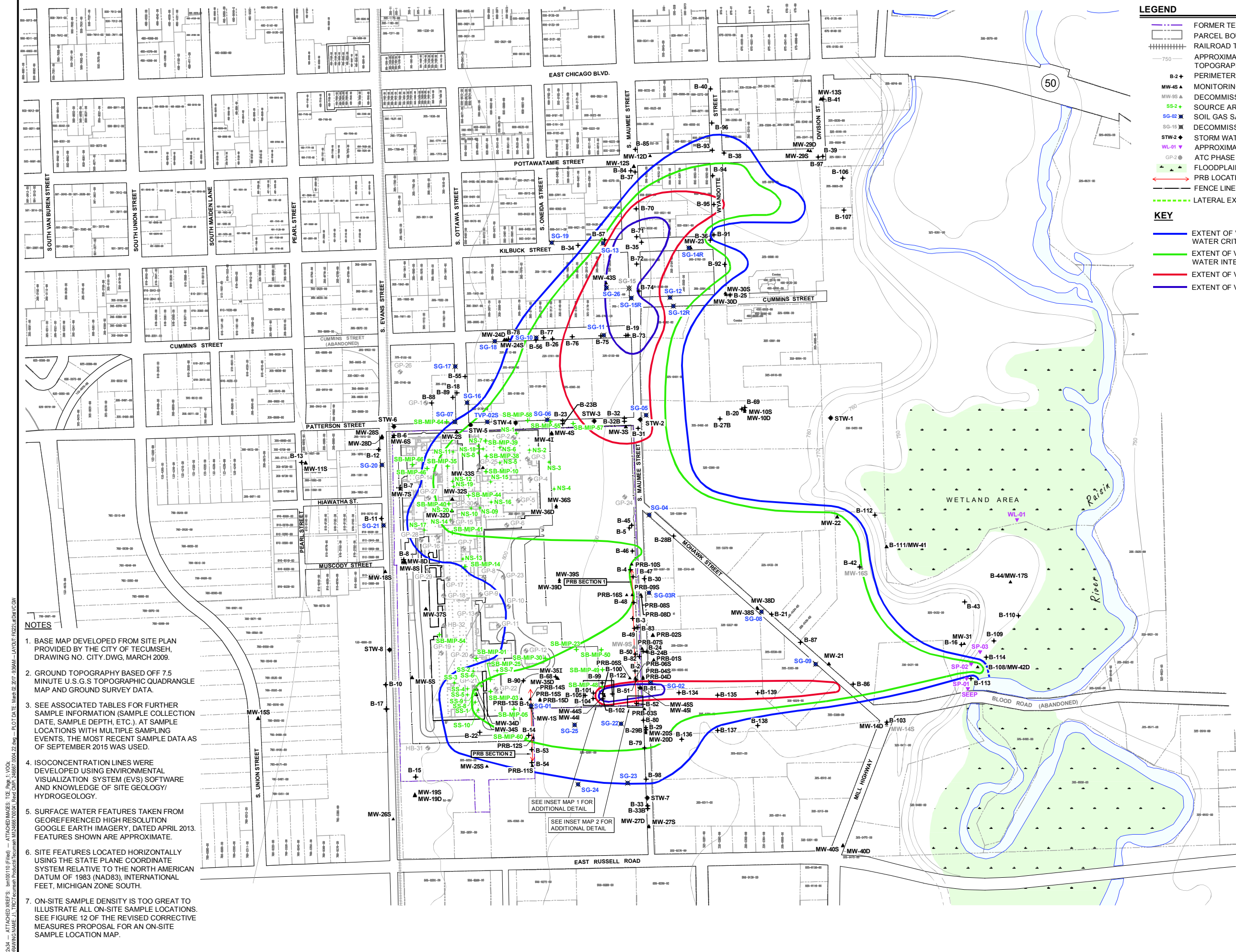


- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 3. SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.), AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 4. ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 5. SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 6. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 7. ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.



PROJECT				
FORMER TECUMSEH PRODUCTS SITE TECUMSEH, MICHIGAN				
TITLE:				
LATERAL DISTRIBUTION OF cis-DICHLOROETHENE IN GROUNDWATER				
DRAWN BY:	DStahle	PROJ. NO.:	246667.0004	
CHECKED BY:	SMetz			
APPROVED BY:	GCrookford	FIGURE 10		
DATE:	FEBRUARY 2017			
		1540 Eisenhower Place Ann Arbor, MI 48108 Phone: 734.971.7080 www.trcsolutions.com		
FILE NO.:	246667.0004.21.DWG			

2024 - ATTACHED XREFS: bml01010 (F146) - ATTACHED IMAGES: 18 (ICE Page 1, VOX) DRAWING NAME: J:\TRC\Tecumseh Products\246667.0004_21.dwg - PLOT DATE: March 02, 2017 9:54AM - LAYOUT: F021 (L) (DMS) DSC.DWG

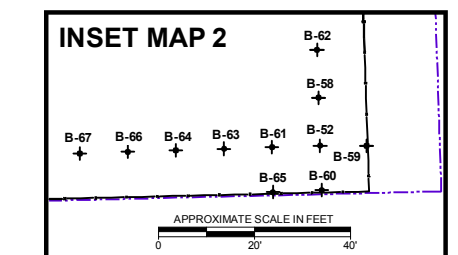
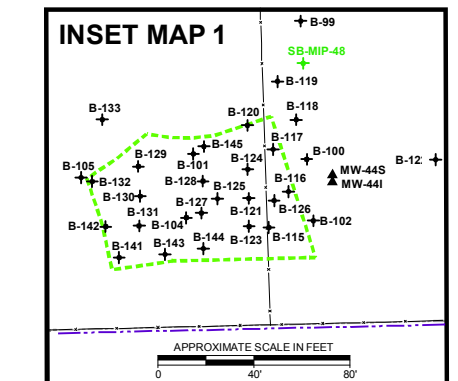


LEGEND

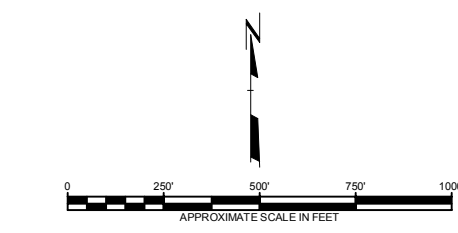
- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- PARCEL BOUNDARY
- RAILROAD TRACKS (APPROXIMATE LOCATION)
- APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MW-4S ▲ MONITORING WELL LOCATION AND NUMBER
- MW-9S ▲ DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SS-2+ ✖ SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SG-02 ✖ SOIL GAS SAMPLE LOCATION AND NUMBER
- SG-15 ✖ DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STW-2 ✖ STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- WL-01 ✖ APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- GP-2 ● ATC PHASE II ESA BORING LOCATION AND NUMBER
- FLOODPLAIN / WOODED WETLAND AREA
- PRB LOCATION
- FENCE LINE
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

KEY

- EXTENT OF VINYL CHLORIDE (VC) ABOVE THE MICHIGAN PART 201 DRINKING WATER CRITERION (2 ug/L)
- EXTENT OF VC ABOVE THE MICHIGAN PART 201 GROUNDWATER SURFACE WATER INTERFACE CRITERION (13 ug/L)
- EXTENT OF VC ABOVE 200 ug/L
- EXTENT OF VC ABOVE 1,000 ug/L



- NOTES**
- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 - GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 - SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.). AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS, THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 - ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 - SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 - SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 - ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.



NO.	BY	DATE	REVISION	APPD.
2	DGS	02/11/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 7	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM

PROJECT: FORMER TECUMSEH PRODUCTS SITE, TECUMSEH, MICHIGAN

TITLE: LATERAL DISTRIBUTION OF VINYL CHLORIDE IN GROUNDWATER

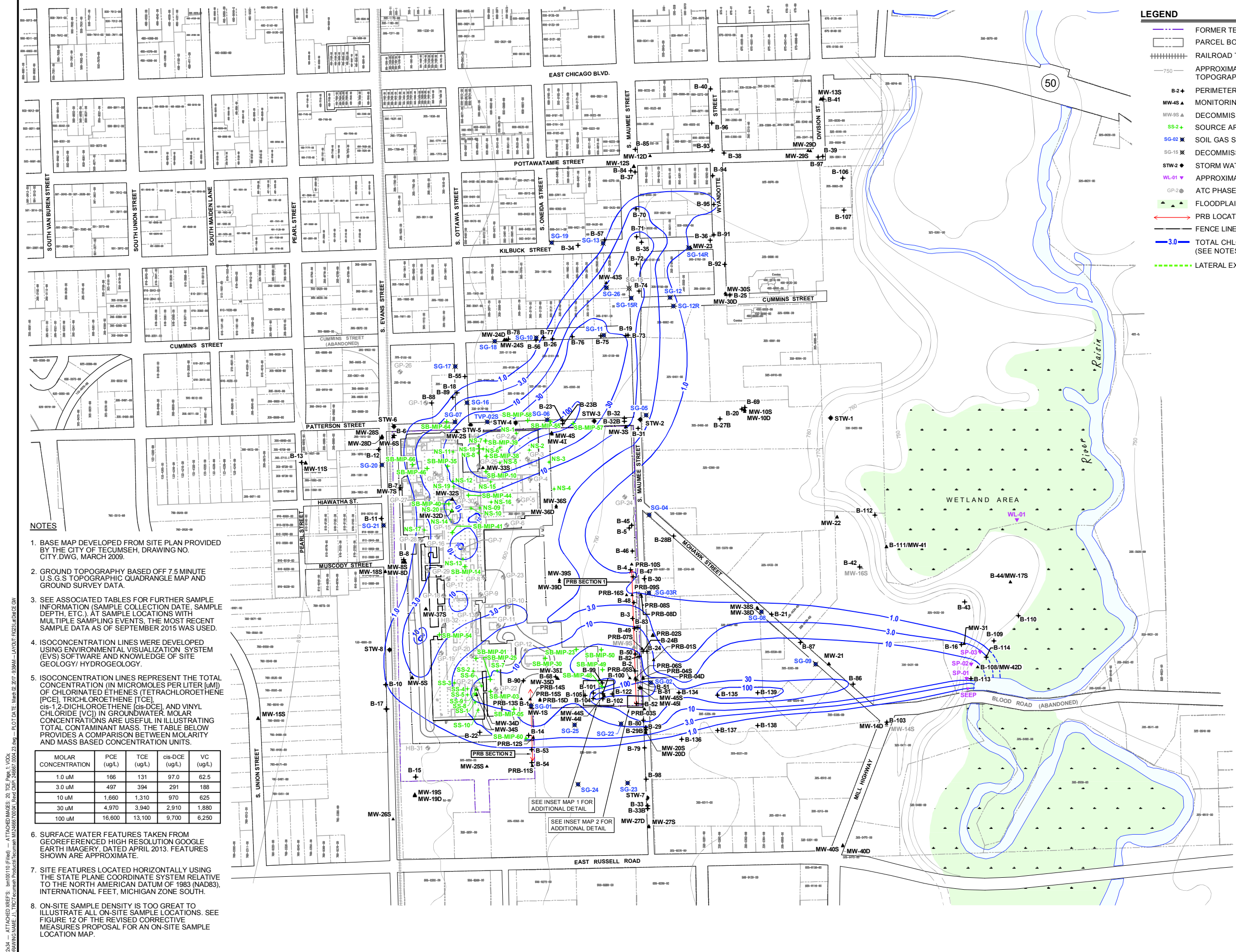
DRAWN BY: DS/Shele PROJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCroford
 DATE: FEBRUARY 2017

FIGURE 11

1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 246667.0004.22DWG

246667.0004.22DWG - ATTACHED XREFS: bml01010 (F146) - ATTACHED IMAGES: TCE, Page: 1, V00X
DRAWING NAME: J:\TRC\Tecumseh Products\TCE\246667.0004.22.dwg - PLOT DATE: March 02, 2017 - 3:59AM - LAYOUT: FE2214.DWG

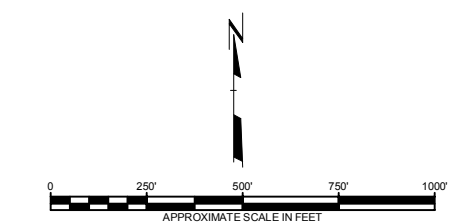
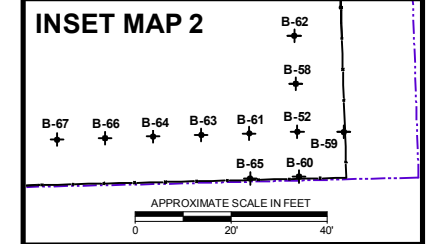
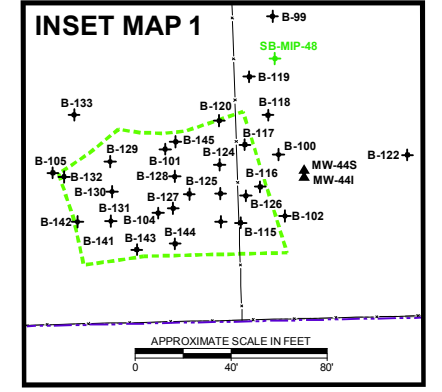


LEGEND

- FORMER TECUMSEH PRODUCTS SITE BOUNDARY
- ▭ PARCEL BOUNDARY
- ||||| RAILROAD TRACKS (APPROXIMATE LOCATION)
- 750 APPROXIMATE GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S. TOPOGRAPHIC QUADRANGLE MAP
- B-2+ PERIMETER / OFF-SITE INVESTIGATION SOIL BORING LOCATION AND NUMBER
- MW-4S ▲ MONITORING WELL LOCATION AND NUMBER
- MW-9S ▲ DECOMMISSIONED MONITORING WELL LOCATION AND NUMBER
- SS-2+ SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
- SG-02 ✕ SOIL GAS SAMPLE LOCATION AND NUMBER
- SG-15 ✕ DECOMMISSIONED SOIL GAS SAMPLE LOCATION AND NUMBER
- STW-2 ✕ STORM WATER SEWER SAMPLE LOCATION AND NUMBER
- WL-01 ▼ APPROXIMATE SURFACE WATER SAMPLE LOCATION AND NUMBER
- GP-2 ● ATC PHASE II ESA BORING LOCATION AND NUMBER
- ▲ FLOODPLAIN / WOODED WETLAND AREA
- ← PRB LOCATION
- FENCE LINE
- 3.0 TOTAL CHLORINATED ETHENE ISOCONCENTRATION LINE (SEE NOTES 3, 4 AND 5)
- LATERAL EXTENT OF PCE SOIL SOURCE REMOVED (SEE INSET MAP 1)

- NOTES**
1. BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
 2. GROUND TOPOGRAPHY BASED OFF 7.5 MINUTE U.S.G.S TOPOGRAPHIC QUADRANGLE MAP AND GROUND SURVEY DATA.
 3. SEE ASSOCIATED TABLES FOR FURTHER SAMPLE INFORMATION (SAMPLE COLLECTION DATE, SAMPLE DEPTH, ETC.) AT SAMPLE LOCATIONS WITH MULTIPLE SAMPLING EVENTS. THE MOST RECENT SAMPLE DATA AS OF SEPTEMBER 2015 WAS USED.
 4. ISOCONCENTRATION LINES WERE DEVELOPED USING ENVIRONMENTAL VISUALIZATION SYSTEM (EVS) SOFTWARE AND KNOWLEDGE OF SITE GEOLOGY/HYDROGEOLOGY.
 5. ISOCONCENTRATION LINES REPRESENT THE TOTAL CONCENTRATION (IN MICROMOLES PER LITER [µM]) OF CHLORINATED ETHENES (TETRACHLOROETHENE [PCE], TRICHLOROETHENE [TCE], cis-1,2-DICHLOROETHENE [cis-DCE], AND VINYL CHLORIDE [VC]) IN GROUNDWATER. MOLAR CONCENTRATIONS ARE USEFUL IN ILLUSTRATING TOTAL CONTAMINANT MASS. THE TABLE BELOW PROVIDES A COMPARISON BETWEEN MOLARITY AND MASS BASED CONCENTRATION UNITS.
 6. SURFACE WATER FEATURES TAKEN FROM GEOREFERENCED HIGH RESOLUTION GOOGLE EARTH IMAGERY, DATED APRIL 2013. FEATURES SHOWN ARE APPROXIMATE.
 7. SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
 8. ON-SITE SAMPLE DENSITY IS TOO GREAT TO ILLUSTRATE ALL ON-SITE SAMPLE LOCATIONS. SEE FIGURE 12 OF THE REVISED CORRECTIVE MEASURES PROPOSAL FOR AN ON-SITE SAMPLE LOCATION MAP.

MOLAR CONCENTRATION	PCE (ug/L)	TCE (ug/L)	cis-DCE (ug/L)	VC (ug/L)
1.0 µM	166	131	97.0	62.5
3.0 µM	497	394	291	188
10 µM	1,660	1,310	970	625
30 µM	4,970	3,940	2,910	1,880
100 µM	16,600	13,100	9,700	6,250



2	DGS	02/21/17	ADD 2016 MONITORING WELLS, PCE EXCAVATION AREA, NOTE 8	SEM
1	DGS	05/18/16	ADD B-134 THROUGH B-139, ADJUST RIVER LOCATION	SEM
NO.	BY	DATE	REVISION	APPD.

PROJECT: **FORMER TECUMSEH PRODUCTS SITE
TECUMSEH, MICHIGAN**

TITLE: **LATERAL DISTRIBUTION OF
CHLORINATED ETHENES IN GROUNDWATER**

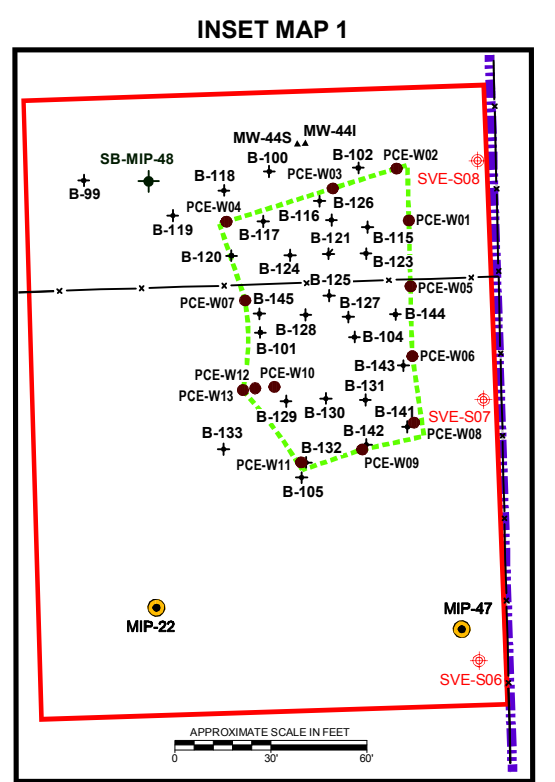
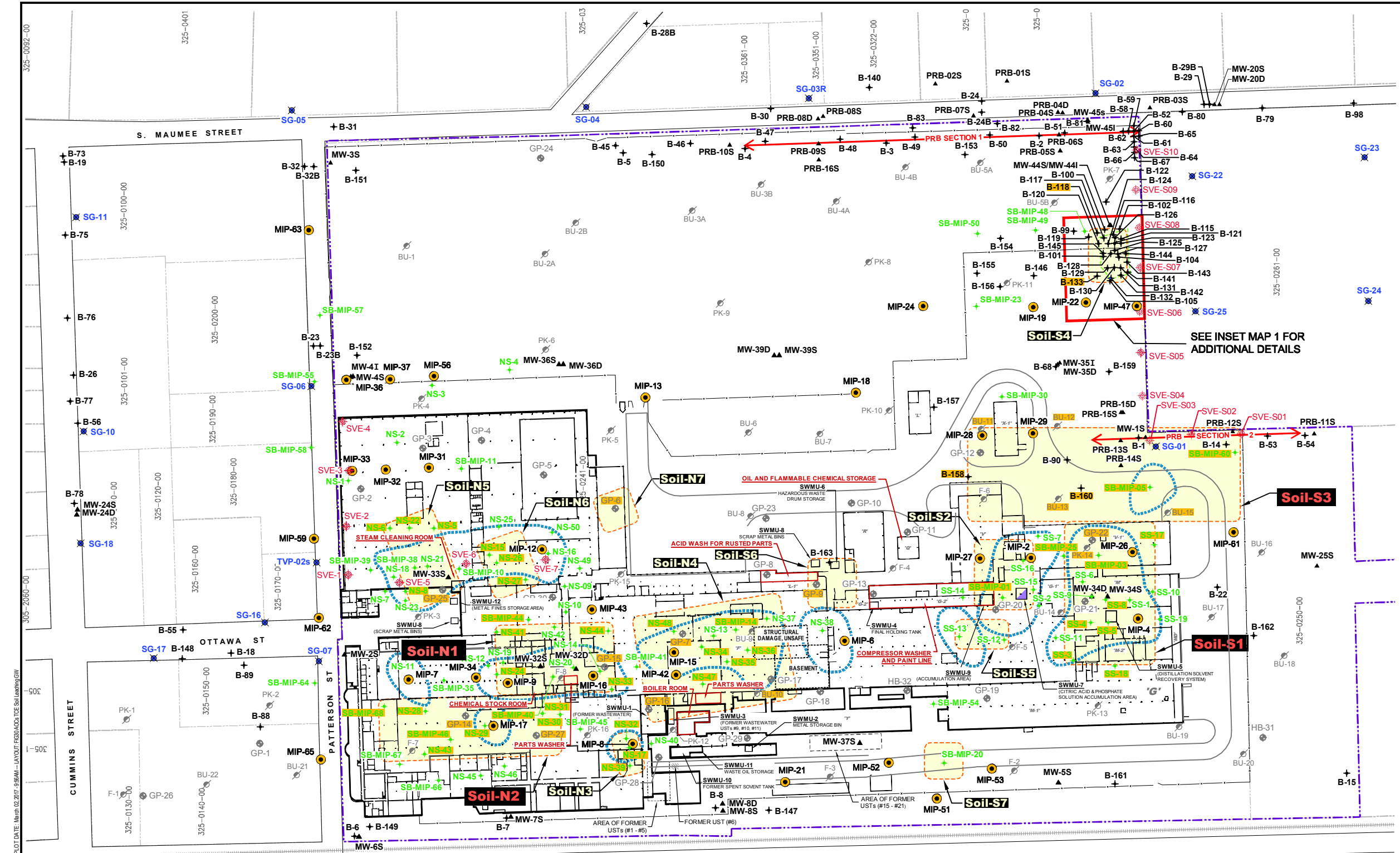
DRAWN BY: DStable PROJ. NO.: 246667.0004
 CHECKED BY: SMetz
 APPROVED BY: GCrockford
 DATE: FEBRUARY 2017

FIGURE 12

CTRC 1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 246667.0004.23.DWG

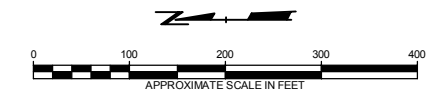
2/24/17 - ATTACHED XREFS: b:\m1010 (f146) - ATTACHED IMAGES: 20_TCE_PCE_VOCs - LAYOUT: FIG12.LAYOUT.DWG
DRAWING NAME: J:\TRC\Tecumseh Products\Technical\2016\246667\FIG12.dwg - PLOT DATE: March 02, 2017 - 9:39AM - LAYOUT: FIG12.LAYOUT.DWG



LEGEND			
	FORMER TECUMSEH PRODUCTS SITE BOUNDARY		SS-10 SOURCE AREA INVESTIGATION BORING LOCATION AND NUMBER
	FENCE LINE		GP-23 ATC PHASE II ESA BORING LOCATION AND NUMBER
	PARCEL BOUNDARY		SVE-7 SOIL VAPOR EXTRACTION WELL LOCATION AND NUMBER
	PRB LOCATION		SG-01 SOIL GAS SAMPLE LOCATION AND NUMBER
	B-8 PERIMETER/OFF-SITE INVESTIGATION BORING LOCATION AND NUMBER		MIP-40 MEMBRANE INTERFACE PROBE (MIP) LOCATION AND NUMBER
	MW-8D MONITORING WELL LOCATION AND NUMBER		F-7 AKT BORING LOCATION AND NUMBER
			PCE-W04 SIDEWALL SAMPLE LOCATION AND NUMBER
			AREA OF FORMER UST
			APPROXIMATE LOCATION OF FORMER SOLID WASTE MANAGEMENT UNITS (SWMUs)
			APPROXIMATE LOCATION OF HISTORICAL USE AREA
			LATERAL EXTENT OF PCE SOURCE EXCAVATION (ALSO SEE INSET MAP 1)
			OUTLINE OF PASSIVE SOIL GAS SURVEY AREAS WITH ELEVATED RESPONSE FOR TCE AND BREAKDOWN PRODUCTS
			ORANGE HIGHLIGHTING INDICATES TCE CONCENTRATIONS IN SOIL GREATER THAN 2.6 MG/KG
			YELLOW SHADING DELINEATES THE LATERAL EXTENT OF TRICHLOROETHENE AREAS OF INTEREST. SEE NOTE 3.

NOTES

- BASE MAP DEVELOPED FROM SITE PLAN PROVIDED BY THE CITY OF TECUMSEH, DRAWING NO. CITY.DWG, MARCH 2009.
- SITE FEATURES LOCATED HORIZONTALLY USING THE STATE PLANE COORDINATE SYSTEM RELATIVE TO THE NORTH AMERICAN DATUM OF 1983 (NAD 83), INTERNATIONAL FEET, MICHIGAN ZONE SOUTH.
- SESOILAT123D MODELS ONLY ALLOW NUMERIC LABELING OF SOURCE AREAS AND POCs. IN ORDER TO DISTINGUISH BETWEEN THE SOURCE AREAS AND POCs IN THE NORTHERN AND SOUTHERN AREAS, THESE FEATURES ARE DESIGNATED WITH AN "N" OR AN "S" ON THIS FIGURE. FOR EXAMPLE, THE FIRST SOIL SOURCE INPUT INTO THE SOUTHERN MODEL, CALLED "SOURCE 1" IN THE MODEL FILES, IS DESIGNATED Soil-S1 (SOIL-SOUTHERN 1) ON THIS FIGURE.



PROJECT: FORMER TECUMSEH PRODUCTS SITE, TECUMSEH, MICHIGAN

TITLE: SOIL AREAS OF INTEREST FOR RISK ASSOCIATED WITH TRICHLOROETHENE LEACHING TO GROUNDWATER

DRAWN BY: DSHeHe PROJ. NO.: 246667.0004

CHECKED BY: SMetz

APPROVED BY: GCrackford

DATE: FEBRUARY 2017

FIGURE 13

1540 Eisenhower Place
Ann Arbor, MI 48108
Phone: 734.971.7080
www.trcsolutions.com

FILE NO.: 246667.0004.30.dwg

2034 - ATTACHED XREFS: bml01010 (fwd) - ATTACHED IMAGES: DRAWINGNAME: J:\TRC\Tecumseh Products\Technical\246667\0004_30.dwg - PLOT DATE: March 02, 2017 9:56AM - LAYOUT: F303A003.TCE Soil Leaching.DWG

APPENDIX 3

**DECLARATION OF RESTRICTIVE COVENANT & GROUNDWATER
USE ORDINANCE**

FINAL DECISION & RESPONSE TO COMMENTS
TECUMSEH PRODUCTS COMPANY
TECUMSEH, MICHIGAN
EPA ID: MID 005 049 440



6

DECLARATION OF RESTRICTIVE COVENANT

U.S. EPA Docket No: RCRA-05-2010-0012
MDEQ Reference No.: RC-OWMRP-111-16-005
Facility MID No: MID-005-049-440

This Declaration of Restrictive Covenant is made to protect public health, safety, or welfare, or the environment pursuant to the provisions of Part 111, Hazardous Waste Management, Michigan Compiled Laws (MCL) 324.11101 *et seq.* (Part 111) and the applicable sections of Part 201, Environmental Remediation, MCL 324.20101 *et seq.* (Part 201) of the Natural Resources and Environmental Protection Act, 1994 PA 451, as amended (NREPA), MCL 324.101 *et seq.* and the administrative rules promulgated pursuant to those Parts, MAC R 299.9101 *et seq.* and MAC R 299.5101 *et seq.* and the Solid Waste Disposal Act, commonly referred to as the Resource Conservation and Recovery Act of 1976 (RCRA), as amended by the Hazardous and Solid Waste Amendments of 1984, 42 U.S.C. §§ 6901 *et seq.*

This Declaration of Restrictive Covenant ("Restrictive Covenant") is made on the ¹⁶ day of August, 2016, by 100 E. Patterson, LLC, whose address is 110 Research Park Way, Dundee, MI 48131, a Michigan limited liability company ("Grantor"), for the benefit of (i) Michigan Department of Environmental Quality (MDEQ), whose address is 525 West Allegan Street, PO Box 30473, Lansing, Michigan 48909-7973, (ii) the United States Environmental Protection Agency (USEPA), whose address is 77 W. Jackson Blvd., Chicago, IL 60604-3590, and (iii) Tecumseh Products Company, whose address is 5683 Hines Drive, Ann Arbor, MI 48108 ("Grantees").

This Restrictive Covenant has been made to prohibit or restrict activities that could result in unacceptable exposure to environmental contamination present at the property located at 100 E. Patterson, City of Tecumseh, County of Lenawee, Michigan, and legally described in Exhibit 1 ("Property").

The Property is currently subject to a Declaration of Environmental Restrictive Covenants dated December 18, 2009, recorded on January 14, 2010, at Liber 2396, Page 0535, of the records of the Lenawee County Register of Deeds ("Existing Declaration"). USEPA has consented to the amendment and replacement of the Existing Declaration with this Restrictive Covenant.

The Property's Tax ID Number is XT0-325-0241-00.

6500 ^{unl} Barristers Title

The Property, formerly owned by Tecumseh Products Company, is located at 100 E. Patterson Street, Tecumseh, Michigan (MID 005-049-440), and is subject to a USEPA Administrative Order on Consent dated March 29, 2010 (RCRA-05-2010-0012), which requires Tecumseh Products Company to develop a Final Corrective Measures Proposal. If approved, the USEPA will document its decision and rationale in a Final Decision and Response to Comments ("Final Decision"). Tecumseh Products Company will then be required to implement the corrective measures approved and published in the Final Decision.

The recording of this Restrictive Covenant is necessary to: 1) restrict unacceptable exposures to hazardous substances located on the Property; and 2) assure that the use of Property is consistent with the exposure assumptions utilized in the development of **on-site** nonresidential cleanup criteria and the exposure control measures relied upon in the Final Decision; and 3) to prevent damage or disturbance of monitoring wells or any other element of the corrective measures constructed on the Property.

The land or resource use restrictions contained in this Restrictive Covenant are based upon information currently available to the MDEQ and USEPA. Failure of the corrective measures to achieve and maintain the cleanup criteria, exposure controls, and requirements specified in the Final Decision; future changes in the environmental condition of the Property or changes in the cleanup criteria; the discovery of environmental conditions at the Property that were not accounted for in the Final Decision; or use of the Property in a manner inconsistent with the restrictions described herein, may result in this Restrictive Covenant not being protective of public health, safety, or welfare, or the environment. Additional restrictions and additional corrective measures, as approved by MDEQ and U.S. EPA, may become necessary and may result in an amendment to this Restrictive Covenant. The approved corrective measures shall be implemented by Grantee Tecumseh Products Company. Information pertaining to the environmental conditions at the Property and the corrective actions undertaken at the Property is on file with the MDEQ, Office of Waste Management and Radiological Protection, and with USEPA, Region V.

Exhibit 2, attached hereto, provides a survey and a map that identifies those portions of the Property that are subject to land use or resource use restrictions as specified herein.

Summary of Completed Corrective Measures

Hazardous substances listed in Exhibit 3 have been found in soils or groundwater at the Property in concentrations above the cleanup criteria for unrestricted residential use for relevant exposure pathways. The Property described in Exhibit 1 contains hazardous substances in excess of the concentrations that satisfy the cleanup criteria for unrestricted residential use and have not been addressed by the corrective measures that have been undertaken to date.

The following corrective measures have been or will be undertaken at the Property:

1. Construction of a Sub-Slab Depressurization System ("SSDS") in "S" Building, depicted on Exhibit 2.
2. Construction and operation of a Soil Vapor Extraction ("SVE") system in the northern portion of the site in and around "P" Building, depicted on Exhibit 2.

3. Construction and operation of a perimeter SVE system in the southeast portion of the site, depicted on Exhibit 2.
4. Construction of a Permeable Reactive Barrier ("PRB") on the eastern edge of the property, depicted on Exhibit 2.
5. Installation of groundwater monitoring wells and soil gas monitoring points, depicted on Exhibit 2.
6. Additional corrective measures to be described in the Final Decision, which may include, without limitation:
 - a. Expansion of existing SVE systems.
 - b. Remediation of affected soils.
 - c. Treatment of groundwater.
 - d. Additional monitoring wells and/or soil gas monitoring points and associated vapor intrusion controls.

Despite these corrective measures identified above, hazardous substances will remain present in soils or groundwater at levels that require controls to prevent unacceptable exposures.

Definitions

"Grantee" shall mean MDEQ, USEPA, and Tecumseh Products Company, their respective successor entities and assigns, and those persons or entities acting on their behalf.

"Grantor" shall mean 100 E. Patterson, LLC, the title holder of the Property at the time this Restrictive Covenant was executed, any persons or entities authorized to act on the title holder's behalf, and any future title holder of the Property or some relevant sub-portion of the Property.

"MDEQ" means the Michigan Department of Environmental Quality, its successor entities, and those persons or entities acting on its behalf.

"USEPA" means the United States Environmental Protection Agency, its successor entities, and those persons or entities acting on its behalf.

"Owner" means at any given time the then current title holder of the Property or any portion thereof, including any lessees and those persons or entities authorized to act on the title holder's behalf.

"Part 111" means Part 111, Hazardous Waste Management, of the NREPA in effect at the time of the recording of this Restrictive Covenant.

All other terms used in this document which are defined in Part 111 of the NREPA and the Part 111 Administrative Rules, or Part 201 of the NREPA and the Part 201 Administrative Rules solely to the extent not inconsistent with the definitions in Part 111 or the Part 111 Administrative Rules, shall have the same meaning in this document as in those statutes and rules as on the date this Restrictive Covenant is made.

NOW THEREFORE,

Declaration of Land Use or Resource Use Restrictions

The Grantor hereby declares and covenants that the Property shall be subject to those restrictions on use described below and intends that said restrictions and covenants shall run with the land, and may be enforced in perpetuity against the Owner by the following entities: (1) the Grantor, if it is no longer Owner; (2) Tecumseh Products Company, its successors and assigns; (3) MDEQ; and (4) USEPA.

1. Land Use Prohibitions. Owner shall prohibit all uses of the Property that are not compatible or consistent with the exposure assumptions for the nonresidential cleanup criteria. Uses that are compatible with nonresidential cleanup criteria are generally described in the Description of Allowable Uses, attached hereto as Exhibit 4.

2. Activities Prohibited. Owner shall prohibit activities on the Property that may result in exposures above cleanup levels established in the Final Decision. These prohibited activities include:

- a. No drinking water wells may be installed or used on the Property.
- b. No groundwater extraction wells may be installed or used on the Property except for wells and devices that are part of an MDEQ or USEPA approved corrective measure, and for short-term dewatering for construction purposes, provided the dewatering, including management and disposal of groundwater, is conducted in accordance with all applicable environmental laws and does not cause or result in a new release, exacerbation of any pre-existing environmental condition, or any other violation of environmental laws.
- c. No contaminated soils, if any are present, may be relocated on the Property except as provided under Part 201, Section 20120c, MCL 324.20120c.
- d. Owner shall not "treat," "store," "dispose" or release any Hazardous Substances, on, at, or below the Property, in a manner that would require a permit under RCRA, 42 U.S.C. §§ 6901 et seq. or equivalent state law, except pursuant to a plan or permit approved in writing by MDEQ or USEPA.
- f. The areas depicted as Areas Requiring Soil Management Plans contain hazardous substances in soil above the volatilization to ambient air criteria and above other Part 201 nonresidential cleanup criteria and screening levels. Owner shall not excavate or disturb the soils depicted as Areas Requiring Soil Management Plans on the attached Exhibit 2 without a soils management plan approved in writing by USEPA, and a copy supplied to Grantee Tecumseh Products for its approval which shall not be unreasonably withheld, delayed or conditioned as long as it is consistent with this Restrictive Covenant.

- g. The Owner will not remove any slabs, pavement or other impervious surface on the Property if required for effective operation of the Groundwater Treatment Systems or SVE Systems. If Owner elects to remove any other slabs, pavement or other imperious surface on the Property, Owner will be responsible for any and all obligations under environmental laws arising from any such removal, alteration or disturbance, whether or not caused by, arising from or related to, an environmental condition.

3. Owner shall prohibit activities on the Property that may interfere with any element of the Final Decision, including prohibiting activities that may interfere with the performance of operation and maintenance activities, monitoring, or other measures necessary to ensure the effectiveness and integrity of the Final Decision; including but not limited to:

- a. Activities on the Property that interfere with the use, operation or maintenance of the Groundwater Treatment Systems or SVE Systems at the site, the approximate locations of which are depicted on Exhibit 2, except in strict accordance with the following:
 - i. If Owner's activities at the Property will impact the use, operation or maintenance of any aspect of a Groundwater Treatment System or SVE System, then Owner shall provide prior written notice to USEPA and Tecumseh Products, asking for consent to perform such work, and describing in detail the manner in which Owner will, replace or relocate the Groundwater Treatment System or SVE System, or the affected components thereof, to ensure equivalent operation.
 - ii. No such work shall proceed without the express prior written consent of USEPA, and a copy supplied to Grantee Tecumseh Products for its approval which shall not be unreasonably withheld, delayed or conditioned as long as the work will not impact the effectiveness of the Groundwater Treatment System or SVE System.
 - iii. If Tecumseh Products changes the final locations of the SVE Systems depicted on Exhibit 2, after consultation with USEPA, then Tecumseh Products shall depict the final location of such SVE Systems on a Figure and deliver it to the Owner with a cover letter requesting Owner's written consent, which shall not be unreasonably withheld, conditioned, or delayed, and shall be deemed given if Owner does not respond in writing within 30 days of receipt. A copy of such cover letter and Figure, and any written consent, shall be provided concurrently to USEPA and MDEQ. Upon installation of such SVE Systems, they shall be subject to the restrictions set forth in this Section 3. If required by USEPA or MDEQ, , the Figure shall be recorded with the Lenawee County Register of Deeds as an Amendment to the Declaration by either the Owner or Grantee Tecumseh Products Company, with the express written permission of the Owner.

- b. Owner shall prohibit the installation of storm water detention basins on the Property that are unlined or have the potential for infiltration that may alter groundwater flow and migration of hazardous substances at the Property.
4. Soil Vapor Management. Owner shall not build or occupy any building on the Property without first completing Option 1 or Option 2, below:
- a. Option 1: Evaluate and determine in accordance with applicable environmental laws, rules, or regulations that no unacceptable vapor intrusion risks to human health exist in any existing or newly constructed site buildings; or
 - b. Option 2: In accordance with its Due Care obligations under Part 201 of NREPA, the Owner shall install, operate and maintain a vapor barrier and/or mitigation system designed to eliminate the potential for subsurface vapor phase hazardous substances to migrate into any building at concentrations greater than applicable criteria. This prohibition does not apply to short-term occupancy of a building for purposes of construction, renovation, repair, or other short-term activity as long as adequate health and safety precautions are employed during these activities, and they are performed in compliance with Section 20107a of NREPA.
 - i. If Option 2 above is selected, the Owner shall install and thereafter maintain a vapor barrier and/or install and thereafter operate and maintain a vapor intrusion mitigation system in accordance with applicable standards and criteria at the time, for the purposes of mitigating the potential intrusion of soil vapor beneath any human-occupied building constructed on the Property after the date of this Restrictive Covenant until it is determined that a vapor barrier or mitigation system is no longer necessary, consistent with the criteria described under Option 1, above.
5. Permanent Markers. [intentionally deleted].
6. Monitoring Locations. Owner shall not remove, disturb or damage any monitoring wells or soil gas monitoring points on the Property, in the approximate locations depicted on Exhibit 2, except in strict accordance with the following:
- a. If Owner's activities at the Property will impact the use, operation or maintenance of any monitoring well or soil gas monitoring point, then Owner shall provide prior written notice to USEPA and Tecumseh Products, asking for consent to perform such work, and describing in detail the manner in which Owner will, at its sole cost and expense, replace or relocate the monitoring well or soil gas monitoring point to ensure equivalent operation.
 - b. No such work shall proceed without the express prior written consent of USEPA and Tecumseh Products, which may include such terms and conditions as are reasonably deemed necessary by USEPA and Tecumseh Products to ensure such equivalent operation.



c. If Tecumseh Products is required, after consultation with USEPA, to install additional monitoring wells pursuant to the Administrative Order on Consent (RCRA-05-2010-0012), then Tecumseh Products shall depict the location of any such well(s) on a Figure and deliver it to Owner with a cover letter requesting Owner's written consent, which shall not be unreasonably withheld, conditioned, or delayed, and shall be deemed given if Owner does not respond in writing within 30 days of receipt. A copy of such cover letter and Figure, and any written consent, shall be provided concurrently to USEPA and MDEQ. Upon installation of such additional well(s), they shall be subject to the restrictions set forth in this Section 6. If required by USEPA or MDEQ, the Figure shall be recorded with the Lenawee County Register of Deeds as an Amendment to the Declaration by either the Owner or Grantee Tecumseh Products Company, with the express written permission of the Owner.

7. Contaminated Soil Management. Owner shall manage contaminated soils, media and/or debris and all other soils located on the Property in accordance with the requirements of Part 111, RCRA Subtitle C, the administrative rules promulgated pursuant to Part 111 and the RCRA, and all other relevant state and federal laws, including, but not limited to, MCL 324.20120c. This includes if the Owner elects to remove any slabs, pavement or other impervious surface on the Property.

8. Management of Existing Slabs and Impervious Surfaces

a. At all times, including if Owner elects to remove any slabs, pavement or other impervious surface on the Property, Owner shall be responsible for Owner's obligations pursuant to Section 107a of Part 201 of the Michigan Natural Resources and Environmental Protection Act (MCL 324.20107a) and Owner's obligations under §§101(40)(C - G) and §§107(q)(A)(iii - viii) of the federal Comprehensive Environmental Response, Compensation, and Liability Act (42 USC 9601(40)(C - G); 42 USC 9607(q)(A)(iii - viii)).

b. If Owner elects to remove any slabs, pavement, or other impervious surface on the Property from the locations shown on Exhibit 2, Owner will replace the impervious surface with a comparable impervious surface or engineered barrier designed to prevent rainwater infiltration, except to the extent USEPA has determined, in writing to Grantor and Grantees, that such replacement is unnecessary.

9. Access. Owner (as such term is defined on page 3 of this Declaration) shall grant to the Grantees the right to enter the Property at reasonable times for the purpose of determining and monitoring compliance with the Final Decision and this Restrictive Covenant, including the right to take samples, inspect the operation of the corrective measures, inspect any records relating thereto, and to perform any actions necessary to maintain compliance with the Part 111 and the Final Decision.

10. Transfer of Interest. The Grantor shall provide notice at the address provided in this document to the Grantees of the Grantor's intent to transfer any interest in the Property, or any portion thereof, at least fourteen (14) business days prior to consummating the conveyance. A

conveyance of title, easement, or other interest in the Property shall not be consummated by the Grantor without adequate and complete provision for compliance with the terms and conditions of this Restrictive Covenant. The Grantor shall include in any instrument conveying any interest in any portion of the Property, including, but not limited to, deeds, leases, and mortgages, a notice which is in substantially the following form:

NOTICE: THE INTEREST CONVEYED HEREBY IS SUBJECT TO A DECLARATION OF RESTRICTIVE COVENANT DATED _____ AND RECORDED WITH THE _____ COUNTY REGISTER OF DEEDS, LIBER _____, PAGE _____.

A copy of this Restrictive Covenant shall be provided to all future owners, heirs, successors, lessees, easement holders, assigns, and transferees by the person transferring the interest.

11. Notices. Any notice, demand, request, consent, approval, or communication that is required to be made or obtained under this Restrictive Covenant shall be made in writing, shall include a statement that the notice is being made pursuant to the requirements of this Restrictive Covenant, shall include the Michigan facility identification number, MID 005-049-440, and MDEQ Reference No. RC-OWMRP-111-16-005 and shall be served either personally, or sent via first class mail, postage prepaid, to Grantees at the addresses below:

For U.S. EPA: 77 W. Jackson Boulevard
Chicago, IL 60604-3590

For MDEQ: Chief, Hazardous Waste Section
Office of Waste Management and Radiological Protection
Michigan Department of Environmental Quality
P.O. Box 30241
Lansing, MI 48909-7741

12. Term. This Restrictive Covenant shall run with the Property and shall be binding on Owner, and all current and future successors, lessees, easement holders, their assigns, and their authorized agents, employees, or persons acting under their direction and control. This Restrictive Covenant may only be modified or rescinded with the written approval of Grantees.

13. Enforcement. The Grantor is entitled to enforce the restrictions and covenants of this Restrictive Covenant by specific performance or other legal action in a court of competent jurisdiction against subsequent Owners of all or part of the Property. The Grantor, on behalf of itself, and its successors in title, intends and agrees that Grantees are entitled to enforce the restrictions and covenants in this Restrictive Covenant by specific performance or other legal action in a court of competent jurisdiction against the Grantor, as Owner, and thereafter against subsequent Owners of all or part of the Property. All remedies available hereunder shall be in addition to any and all other remedies at law or equity.

14. Modification/Release/Rescission. The Grantor or Owner may request in writing to the Grantees, at the addresses provided herein, modifications to, or release or rescission of, this Restrictive Covenant. This Restrictive Covenant may be modified, released or rescinded only

with the written approval of the Grantees. Any approved modification to, or release or rescission of, this Restrictive Covenant shall be filed with the appropriate Register of Deeds by the Grantor or Owner and a certified copy shall be delivered to the MDEQ, Tecumseh Products, and USEPA, at the addresses provided herein.

15. Severability. If any provision of this Restrictive Covenant is held to be invalid by a court of competent jurisdiction, the invalidity of such provision shall not affect the validity of any other provisions of this Restrictive Covenant and all other provisions shall continue to remain in full force and effect.

16. Authority to Execute Restrictive Covenant. The undersigned person executing this Restrictive Covenant is the Owner and represents and certifies that he is duly authorized and has been empowered to execute and deliver this Restrictive Covenant.

IN WITNESS WHEREOF, 100 E. Patterson, LLC has caused this Restrictive Covenant, MDEQ Reference Number RC-OWMRP-111-16-005 to be executed on this 16 day of ~~August~~ ^{September}, 2016.

100 E. Patterson, LLC, a Michigan limited liability company, Grantor

By: [Signature]
Jason Miller

Its: _____
Managing Member

STATE OF Michigan

COUNTY OF Monroe

The foregoing instrument was acknowledged before me this 16 day of ~~August~~ ^{September}, 2016, by Jason Miller, the Managing Member of 100 E. Patterson, LLC, a Michigan limited liability company, on behalf of the company.

IN TESTIMONY WHEREOF, I have hereunto set my hand and seal at Monroe County, MI, this 16 day of ~~August~~ ^{September}, 2016.

[Signature]
Rachel Lloyd
Notary Public
My Commission Expires: 10-14-19

RACHEL LLOYD
NOTARY PUBLIC - STATE OF MICHIGAN
COUNTY OF MONROE
My Commission Expires October 14, 2019
Acting in the County of Monroe

LIBER 2533 PAGE 0341 9 of 18

Drafted By and When Recorded Return To:

Douglas G. McClure
Conlin, McKenney & Philbrick, P.C.
350 South Main Street, Suite 400
Ann Arbor, MI 48104


LIBER 2533 PAGE 0341 10 of 18

EXHIBIT 1
LEGAL DESCRIPTION OF PROPERTY

Real property situated in the City of Tecumseh, County of Lenawee, Michigan, described as follows:

Parcel 1

A parcel of land located in the Southwest ¼ of Section 34, Town 5 South, Range 4 East, City of Tecumseh, Lenawee County, Michigan and being a part of Lot 24 of "Assessor's Plat No. 6" City of Tecumseh as recorded in Liber 14, pages 15 through 17 in the Office of the Register of Deeds for Lenawee County, Michigan and being further described as: Beginning at the Southwest Corner of said Lot 24; thence North 00 degrees 21 minutes 54 seconds East, 959.73 feet (recorded as North 00 degrees 17 minutes East) along the West line of said Lot 24; thence North 89 degrees 21 minutes 43 seconds West, 25.00 feet; thence North 00 degrees 21 minutes 17 seconds East, 745.43 feet (recorded as North 00 degrees 17 minutes East) along the West line of said Lot 24 and its extension Southerly, to the Northwest Corner of said Lot 24; thence South 89 degrees 33 minutes 12 seconds East, 385.12 feet (recorded as South 89 degrees 37 minutes East, 384.8 feet) along the South line of Patterson Street; thence South 00 degrees 01 minutes 27 seconds East, 8.40 feet (recorded as South 00 degrees 02 minutes West, 8.4 feet) along said South line; thence North 89 degrees 40 minutes 52 seconds East, 896.23 feet (recorded as South 89 degrees 46 minutes East, 897.18 feet) along said South line to the Northeast Corner of said Lot 24; thence South 00 degrees 19 minutes 41 seconds West, 1526.83 feet (recorded as South 00 degrees 18 minutes West) along the West line of Maumee Street to the South line of said Lot 24; thence North 89 degrees 28 minutes 33 seconds West, 598.80 feet (recorded as North 89 degrees 34 minutes West) along said South line to the Northwest Corner of Lot 26 of said "Assessor's Plat No. 6" City of Tecumseh; thence South 00 degrees 42 minutes 29 seconds West, 178.06 (recorded as South 00 degrees 21 minutes West) along the West line of said Lot 24 to the Northeast Corner of Lot 25 of said "Assessor's Plat No. 6" City of Tecumseh; thence North 89 degrees 05 minutes 50 seconds West, 657.42 feet (recorded as North 89 degrees 05 minutes West, 657.3 feet) along the South line of said Lot 24 to the point of beginning.

All bearings are derived from the bearing of the South line of Lot 24 of "Assessors Plat No. 6" City of Tecumseh as bearing North 89 degrees 04 minutes 00 seconds West as shown on the recorded plat, and KEBS, Inc. drawing of Job No. 05-B-76298.

All of the above described land also being described as follows:

Parcel "A"

Part of Lot 24 of Assessor's Plat No. 6 City of Tecumseh being part of the Southwest ¼ of Section 34, Town 5 South, Range 4 East, City of Tecumseh, Lenawee County, Michigan described as beginning at the Southwest corner of Lot 24 of "Assessor's Plat No. 6"; thence N 00 deg. 17' 00" E along the West line of said Lot 24 a distance of 959.53 feet (recorded as N 00 deg. 17' E 959.73 feet); thence N 89 deg. 03' 58" W a distance of 24.84 feet (recorded as N 89 deg. 21' 43" W 25 feet); thence N 00 deg. 15' 47" E a distance of 744.78 feet (recorded as N 00 deg. 17' E 745.43 feet) to a chiseled "X" at the South Right of Way line of Patterson Street; thence S 89 deg. 45' 16" E along the

South Right of Way line of Patterson Street a distance of 385.13 feet (recorded as S 89 deg. 37' E 384.8 feet) to a found nail; thence S 00 deg. 10' 05" E a distance of 8.38 feet (recorded as S 00 deg. 01' 27" E 8.4 feet) to a chiseled "X"; thence S 89 deg. 34' 16" E along the South Right of Way line of Patterson Street a distance of 896.18 feet (recorded as S 89 deg. 46' E 897.18 feet); thence S 00 deg. 14' 44" W a distance of 1,524.10 feet (recorded as S 00 deg. 18' W 1526.83 feet); thence N 89 deg. 33' 09" W a distance of 598.85 feet (recorded as N 89 deg. 34' W 598.80 feet); thence S 00 deg. 36' 36" W a distance of 178.08 feet (recorded as S 00 deg. 21' W 177.7 feet); thence N 89 deg. 10' 17" W a distance of 657.45 feet (recorded N 89 deg. 05' W 657.3 feet) to the Point of Beginning.

Contains 2,052,326 square feet or 47.114 acres. Subject to any easements, restrictions, and Rights of Way of record if any.

100 E. Patterson St., Tecumseh, MI 49286
Tax I.D. No.: 325-0241 -00 (as to Parcels I & 2)

Parcel 2

Situated in the City (formerly Township) of Tecumseh, County of Lenawee, Michigan, to wit:

All that part of the Southwest Quarter (1/4) of Section Thirty-four (34) in Town Five (5) South, Range Four (4) East, described as commencing in the center of highway at a point located Fifty-seven and five tenths (57.5) feet South Eighty-eight (88) degrees Forty-five (45) minutes East from the Southwest corner of said Section Thirty-four (34) and running thence North No (0) degrees Forty-one (41) minutes East and along the East line of land now, or formerly, owned by the New York Central Railroad Company Eight hundred forty and six tenths (840.6) feet, thence South Eighty-eight (88) degrees Forty-five (45) minutes East Six hundred fifty-seven and four tenths (657.4) feet, thence South No (0) degrees Forty-five (45) minutes West Eight hundred forty and six tenths (840.6) feet to the center of highway, thence North Eighty-eight (88) degrees Forty-five (45) minutes West Six hundred fifty-six and eight tenths (656.8) feet to the place of beginning, except the northerly One hundred seventy-seven and seven tenths (177.7) feet thereof as described in Liber 398 at Folio 146, containing Ten (10) acres of land more or less.

SAVE AND EXCEPT:

Situated in the City of Tecumseh, County of Lenawee, Michigan:

All that part of the Southwest 1/4 of Section 34, Town 5 South, Range 4 East, (also being part of Lot 25, Assessor's Plat No. 6, City of Tecumseh, as recorded in Liber 14 of Plats on Page 15, 16 and 17, Lenawee County Records) described as beginning 464.03 feet S 89 deg. 04' 00" E (along the south line of said Section 34) and 283.00 feet N 00 deg. 21' 00" E from the Southwest corner of Section 34 aforesaid; thence N 00 deg. 21' 00" E 176.00 feet; thence S 89 deg. 04' 00" E 250.00 feet; thence S 00 deg. 21' 00" W 176.00 feet along the east line of said Lot 25; thence N 89 deg. 04' 00" W 250.00 feet to the place of beginning. Containing 1.01 acres.

SAVE AND EXCEPT:

Situated in the City of Tecumseh, County of Lenawee, Michigan:

All that part of the Southwest ¼ of Section 34, Town 5 South, Range 4 East, (also being part of Lot 25, Assessor's Plat No. 6, City of Tecumseh, as recorded in Liber 14 of Plats, Pages 15, 16 and 17, Lenawee County Records), described as beginning at the Southwest corner of Lot 25, aforesaid, 57.36 feet (recorded as 57.3 feet) South 89 deg. 04' 00" East (along the South line of said Section 34) and 33.00 feet North 00 deg. 17' 00" East from the Southwest corner of said Section 34; thence North 00 deg. 17' 00" East 426.00 feet along the West line of said Lot 25; thence South 89 deg. 04' 00" East 326.97 feet; thence South 00 deg. 17' 00" West 176.00 feet; thence North 89 deg. 04' 00" West 120.00 feet; thence South 00 deg. 21' 00" West 250.00 feet to the South line of said Lot 25; thence North 89 deg. 04' 00" West 206.68 feet to the point of beginning.

SAVE AND EXCEPT:

Situated in the City of Tecumseh County of Lenawee, Michigan, to-wit:

All that part of the Southwest ¼ of Section 34, Town 5 South, Range 4 East, (Also being part of Lot 25, Assessor's Plat No. 6, City of Tecumseh, as recorded in Liber 14 of Plats on Pages 15, 16 and 17, Lenawee County Records), described as beginning on the south line of Lot 25 aforesaid 464.03 feet S 89 deg. 04' 00" E (along the south line of said Section 34) and 33.00 feet N 00 deg. 21' 00" E from the Southwest corner of Section 34 aforesaid; thence N 00 deg. 21' 00" E 250.00 feet; thence S 89 deg. 04' 00" 250.00 feet to the east line of said Lot 25; thence S 00 deg. 21' 00" W 250.00 feet to the southeast corner of said Lot 25; thence N 89 deg. 04' 00" W 250.00 feet to the place of beginning containing 1.435 acres.

Subject to easements and restrictions of record.

The bearings are referenced to the Assessor's Plat No. 6, as recorded in Liber 14 of Plats, Pages 15, 16 and 17, Lenawee County Records.

SAVE AND EXCEPT:

Situated in the City of Tecumseh, County of Lenawee, Michigan, to-wit:

All that part of the Southwest ¼ of Section 34, Town 5 South, Range 4 East, (Also being part of Lot 25, Assessor's Plat No. 6, City of Tecumseh, as recorded in Liber 14 of Plats on Pages 15, 16 and 17, Lenawee County Records), described as beginning on the south line of Lot 25 aforesaid 264.03 feet S 89 deg. 04' 00" E (along the south line of said Section 34) and 33.00 feet N 00 deg. E from the Southwest corner of Section 34 aforesaid; thence N 00 deg. 21' 00" E 250.00 feet; thence S 89 deg. 04' 00" 200.00 feet; thence S 00 deg. 21' 00" W 250.00 feet to the south line of said Lot 25; thence N 89 deg. 04' 00" W 200.00 feet to the place of beginning containing 1.148 acres.

The bearings are referenced to the Assessor's Plat No. 6, as recorded in Liber 14 of Plats, Pages 15, 16 and 17, Lenawee County Records,

805 S. Evans St., Tecumseh, MI 49286
Tax ID. No.: 325-0250-00 (as to Parcel 3) Vacant Land



LIBER 2533 PAGE 0341 14 of 18

EXHIBIT 2
LEGAL DESCRIPTION AND SURVEY OF RESTRICTED AREAS OF THE
PROPERTY


LIBER 2533 PAGE 0341 15 of 18

Exhibit 3
List of Hazardous Substances above Screening Criteria in Soil or
Groundwater

Hazardous Substance	CAS Number	Screening Criteria
Soil		
1,1-Dichloroethene	75354	330 ug/kg
cis-1,2-Dichloroethene	156592	1,200 ug/kg
Ethylbenzene	100414	360 ug/kg
2-Methyl-naphthalene	91576	4,200 ug/kg
Naphthalene	91203	730 ug/kg
Tetrachloroethene	127184	1,200 ug/kg
1,1,1-Trichloroethane	71556	1,800 ug/kg
Trichloroethene	79016	1,900 ug/kg
1,2,4-Trimethyl-benzene	95636	570 ug/kg
1,3,5-Trimethyl-benzene	108678	1,100 ug/kg
Vinyl Chloride	75014	260 ug/kg
Total Xylenes	1330207	828 ug/kg
Arsenic	7440382	5,800 ug/kg
Cadmium	7440439	6,000 ug/kg
Groundwater		
Benzene	71432	5 ug/l
1,1-Dichloroethene	75354	7 ug/l
1,4-dioxane	123911	85 ug/L
cis-1,2-Dichloroethene	156592	70 ug/l
trans-1,2-Dichloroethene	156605	100 ug/l
Tetrachloroethene	127184	5 ug/l
1,1,1-Trichloroethane	71556	89 ug/l
1,1,2-Trichloroethane	79005	5 ug/l
Trichloroethene	79016	5 ug/l
1,2,4-Trimethyl-benzene	95636	17 ug/l
Vinyl Chloride	75014	2 ug/l
Lead	7439921	4 ug/L

Notes:

1. Most conservative screening level is identified. This screening level may not be relevant based on pathway evaluation.



EXHIBIT 4
DESCRIPTION OF ALLOWABLE USES

Nonresidential Land Use: This land use is characterized by any use which is not residential in nature and is primarily characterized by industrial and commercial uses. Industrial uses typically involve manufacturing operations engaged in processing and manufacturing of materials or products. Other examples of industrial uses are utility companies, industrial research and development, and petroleum bulk storage. Commercial uses include any business or income-producing use, such as commercial warehouses, lumber yards, retail gas stations, auto dealerships and service stations, as well as, office buildings, banks, and medical/dental offices (not including hospitals). Commercial uses also include retail businesses whose principal activity is the sale of food or merchandise within an enclosed building and personal service establishments which perform services indoors, such as health clubs, barber/beauty salons, photographic studios, etc.

Any residential use is specifically prohibited from the non-residential land use category. This would include the primary use of the Property for human habitation and includes structures such as single family dwellings, multiple family structures, mobile homes, condominiums, and apartment buildings. Any uses which are intended to house, educate, or provide care for children, the elderly, the infirm, or other sensitive populations, and therefore could include day care centers, educational facilities, hospitals, elder care facilities, and nursing homes, may not fit the nonresidential exposure assumptions. Residential or site specific environmental protection standards may need to be considered. The use of any accessory building or portion of an existing building as a dwelling unit permitted for a proprietor or storekeeper and their families, located in the same building as their place of occupation, or for a watchman or caretaker is also prohibited. Any authority that allows for residential use of the Property as a legal non-conforming use is also restricted per the prohibitions contained in this restrictive covenant.


LIBER 2533 PAGE 0341 18 of 18



ORDINANCE #4-11

GROUNDWATER USE ORDINANCE

Regular meeting of the City Council of the City of Tecumseh, County of Lenawee, and State of Michigan, held the 6th day of June 2011 at 7:30 p.m. in Council Chambers at 309 E. Chicago Boulevard, Tecumseh, Michigan 49286.

PRESENT: Mayor Johnson, Council members Baker, Housekeeper, Naugle, VanAlstine, Wimple and Wright.

ABSENT: None.

AN ORDINANCE TO AMEND CHAPTER 82 UTILITIES ARTICLE IV. WATER SUPPLY SYSTEM OF THE TECUMSEH CITY CODE OF ORDINANCES TO PROHIBIT PRIVATE WATER WELLS WITHIN THE CITY OF TECUMSEH CITY, REQUIRE CONNECTION TO THE MUNICIPAL WATER SYSTEM WHEN SERVICE IS WITHIN 250 FEET, PROVIDE EXCEPTIONS FOR CURRENT WATER WELLS AND PROVIDE PENALTIES FOR VIOLATIONS.

THE CITY OF TECUMSEH ORDAINS:

1. Article IV. City Water Utility Section 82-120 shall be added to read as follows:

Sections 82-120. Private Water Wells

- (1) Definitions. The following definitions shall apply in the interpretation of this Section:
 - (a) "Applicant" means a person who is applying under Section 13 of this Ordinance for an addition or modification to a restricted zone.
 - (b) "Construction site dewatering" means temporary removal of ground water from an excavating site.
 - (c) "Owner" means the person holding the legal or equitable title to real property or a lesser estate therein, a mortgagee or vendee in possession, an assignee of rents, receiver, executor, trustee, lessee or any other person, firm or corporation directly or indirectly in control of a building, structure or real property or his duly authorized agent.
 - (d) "Person" means any individual, partnership, corporation, limited liability company, association, organization or other legal entity.
 - (e) "City" means the City of Tecumseh.
 - (f) "City water service" means the water supplied by the City of Tecumseh.

c-4-11

3200 ✓ City of Tecumseh - Attn Amanda

- (g) "Water well" means a hole drilled or bored into the earth for the purpose of removing water through mechanical or non-mechanical means.
 - (h) "Restricted zone" is the area depicted on Figure I, prepared by RMT and dated March 2010, which accompanies this Ordinance, and any other areas so designated pursuant to Section 13 of this Ordinance.
- (2) Purpose. The purpose of this Ordinance is to protect public health, safety and welfare by preventing public exposure to an area of likely or known groundwater contamination.
- (3) Private Water Wells Prohibited. Except as provided in Subsection (4), no person shall install, construct, develop, maintain or use a water well within a restricted zone.
- (4) Permitted Water Wells. The following water wells are not prohibited by this Ordinance:
- (a) A water well used solely for the purpose of construction site dewatering or for conducting response activities, including sampling or treatment of the groundwater, provided that: (i) prior notice of the well is given to the City Manager, (ii) the Owner has demonstrated to the City Manager's satisfaction that the use of the well will not result in exposure to contaminated groundwater, possible cross-contamination between zones of groundwater, or hydrogeological effects on contaminated groundwater plumes, and (iii) the water generated by the well is properly handled and disposed of in compliance with all applicable laws, rules, regulations, permit and license requirements, orders and directives of any governmental entity or agency of competent jurisdiction.
 - (b) Municipal wells operated by the City for its municipal water supply, provided such wells are subject to groundwater monitoring under the oversight of the Michigan Department of Natural Resources and Environment Drinking Water and Radiological Protection Division, and/or its successor agency or designee, in accordance with Act 399 of 1976, The Michigan Safe Drinking Water Act, and applicable Administrative Rules promulgated thereunder.
 - (c) A geothermal type well for non-contact heating, cooling or processing activities, provided the well is a closed-loop design which does not allow fluid in the coils to be in direct contact with the subsurface, and further provided that Owner has demonstrated to the City Manager's satisfaction that the closed loop system and associated wells will not penetrate a confining clay layer and will be constructed and grouted in accordance with relevant construction criteria.

- (5) Large Capacity Wells. No well may be installed or used at any place in the City if its use will cause the migration of contaminated groundwater into previously unaffected groundwater, or will adversely affect any groundwater treatment system, unless the well is part of an MDEQ or US EPA approved groundwater monitoring or remediation system.
- (6) Connection to City Water Service Required. The owner of any house, building, or property used for human occupancy, employment, recreation, or other purposes situated within the restricted zone or who is prohibited from installing a well by Section 3(b) of this Ordinance, is hereby required at his or her expense to install suitable plumbing facilities therein, in accordance with the plumbing codes then in effect and enforced within the City and to connect such facilities directly with the City water service in accordance with the requirements of the City of Tecumseh City Code of Ordinances.
- (7) Existing Wells. Any existing well, the use of which is prohibited by Section 3(a), except as permitted under Section 4, shall be plugged or abandoned in conformance with Rules established by the Michigan Department of Environmental Quality ("MDEQ") and applicable Lenawee County Ordinance and Regulation.
- (8) Violations. Any person who violates any provision of this Section shall be responsible for a municipal civil infraction as defined in Public Act 12 of 1994, amending Public Act 236 of 1961, being Sections 600.101-600-9939 of Michigan Compiled Laws, and shall be subject to a fine of not more than Five Hundred and 00/100 (\$500.00) Dollars. Each day this Section is violated shall be considered a separate violation.
- (9) Enforcement Officials. The City Manager is authorized to issue municipal civil infraction citations.
- (10) Nuisance Per Se. A violation of this Section is hereby declared to be a nuisance per se and is declared to be offensive to the public health, safety and welfare.
- (11) Civil Remedies. In addition to enforcing this Section through the use of a municipal civil infraction proceeding, the City may initiate proceedings in the Circuit Courts to abate or eliminate the nuisance per se or any other violation of this Section.
- (12) Severability. If any provision of this Section or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect any remaining portion or application of this Section which can be given effect without the invalid portion or application.
- (13) Amendments. The City shall notify the MDEQ at least thirty (30) days prior to adopting a modification to this Ordinance or the lapsing or

revocation thereof, including any modification to add to or remove property from a restricted zone.

(14) Additions or Modifications to Restricted Zone.

(a) Removing Property from Restricted Zone.

(i) An owner of property located in the City within a restricted zone may apply to the City to remove property from the restricted zone upon a demonstration that such property need not be included in the restricted zone because of improved conditions in the affected groundwater.

(ii) The Application must include the MDEQ's written and specific concurrence with the requested action, as well as all documentation on which MDEQ based its concurrence.

(iii) The Application must be accompanied by payment of an application fee established by resolution of the City Council, intended to cover the City's anticipated out-of-pocket expenses to review and respond to the Application.

(b) Adding Property to or Establishing a Restricted Zone.

(i) Property may be added to a restricted zone or a new restricted zone established on a case-by-case basis following the procedures set forth in this section. An Applicant shall file an Application with the City to add property to a restricted zone or establish a new restricted zone. The Applicant shall include a fee established by resolution of the Council, intended to cover the City's anticipated out-of-pocket expenses to review and respond to the Application. The Application shall describe the proposed location to be added, and the nature of the proposed use restrictions.

(ii) The Applicant shall include all documentation submitted to the MDEQ, along with a written statement from a MDEQ representative with approval authority stating that the proposed restricted zone and use regulations have received MDEQ approval as part of the response actions for groundwater contamination.

(iii) The Applicant shall include notices provided to the Lenawee County Health Department concerning the property, and the Health Department's written acknowledgment that it will not issue permits for prohibited wells within the property to be added to the restricted zone.


LIBER 2532 PAGE 0965 4 of 7

(c) Council Action.

(i) Once the City Manager or his or her designee is satisfied that a restricted zone application is complete, the City Manager shall place the matter on the City Council agenda for a public hearing.

(ii) After the City Council sets the public hearing, the City Manager or his or her designee shall cause a written notice of the hearing to be sent by first class mail to all persons having an interest as owner, tenant, easement holder or mortgagee in any property included in the Application. The notice shall describe the Application and identify its main features and potential impact on the recipients. The notice shall be mailed at least ten (10) days, but not more than twenty (20) days, prior to the date of the hearing. The notice shall also be mailed to the appropriate MDEQ representatives.

(iii) After the public hearing, the City Council shall act on the application within thirty (30) days, unless it determines that it needs more information before it can decide. In that case, it shall act on the application within thirty (30) days after it has received the additional information.

(iv) Within 10 days of City Council action modifying the restricted zone, the Applicant shall cause a notice of the City Council action to be recorded with the Lenawee County Register of Deeds, in a form approved by the City, and recorded in a manner designed to insure that it serves as record notice of the City Council action with respect to all affected premises within the restricted zone.

(v) Within 30 days of recording the notice, Applicant shall provide the City Clerk, the Lenawee County Health Department, and the MDEQ with copies of the recorded notice.

2. Effective Date and Recording. This ordinance shall be effective upon publication. This ordinance shall be filed with the Lenawee County register of deeds as an ordinance affecting multiple properties. The City shall provide notice to the Lenawee County Health Department containing a copy of this Ordinance.

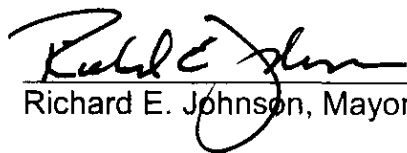
The foregoing Ordinance was offered by Council member Housekeeper,
and supported by Council member VanAlstine.


YES: VanAlstine, Wimple, Wright, Baker, Housekeeper, Johnson and
Naugle.

NO: None.

ORDINANCE DECLARED ADOPTED.

Dated: June 6, 2011


Richard E. Johnson, Mayor


Mary Feight, City Clerk

DRAFTED BY:
MARY FEIGHT
309 E. CHICAGO BLVD.
TECUMSEH, MI. 49286

Unofficial Copy
Do Not Duplicate


LIBER 2532 PAGE 0965 6 of 7

APPENDIX 4

ADMINISTRATIVE RECORD INDEX

FINAL DECISION & RESPONSE TO COMMENTS
TECUMSEH PRODUCTS COMPANY
TECUMSEH, MICHIGAN
EPA ID: MID 005 049 440

U.S. ENVIRONMENTAL PROTECTION AGENCY

**ADMINISTRATIVE RECORD
FOR THE
TECUMSEH PRODUCTS INCORPORATED SITE
TECUMSEH, LENAWEE COUNTY, MICHIGAN**

**FINAL DECISION AND RESPONSE TO COMMENTS
JUNE, 2019
SEMS ID:**

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
1	947664	Undated	-----	-----	CMP Implementation Project Schedule	2
2	947663	Undated	-----	-----	CMP Implementation Project Schedule	2
3	947667	Undated	U.S. EPA	Public	Public Notice - U.S. EPA Proposes to Issue Cleanup Plan	1
4	947669	Undated	Kelly, J., U.S. EPA	Public	Tecumseh Public Meeting Presentation Notes	6
5	947226	8/28/2018	TRC	-----	TRC - Piezometer and Pumping Well Installation Soil Boring Logs and Well Construction Diagrams	10
6	943680	9/18/2018	U.S. EPA	Tecumseh Products	EPA - Statement of Basis	62
7	947670	10/1/2018	-----	-----	Public Contact List - Table 1 (Redacted)	1
8	947661	10/15/2018	Metz, S. and Crockford, G., TRC Environmental Corp.	Kelly, J., U.S. EPA	TRC Third Quarter 2018 Progress Report (Redacted)	214
9	947722	11/5/2018	AKT Peerless	Kelly, J., U.S. EPA	AKT Peerless Memo re: P Building Occupancy	13
10	947668	11/7/2018	Kelly, J., U.S. EPA	Public	EPA Presentation Slides - Statement of Basis for RCRA Corrective Action	18

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
11	947740	12/12/2018	Metz, S. and Crockford, G., TRC Environmental Corp.	Kelly, J., U.S. EPA	TRC Letter re: Tecumseh Products Comments on Statement of Basis	41
12	947717	1/1/2019	AKT Peerless Environmental	Smith, J., Tecumseh Products	AKT Peerless Environmental Email Attachment - TRC Monitoring Well Installation Locations	1
13	947658	1/15/2019	Metz, S. and Crockford, G., TRC Environmental Corp.	Kelly, J., U.S. EPA	TRC Fourth Quarter 2018 Progress Report	366
14	947721	2/21/2019	Kelly, J., U.S. EPA	Metz, S. and Crockford, G., TRC	U.S. EPA Email re: Fourth Quarter 2018 Progress Report	3
15	947710	2/21/2019	Kelly, J., U.S. EPA	Metz, S. and Crockford, G., TRC	U.S. EPA Email re: Fourth Quarter 2018 Progress Report Comments	3
16	947711	2/21/2019	Kelly, J., U.S. EPA	Metz, S., TRC	U.S. EPA Email re: Comments on Statement of Basis	2
17	947712	3/13/2019	Metz, S., TRC	Kelly, J., U.S. EPA	TRC Email re: U.S. EPA Fourth Quarter 2018 Progress Report Review	6
18	947713	4/1/2019	Metz, S. and Crockford, G., TRC	Kelly, J., U.S. EPA	TRC Email re: Comments on Statement of Basis	4
19	947666	4/4/2019	Strandbergh, D., Fibertec Environmental Services	AKT Peerless	Fibertec Environmental Services - Analytical Laboratory Report	47
20	947662	4/15/2019	Metz, S. and Crockford, G., TRC Environmental Corp.	Kelly, J., U.S. EPA	TRC First Quarter 2019 Progress Report (Redacted)	28
21	947727	4/23/2019	AKT Peerless	City of Tecumseh	AKT Peerless Pre-Renovation Asbestos and Hazardous Materials Survey	87

<u>NO.</u>	<u>SEMS ID</u>	<u>DATE</u>	<u>AUTHOR</u>	<u>RECIPIENT</u>	<u>TITLE/DESCRIPTION</u>	<u>PAGES</u>
22	947665	4/30/2019	Strandbergh, D., Fibertec Environmental Services	AKT Peerless	Fibertec Environmental Services - Analytical Laboratory Report	14
23	947718	5/2/2019	AKT Peerless	-----	AKT Peerless Site Map with Sample Locations (Redacted)	1
24	947725	5/2/2019	AKT Peerless	-----	AKT Peerless Topographic Location Map and Site Map with Sample Locations (Redacted)	2
25	947671	5/3/2019	-----	-----	Monthly Conference Notes	2
26	947714	5/7/2019	AKT Peerless	Smith, J., Tecumseh Products	AKT Peerless Email re: Evans and Ottawa Soil Gas Sampling Map and Lab Data	1
27	947720	5/7/2019	Metz, S., TRC	Kelly, J., U.S. EPA	TRC Technical Memo re: Risk Assessment Addendum - Supplemental Seep Water Risk Evaluation	14
28	947672	5/8/2019	Metz, S., TRC	Kelly, J., U.S. EPA	TRC Email re: Notice of Second Quarter 2019 Field Activities and Monitoring Well Installation Locations	2
29	947715	5/8/2019	Kelly, J., U.S. EPA	Metz, S., TRC	U.S. EPA Email re: Notice of Second Quarter 2019 Field Activities	3
30	947716	5/9/2019	Metz, S., TRC	Kelly, J., U.S. EPA	TRC Email re: Evans and Ottawa TPC International Building Soil Gas Data Summary	2
31	947723	5/10/2019	Metz, S. and Crockford, G., TRC	Kelly, J., U.S. EPA	TRC Technical Memo re: Re- evaluation of Soil Treatment Options for Northern Soil Area 2	20